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Sonya Senithia Gaither Shepherd

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THE RELATIONSHIP BETWEEN COMPUTER SKILLS AND THE  
LEVELS OF TECHNOSTRESS AMONG FACULTY AND ACADEMIC  
LIBRARIANS FROM SELECTED INSTITUTIONS WITHIN THE  
UNIVERSITY SYSTEM OF GEORGIA

Sonya Senithia Gaither Shepherd





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LEVELS OF TECHNOSTRESS AMONG FACULTY AND ACADEMIC  
LIBRARIANS FROM SELECTED INSTITUTIONS WITHIN THE  
UNIVERSITY SYSTEM OF GEORGIA

A Dissertation

Presented to  
the College of Graduate Studies of  
Georgia Southern University

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In Partial Fulfillment  
of the Requirements for the Degree  
Doctor of Education  
in  
Educational Administration

---

by  
Sonya Senithia Gaither Shepherd

December 2003



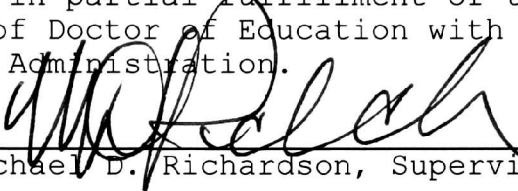
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December 1, 2003

To the Graduate School:

This dissertation entitled "The Relationship Between Computer Skills and the Levels of Technostress Among Faculty and Academic Librarians from Selected Institutions Within the University System of Georgia" and written by Sonya S. Gaither Shepherd is presented to the College of Graduate Studies of Georgia Southern University. I recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Education with a major in Educational Administration.

  
Michael D. Richardson, Supervising Committee Chair

We have reviewed this dissertation and recommend its acceptance:

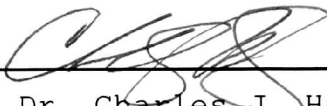
  
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## DEDICATION

In honor and memory of my grandmothers, Mrs. Louise S. Freeman and Mrs. Ernestine A. Gaither, I dedicate this work to you. I did exactly what you told me to do - "Don't Stop... Keep Going, Get It All While You Can..." Thank you for teaching me, loving me, and supporting me. I love you forever and always. And I miss you dearly.

## ACKNOWLEDGMENTS

I could not have made it through the process of writing this dissertation had it not been for my support system: family, friends, co-workers, professors, student assistants, and others who have made contributions to this process. I want to sincerely say "Thank You" to each one of you for your encouraging words, your understanding for all the times when I could not come home or visit you on the weekends, your assistance in finding and/or printing resource materials, your time for typing data files, and other services provided.

- Dr. M. D. Richardson, we began this journey five years ago as strangers and now you are one of my mentors. I appreciate the push and the confidence you had in me to see me through the program.
- Drs. Mia Alexander-Snow, Bryan Griffin, W. Bede Mitchell, and Bob Fernekes, each of you contributed to the success of this dissertation in your own unique way. You gave me insight that will always be valued and remembered.
- VanHubert F. Shepherd and Vanessa, and the Jackson, Gaither, and Shepherd families, thank you for loving and encouraging me, for seeing me through all of my hopes and dreams, and for celebrating all of my accomplishments.
- Lisa Ennis, Georgia College and State University; Dr. Susan May, Fox Valley Technical College; Dr. Richard Hudiburg, University of North Alabama; Dr. Phillip Sleeman, Executive Editor, International Journal of Instructional Media; and Dr. Lawrence Lipsitz, Editor, Educational Technology Magazine, thank you for sending



me copies of your thesis and surveys, and/or for allowing me to reprint material relevant to my topic.

- Zach S. Henderson Library Faculty, Staff, and Student Assistants, you answered my reference questions when I could not, you checked out my books, requested articles we did not own, photocopied articles found in house, fixed my computer, fixed my web pages, photocopied my surveys, stuffed survey packets, mailed my surveys, and continuously asked me how I was doing. I truly appreciate everything. Thank you for all of your assistance and support. It is great working with you as a student and a librarian. You are number one.
- Mrs. Mary Addison, Dr. Linda Blankenbaker, Dr. Gerald Kehr, Dr. Charles Webb, Dr. Catherine Wooddy, and Dr. Rebecca Ziegler, thank you for your time and for agreeing to be pilot participants. Your feedback was very important in finalizing the survey used in the study.
- Ms. Kimberly Chappell-Stevens, Franklin (my godson), Mr. and Mrs. Frank Chappell, and Mr. Vince Thomas and Mrs. Amy McCrory, Demetri and Louise (my godchildren), you hid me, fed me, housed me, and loved me, when I could not get home to my family or when I was technostressed and could not go on. Thank you!!!!
- So many people have asked about my progress throughout this entire phase of my educational career. Words of inspiration, encouragement, and advice have been given and received. The names are so many I dare not try to recall them all but you know who you are and what you have done for me. Please know I greatly appreciate everything you have done and said.

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ABSTRACT

THE RELATIONSHIP BETWEEN COMPUTER SKILLS AND THE LEVELS OF  
TECHNOSTRESS AMONG FACULTY AND ACADEMIC LIBRARIANS FROM  
SELECTED INSTITUTIONS WITHIN THE UNIVERSITY SYSTEM OF  
GEORGIA

DECEMBER 2003

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The struggle to adjust to rapid technological change has increased for the majority of the population, especially those in higher education. Change is an inevitable part of society and each individual handles change differently. Furthermore, technology's effect on society, and in particular on higher education, has been positive and negative. There has been resistance to the increased development and use of technology and this resistance may be dependent upon certain factors such as age, sex, and computer experience.

The intent of this study was to determine if computer skills relate to the levels of technostress among faculty in

the Colleges of Business and Education, and academic librarians. Participants in this study were selected from four University System of Georgia institutions. Participants were given a choice of completing the survey traditionally or on-line. Three hundred twenty seven surveys were completed resulting in a return rate of 32.8%.

Major conclusions from the study included (1) negative weak relationships existing between computer skills and technostress levels among the three participant groups, (2) business faculty reporting the highest computer skills rating even though the results were not statistically significant, (3) although academic librarians reported the most severe levels of technostress, their level of severity did not differ significantly from the severity levels of technostress among the business and education faculty, (4) no statistical differences based on sex, rank, or tenure existed in computer skills levels or the technostress levels between the three participant groups, (5) although not statistically significant, females reported lower technostress levels contrary to the literature reviewed, and (6) causes of and solutions for coping with technostress varied depending on the task and the person completing the task.

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## CHAPTER I

### INTRODUCTION

The creation of computer software and hardware, telecommunications, databases, and the Internet has affected society as a whole, and particularly higher education by giving people new productivity options and changing the way they work (Hulbert, 1998). In the so-called "Information Age" the increasing use of technology has become the driving force in the way people work, learn, and play (Drake, 2000). As this force evolves, the people using technology change also (Nelson, 1990).

Adapting to technology is not simple. Some people tend to embrace change while others resist change (Wolski & Jackson, 1999). Before making a decision on whether to embrace technology or not, people may look at the practical and social consequences of accepting change. Therefore, the technology acceptance model, the accepting or resisting of technology, is considered to be a form of reasoned behavior (Wolski & Jackson).

Technology changes the way people work and learn. As the role of technology is being defined and is constantly being improved, change is inevitable (Davis-Millis, 1998; Brand, 2000). As a result, those involved in higher education have to find ways to adapt to technological

change. Administrators, faculty, academic librarians, and students should define the role of technology for the purposes of (1) sharing new ideas and techniques for teaching and learning; (2) encouraging enthusiasm and innovativeness; and (3) learning about opportunities and challenges, and how to deal with them (Landsberger, 2001).

In fact, college faculty are spending more time with those from the business sector to ensure what is taught in the classroom is applicable in the workforce (Gavert, 1983; Lynton, 1984; Katz, 1999). This collaboration on a curricula that meet education standards and job related skills required in industry is providing opportunities for faculty to remain current in rapidly changing technical disciplines (Gavert; Katz). On the other hand other disciplines such as liberal arts have had less need to adapt as quickly, and perhaps have been more reluctant to change (Miller & Rojewski, 1992).

#### Statement of Problem

The rapid growth in technology over the last three decades has been well documented. Accompanying that growth has been an equally rapid increase in the struggle to keep up with technology. The way services are provided by society and to society (e.g., fast, instantly, remotely) is changing. While virtually all facets of society are affected

by technology, its impact can be clearly seen in the way higher education clientele have been served. Colleges and universities are being changed in multiple and profound ways, ways almost unrecognizable to students, faculty, academic librarians, administrators, and alumni.

The move to the Information Age, with its changes and need for adaptation to technology, has been rapid and stressful for many people. While many people have increased their usage of technology and are comfortable with it, many others still do not use much technology and are not comfortable using it when they must do so. For those who are not amenable to change, who find it difficult to adapt, there are often a variety of responses or results. One type of response is called technostress. Technostress is the inability to adapt to or cope with new computer technologies which reveals itself in one of two ways: (1) computer users struggle to accept the technologies or (2) computer users over-identify with the technology.

Studies relating to technostress have been fairly limited. Those conducted have sought to determine correlations between such variables as personality type, academic performance, self-concept, and why certain faculty decide to use technology while others do not. Study participants have included people from the business



industry, students majoring in business and education, and a limited number of faculty members and librarians. However, there are few studies that look at the severity of stress for various types of computer users (e.g., faculty, staff, administrators, academic librarians) in postsecondary settings.

Because business faculty deal with people in business and industry, it is presumed by the researcher that professors in Colleges of Business Administration are more adept and comfortable using technology than those in other colleges within universities. In order to ensure what is taught in the classroom is applicable in the workforce, college faculty are spending more time with those from the business industry. This partnership is providing opportunities for faculty to remain current in rapidly changing technical disciplines because both are collaborating on curriculum that meet education standards and job related skills required in industry.

Likewise, education faculty are preparing future teachers, counselors, and administrators to go into elementary, middle, and secondary schools. These teacher programs may or may not require their students to obtain and use technological skills. Similarly, there may or may not be an expectation among the education faculty to obtain or

utilize these same skills. Some education faculty and students may only learn and use technology because they wanted to and not because there was an expectation.

University library staff also have had to adapt to a wide variety of technological demands unimaginable just a few years ago (e.g., processing library materials and teaching research skills on-line). Other disciplines such as liberal arts have had less need to adapt as quickly, and perhaps have been more reluctant to change. All, however, are faced with the necessity to change. Therefore, in all likelihood, all professors are experiencing some level of technological stress.

It is the intent of the researcher to explore the relationship between technology skills and the possible causes of technostress among academic librarians, and education and business faculty. The exploration will look at the role, if any, computer skills have on the levels of technostress experienced by academic librarians, and business and education faculty.

#### Research Questions

The proposed study is designed to answer the following research question: Do computer skills relate to the levels of technostress among faculty in the Colleges of Business

and Education, and academic librarians? The following seven related sub-questions will also be addressed in this study:

1. How do the business and education faculty and academic librarians rate their computer skills?
2. At what levels do the business and education faculty and academic librarians experience technostress?
3. Do differences in technostress and computer skills exist among business and education faculty and academic librarians, and if there are differences, do these differences still persist once college unit/affiliation, age, sex, rank, tenure status, and classification status have been considered?
4. Is there a correlation between the self-rated computer skills of the business and education faculty, and academic librarians and the levels of technostress they may experience?
5. Does the correlation between the self-rated computer skills and levels of technostress still exist once college unit/affiliation, age, sex, rank, tenure status, and classification status have been considered?
6. What are the possible causes identified by business faculty, education faculty, and academic librarians in higher education when they experience technostress?

7. How do the business faculty, education faculty, and academic librarians cope with technostress?

#### Importance of Study

This study is intended to inform faculty, academic librarians, and higher education administrators about technostress. Causes of technostress and possible coping techniques will be identified. Identifying causes and coping techniques will assist faculty, librarians, and administrators in knowing when they are experiencing technostress, how to deal with technostress, and how to reduce technostress in the workplace. It is also important to help users increase their knowledge and comfort level so they may become self-reliant, more productive and less dependent upon others who are more skilled technologically. Additionally, faculty and academic librarians will learn how to help each other when utilizing technology. Results of the study will assist higher education administrators in making well-informed decisions regarding support and training for faculty and academic librarians when implementing technology at higher educational institutions.

As a librarian who works with technology daily, the researcher perceives a need to help users become more comfortable and more knowledgeable about the technology they use at work. As a result, there may be implications for

creating programs which can reduce computer related stress experienced by faculty and academic librarians. Finally, a void in the education and library literature will be filled.

#### Procedures

Participants were given the option of completing the survey instrument electronically and having the responses e-mailed to the researcher, or receiving numbered, color-coded paper copies and mailing the results back to the researcher in a self-addressed stamped envelope. The numbered, color-coded paper copies were used to keep track of participants who responded so the researcher could do follow-up requests for survey participation. The survey was a new instrument containing four sections: (1) Computer Hassle Scale-revised (CHS-R); (2) Computer Skills Survey; (3) two open-ended questions; and (4) demographic items. When completing the CHS-R section of the instrument, respondents were asked to circle the number corresponding to the severity of the computer hassle they have experienced. Choice of numbers were 0=not at all, 1=rarely severe, 2=moderately severely, and 3=extremely severe. They were asked to complete the Computer Skills section by rating his/her skill level. Answer choices were 1=low, 2, 3=medium, 4, and 5=high. The faculty and academic librarians were then asked to answer two open-ended questions about what they perceived to be

possible causes of technostress and possible solutions for relieving technostress. Lastly, faculty and academic librarians were asked to provide the following demographics: (1) college/unit affiliation; (2) rank; (3) tenure status; (4) age; (5) software applications or programs used; (6) number of hours per week spent using computer technology; (7) faculty status; (8) classification status; (9) sex; and (10) teaching level. All paper copies were mailed back to the researcher using a self-addressed stamped envelope for data analysis.

Alternatively, participants completed the instrument electronically by filling out a web-based form posted on the Internet. Using the same numeric code found on the paper copy of the survey, each faculty member or academic librarian wishing to complete the instrument on-line was able to enter that code on the web form for tracking purposes. The code was used to keep track of those who responded to the survey so the researcher could request participation from non-respondents after follow-up contact had been made with those not responding initially. Each participant completed the CHS-R section by clicking the radio button corresponding to the appropriate severity level of each of the computer hassles they have experienced. The choices were the same as the ones on the paper copy.

Similarly, the Computer Skills section had clickable radio buttons corresponding to the skill level for each computer skill. The choices were the same as those on the paper copy. Two open text boxes were provided for respondents to type in their responses to the open-ended questions. Lastly, clickable radio buttons were provided for responding to the demographics section. All responses from the survey were e-mailed to the researcher for data analysis.

#### Limitations

This study was limited in several ways. Participants were academic librarians and teaching faculty in the Colleges of Business and Education from four year public colleges and universities within the University System of Georgia (USG) who have graduate degree programs with enrollments equivalent to or larger than 14,000. The researcher wanted institutions similar in size and degree offerings to the one where she is employed. There are 34 institutions within the University System of Georgia and all could not be studied at this time. Likewise the number of teaching faculty and academic librarians within the USG is very large. Similarly, characteristics of the faculty and librarians were very diverse (e.g., ethnicity and educational background). Therefore, time did not permit a

more detailed study of all computer users and demographics within this population.

Time became a factor in completing the instrument due to the lengthy sections. The CHS-R survey, section one, used for collecting quantitative data was a 63-item Likert scale. As a result, the researcher reduced the 63-items on the CHS-R to 39-items based on information obtained from a factorial analysis performed by the instrument's creator. The Computer Skills survey, section two, was a 26-item Likert scale. However, one item was removed because it duplicated another item on the scale; therefore, the Computer Skills survey was reduced to 25-items.

Finally, there are many types of technology, but for the purpose of this study only computer technology was investigated.

#### Definition of Terms

Academic librarian - person who has completed an outlined course of study from an accredited library school and performs one or more of the following in the state of Georgia: (1) purchase and catalog resources for public use; (2) help find information for research or study; (3) plan, operate, and maintain computer systems; and (4) manage and plan library operations (Good, 1973; US Department of Labor, 2001); and may or may not hold faculty status.



Computer anxiety - Fear and apprehension felt by an individual when considering the implications of utilizing computer technology, or when actually using computer technology (Maurer & Simonson, 1993).

Computer attitude - how a person thinks or feels when using a computer.

Computer hassles (also known as computer irritants or computer technology hassles) - stressors that come from interactions with computers, computer technology, the impact of computers on society, or computer-generated information (Hudiburg, 1989a; Hudiburg, 1992).

Computer literacy - basic level of expertise, familiarity, and ability to use software applications.

Computer phobia - fear of computers (Baker, 2001).

Computer skills - knowledge or performance level when a person uses a computer.

Computer stress (also known as computer related stress)- negative computer attitudes and avoidance of computers (Hudiburg, 1996).

Computer technology (also known as technology) - machines with cd-rom, DVD, and/or floppy disk drives with software applications which are used to enhance human efficiency and workflow.

Corps of instruction - "Full-time professors, associate professors, assistant professors, instructors, and lecturers . . ." (University System of Georgia Board of Regents, 2002).

Educational tool - item (e.g. Internet, computer software) used to assist faculty and academic librarians with teaching.

Extraversion - personality type of person who enjoys being with other people (Edgerton, 1994).

Information literacy - a set of abilities requiring individuals to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information (Association of College and Research Libraries, 2003).

Information problems (also known as computer information problems) - having little or no information or sometimes having too much information when trying to utilize computer technology.

Information technology (IT) - "IT is a technology that dramatically increases the ability to record, store, analyze, and transmit information in ways that permit flexibility, accuracy, immediacy, geographic independence, volume, and complexity" (Lowry, 1993, p.237).

Neuroticism - personality trait characterized by instability, anxiety, aggression, etc. (Collins English Dictionary, 2000).

Over-identification with technology - constant use of technology or over reliance on a computer to complete a task especially if the task is simple and may be performed by an individual much faster than performing the task by computer.

Runtime problems - difficulties occurring while software applications are being used.

Sample error - "The difference in results for different samples of the same size" (Center for Technology in Learning, 2002).

Somatization - physical symptoms of stress (Hudiburg, Ahrens, & Jones, 1994).

Technostress - "a modern disease of adaptation caused by an inability to cope with the new computer technologies in a healthy manner. It manifests itself in two distinct but related ways: In the struggle to accept computer technology and in the more specialized form of over-identification with computer technology" (Brod, 1984, p. 16).

#### Summary

There has been a rapid growth in technology over the last decades as well as an increased struggle to keep up with technology. In moving from the Industrial Age to the Information Age, society has been affected in numerous ways, especially in higher education. Technology affects and will

continue to affect the roles that administrators, faculty, students, and academic librarians play in higher education.

With the rapid growth in technological change, the struggle to adjust increases for the majority of the population. This struggle is causing a multitude of reactions including technostress. Furthermore, review of the research and related literature has not revealed any definitive studies conducted which may determine the severity of stress for the various types of higher education computer users. Mostly higher education students and those in the business sector have been asked to participate in studies which have investigated correlations between such variables as personality type, academic performance, self-concept, and why some faculty members decide to use technology while others do not. As a result, the intent of this study is to investigate in more detail the levels of technostress among multiple groups of higher education computer users and the relationship between their computer skills and technostress levels.

## CHAPTER II

### REVIEW OF RESEARCH AND RELATED LITERATURE

#### Introduction

With the rapid growth of technology, and the move to the Information Age, society has been exposed to continual change. Society has also increased its use of and dependence upon technology. Some people, particularly those in higher education, have adapted to these changes while others have not. Depending upon how a person has adapted to the rapid growth and change of technology, that person may experience what is known as technostress. Defined as the inability to cope with technology in a healthy manner, technostress may reveal itself in one of two ways: (1) over-identification with technology or (2) struggle to accept technology (Brod, 1984).

Faculty, academic librarians, and higher education administrators must become knowledgeable about technostress, its symptoms, and how to cope with and reduce technostress. Higher education administrators will then be able to make well-informed decisions regarding support and training for faculty and academic librarians when implementing new technology. Faculty, academic librarians, and higher

education administrators may become self-reliant, more productive, and less dependent upon those who are more skilled technologically.

### Information Age

As one of the primary drivers of change, technology is used by people to find information, communicate, entertain, and work with one another (Drake, 2000). Those in higher education have to adjust in order to teach future generations how to utilize this technology. Faculty, librarians, and students all have roles to play during this change. Senese (1984) said society has moved from the Industrial Age to the Information Age. The Information Age was defined as the advent of computers, databases, the Internet, and telecommunications. In the Information Age, the computer is a given and it has an expanding role (Hulbert, 1998). Furthermore, students are taking computers to college in ever increasing numbers and computer use enhances individual instruction which may cause frustration and stress. All of this has affected libraries and institutions of higher learning (Hulbert).

While defining the goals of education and learning is a challenge for institutions of higher learning, technology may be used to assist with identifying those goals and addressing those challenges (Dowler, 1997). Furthermore, the

use of technology will determine the transformation of universities as learning organizations (Uprichard, 1998).

### Information Technology and Change

Information technology (IT) is used to increase the ability to record, store, analyze, and transmit information (Lowry, 1993). Finding information is both easier and harder. It is easier because information is accessible online from anywhere in the world by various tools. It is harder because search protocols continue to evolve toward greater levels of sophistication (Banks, Carder, & Pracht, 1996).

Adaptation to technology on the job is needed when technology is introduced into that job (Woodsworth, 1991). Organizational problems, centralization, territorial boundaries, and coordination are among the challenges raised by technological change (Woodsworth). One way of addressing technological change in higher education is encouraging interdependence among campus units as well as increasing computer literacy throughout the campus population (Woodsworth). There are, however, many benefits and disadvantages when trying to address technological change. Having easy access to information may be beneficial as well being able to reduce the time and physical location constraints of accessing the information (Lewin, 2000).

However, technological innovation is often undermined by scarcity of funds, poor management of resources, a lack of charismatic and visionary leadership, and an unwillingness to use the simplest technology (e.g., typewriter) (Woodsworth, 1991).

#### Highlights from the History of Technology in Education

Recorded use of educational tools can be traced as far back as the late 1600s. As educators began to incorporate these tools into their daily instruction, they might have become anxious, apprehensive, or resistant to using these tools because of their unfamiliarity with them. The use of educational tools enhanced individualized instruction, made students more independent, and provided greater efficiency and effectiveness of teaching (Saettler, 1990). Examples of educational tools include chalk and board, overhead projector with lcd panel, television with or without vcr, and computers.

#### Higher Education

In the 1650s, visual material was introduced by John Amos Comenius to supplement student instruction (Small, 1990). Between 1806 and 1853, Lancasterian monitorial schools used slates, sand tables, wall charts, and chalk boards to assist with teaching students. The first printed textbooks were created for educational use in the mid



nineteenth century while photography, instructional slides, maps, and globes were used in the late nineteenth century. Visual instruction as it became known expanded in the 1900s to include lantern slides and stereo-opticians. The motion picture was also introduced as an educational tool during the 1910s as well as the slide projector and sound film strip projector. In the 1920s, the radio was used for educational purposes. During World War II, audio recordings, transparencies, slides, and the overhead projector was used by instructors to assist with teaching. The teaching machine and the television were introduced for the purposes of distance education in the 1950s. Moreover, the mainframe computer was introduced in the mid-1970s and the microcomputer came about in the late 1970s (Saettler, 1990; Small, 1990).

It was not until the early 1980s that school systems began to invest in computers (Saettler, 1990). Used primarily for word processing by both faculty and administrators, microcomputers were adapted for educational use (Bedell, 1998). In the late 1980s, most educators were uncritical of computers and continued to use them in the schools (Saettler, 1990; Small, 1990). However, Anderson (1999) believed faculty only used computers because they were forced by peer pressure. An important educational goal

in the 1990s was to prepare people to become technically literate (Zachariades & Roberts, 1995). The computer was viewed as a further extension and incorporation of the educational goals where the primary forces (educators, parents, and the computer industry) pushed computers in the schools (Saettler, 1990).

#### Academic Libraries

As an entity of higher education, academic libraries have implemented technology in many forms. Technology implemented and/or used in academic libraries include books, telephones, card catalogs, and computers. For example, the CODEX (ancient manuscript or scripture) book was invented in the sixteenth century. Small presses for book publishing and use of typewriters began in the nineteenth century (Horan & Stalker, 1996). In 1867, Index Medicus was created for searching medical and science information. The first card catalog was used at the University of Rochester but widespread use of the card catalog did not take effect until the 1920s. The telephone was used as early as the 1890s for requesting newspapers and in 1936, librarians began providing reference service over the telephone (Horan & Stalker).

The Electronic Numerical Integrator and Computer (ENIAC) was developed during World War II to calculate

ballistics and missile trajectories for the Army (Pope & Woods, 1983). The first general purpose electronic digital computer was discovered in 1945. This computer performed simple addition, subtraction, multiplication, and division in programmed sequences and it was the heart of the data processing industry (Pope & Woods; Forcier, 1996). Library databases (e.g., Medline and DIALOG) were created in the 1950s (Horan & Stalker, 1996). In 1951, the first electronic computer to use a stored program was created (Forcier, 1996).

The minicomputer was invented in 1961 and by 1977 companies were manufacturing library software that could be used on those minicomputers (Pope & Woods, 1983). The first automated circulation system was installed at the Illinois State library in 1966. With the founding of the Online Computer Library Center (OCLC) in 1967, three years later a shared cataloging system came on-line. Also, in 1967, a system for bibliographic control was developed. ARPANET was created in 1969 in order to link researchers and academic institutions together for sharing information (ACRL, 1999).

Mainframe computers and digital computers were used in the early 1970s for library automation projects. The first library system vendor (CLSI) began to market its circulation system which was based on the Digital Electronics

Corporation microcomputer (ACRL). The first microcomputer was created by Apple in 1976. In 1979, OCLC implemented its interlibrary loan system (ACRL). Until 1981, librarians had a strong resistance to microcomputers because a lot of time was spent in completing tasks (e.g., batch processes) (Fine, 1979a; Pope & Woods, 1983). However, by 1982, librarians were considering which computers to buy, rather than whether or not to buy (Pope & Woods). During the 1980s, the Internet, cd-roms, and local area networks began to emerge and be used within libraries (Lowry, 1993). In 1985, NSFNET was implemented by the National Science Foundation which networked researchers and educators together to share science information (Lowry).

The Online Computer Library Center launched PRISM in 1991 which enhanced the capabilities for on-line cataloging and searching. Additionally, Congress appropriated funds to expand networks (e.g., NSFNET) having federal government affiliations by passing the High Performance Computing Act of 1991 (ACRL, 1999). Furthermore, President Bill Clinton signed the Library Services and Technology Act in 1996 which focused on technological innovations and outreach services in libraries (LITA, 1997). In 2000, President Clinton also signed the Goals 2000 Act which united technology and technology planning into all educational programs at the

state and local levels with coordination efforts from the federal government (Goals 2000, 1994). In closing, today there are many uses (cataloging, circulation, reference, instruction, and management) for microcomputers in libraries (Pope & Woods, 1983; Drake, 1993).

#### Role and Uses of Technology in Higher Education

Although Mesthene (1970) considered technology as a factor of social change since the Industrial Revolution, and Neil Postman in Informing Ourselves to Death believed technology was a tool to help people deal with social and personal issues (Zimmerman, 1996), there were those who did not assume that technology was a tool that effected social change. Zimmerman (1996) did not believe social or personal problems (e.g., poor education, poverty, or making people better) would be solved by storing, organizing or transmitting text, images, and videos.

Regardless of these beliefs, technology is a part of society and society has been affected both positively and negatively. Economic and social relationships have been enhanced or destroyed (Aguirre, 2001). Security for protecting society has been enhanced (Lundquist, 2001). However, the digital divide continues between those who have and those who have not (Irving & Young, 2002).

Technological innovation has affected individuals and group behaviors within organizations. Technological innovation has also led to structural changes, where information flows and organizational work designs are revised (Nelson, 1990), and people use technology to communicate, share, and deliver information with more speed and efficiency (Zimmerman, 1996). Moreover, increased automation requires the need to train and retrain (Albritton, Clayton, Roper, & Sievert, 1988). The most effective way to obtain confidence in technology is to simply use it (Managing Technostress, 1997).

#### Faculty Use of Technology

The faculty have moved to using a process-oriented approach to information technology, which includes analyzing research needs, forming research questions, and evaluating search results, while expanding from computer literacy to information literacy (Dennis & Harrington, 1990). However, concerns (e.g., time constraints and increased workloads) have been expressed by faculty about technology's effects on teaching, publishing, and research. Faculty members are more likely than students to use on-line search services since faculty are able to use the research skills they obtained while in graduate school (Dennis & Harrington).

Additionally, college faculty have spent more time with those from the business industry to ensure the technological needs of the workplace are reflected in the curriculum (Gavert, 1983; Lynton, 1984; Katz, 1999). Other disciplines such as liberal arts have had less need to adapt as quickly, and perhaps have been more reluctant to change (Miller & Rojewski, 1992).

Likewise, education faculty prepare future teachers, counselors, and administrators to go into elementary, middle, and secondary schools (Bureau of Labor Statistics, 2003). These teacher programs might or might not require their students to obtain and use technological skills (Stevens, 1982; Persichitte, Tharpe, & Caffarella, 1996). Similarly, education faculty might or might not be expected to obtain or utilize these same skills (Stevens; Persichitte et al.). Some education faculty and students alike might only learn and use technology because they wanted to and not because there was an expectation (Stevens; Persichitte et al.).

Technology is a tool and its effectiveness depends on it being put to good use. The workloads of the faculty initially increased because they had to learn how to use the technology but faculty began to save time and became more proficient as they became more knowledgeable

technologically. Additionally, teaching and learning was promoted as faculty developed and enhanced their computer skills (Haysbert, 2002; Ugboma, 1999). Other effects of technology included the decreased amount of time it took to receive information; the increased reliability of information; increased productivity time; and improved teaching and learning methods (Ugboma).

#### Students' Use of Technology

Information technology could also be used by students with guidance from the faculty (Kosakowski, 1998). Three decades ago, computers and related IT were introduced as educational tools. Student use of information technology could be advantageous if students used the resources for practicing basic skills, learning new knowledge, or learning new complex multimedia products. Studies conducted by Bialo & Sivin-Kachala (1996) demonstrated improved attitudes of students toward self and toward learning after having used information technology. Students had more control over their learning, analytical and critical thinking, and collaborative work (Kosakowski, 1998).

Approximately nine out of 10 professors thought computers enhanced student learning according to a study by Marklein (1999). Ballance and Ballance (1992) examined the way students with different amounts of class-based computer



experience perceived computer hassles. In 1994, researchers Rosen and Weil reported that some type of technophobia afflicted one third of college students, and the numbers had never been higher (DeLoughry, 1993). Findings suggested that computer anxiety was reduced as students gained more computer experience. However, students with computer anxiety did not receive the help needed to overcome their fear (Gos, 1996).

#### Academic Librarians' Use of Technology

As key players in higher education, librarians help the faculty and students (Bosseau & Martin, 1996). Technology has enabled librarians to facilitate faculty members' research through searching on-line resources (Dennis & Harrington, 1990; Tenopir, 2002). Teaching on-line searching strategies to faculty members was important because librarians were reinforced as instructors and librarians became more comfortable in their teaching role. The librarians' methods for teaching also tended to improve. The relationship established between faculty members and the librarians gained support for library programs. Collaboration between faculty and librarians was also promoted. Complicating librarians' efforts to teach faculty how to conduct on-line searching techniques were an

increased workload, faculty members' lack of preparedness, and equipment malfunctioning. (Dennis & Harrington).

Libraries, especially university libraries, have been leaders in the education world in using technology (Hulbert, 1998). The first major shift in libraries during the last 100 years was the shift toward information technology. However, due to demands of information technology, distance education, research and teaching support, and declining university resources, academic libraries have been in a critical position. For instance, at one time librarians could master databases in detail. Now, there is so much change in a short amount of time, librarians must focus on the principles and commonalities of the resources instead of the specifics, which may cause stress or resistance (Clark & Kalin, 1996).

#### Effects of Change and Rapid Development in Technology

In 1965, Gordon Moore identified the rapid, unprecedented growth of technology as Moore's Law (Mann, 2000). According to Moore (1965), computer technology continues to grow because it leads to lower costs and greater reliability (Mann). Furthermore, Brand (2000) commented that technology was perpetually self-accelerating and this rapid growth in technology might cause instability, unpredictability, and unreliability in society. Likewise,

Ann Majchrzak, organizational psychologist, said workplace stress was caused by technology and the way management handled technology (Koenenn, 1990). Majchrzak explained how technostress occurred when organizations performed training only once, continued to update existing software packages, and the manuals were the only assistance available to employees (Koenenn).

Similarly, librarians did not always embrace technology (Pope & Woods, 1983). Sara Fine (1986) stated that resistance to technology and the part that resistance played in an organization's life was a process. This process was addressed by respecting people's resistance to technology, trying to understand why people were resistant, and allowing them to talk about their resistance (Fine). As society became more technological, people also became more focused on machines and more starved for personal contact which might lead to an over-identification with technology, a kind of technostress (Brod, 1984). Individuals experienced a sense of time acceleration, a desire for perfection as they completed personal and professional tasks, and difficulty relating to family, friends, and co-workers (Koenenn, 1990).

### Generational Differences

Society began to experience "future shock" or the inability to process large amounts of information due to the rate of change during the Industrial Revolution (Toffler, 1971). Toffler also believed the rate of change accelerated and extended into more aspects of people's lives (e.g., education, work, and government). As change accelerated, intergenerational differences increased (Coopersmith, Regan, & Dick, 1975). The advancement of technology had a strong effect on generational differences which changed the assumptions of what was possible and desirable (Coopersmith et al.).

The generation gap was the name given to the differences in attitudes, values, and practices between adolescents and their parents (Coopersmith et al.). The generation gap is better understood by explaining the groups of generations that make up society: (1) the GI or World War II, (2) Swing or Silent, (3) Baby Boom or Boomers, (4) Generation X or Gen Xers, and (5) Generation Yers, Gen Yers, Nexters, or Millennial generations (Effective Managers, 2001).

The World War II or GI generation was born before 1933. Those persons born between 1933 and 1945 are members of the Swing generation. Members of the Swing and GI generation are

collectively called Matures (Effective Managers). Boomers were born between 1946 and 1964. Gen Xers were born after 1965 but before 1976, while those born after 1977 are a part of the Millennial generation (Mitchell, 2000; Effective Managers).

Matures (ages 55-69) lived through the Great Depression and World War II and came of age during the Cold War. It was during this time when the Matures were introduced to the radio. Baby boomers (age 36-54) grew up during the Vietnam War and Civil Rights Movement. Boomers watched television as men traveled into Space. Gen Xers (age 21-35) grew up during economic prosperity in the 1980s. They played video games on computers, and watched music videos on television while the computer skills they obtained was a fundamental part of their elementary education. Gen Yers grew up during the 1990s with computers already in their homes (Effective Managers; Zemke, Raines, & Filipczak, 2000; Tsacoumis, 2002).

Each generation has experienced change in one way or another and they have dealt with that change according to their beliefs and values. Additionally, the generations have been exposed to technology and have responded in different ways. Even though Sievert, Albritton, Roper, and Clayton (1988) and Ballance and Ballance (1992; 1993) found computer

related stress was not associated with computer experience and age, Elder, Gardner, and Ruth (1987) conducted a study that determined age and technostress correlated. Results indicated those 50 or older were more technostressed than those under 30, 30-39, and 40-50. Persons 40-50 years old had the second highest level of technostress. Those under 30 had the third highest level while those 30-39 years old had the lowest level of technostress (Elder et al). Thus, the Matures and some Baby Boomers were said to be challenged technologically. They did not use information technology well nor did they handle change well. Boomers were described as techno phobic and said not to handle technology or change very well, similar to Matures. In contrast, Gen Xers were adaptable to change and were techno literate while Gen Yers were technologically smart (Saunderson, 2000).

Zemke, Raines, and Filipczak (2000), believed Matures needed more training than the other generations on how to use information technology. Additionally, they believed Matures found information technology intimidating and confusing (Zemke et al.). Even though the older generations learned computer skills, they never had the natural interest for information technology that Gen Xers had because Gen Xers were not afraid to use information technology (Zemke et al.). However, boomers were willing and trying to learn new

fields of study including information technology, as reported by a 1998 article in USA Today (Zemke et al.). Also, boomers who became academicians had little exposure to computers during their college training, but now they were acquiring technical skills (Green, 1999). Zemke, Raines, and Filipczak (2000) reported that one in ten Matures owned a personal computer (PC) while three in ten Gen Xers owned a PC. Furthermore, information technology was natural to Gen Yers. Even though information technology played a large role in the lives of Generation X, the Millennial generation was the first to have computers already in their homes (Zemke et al.).

#### Differences Between Females and Males

Similar to generational differences, differences between females and males were identified in the way technology was accepted or resisted. Even though, Sievert, Albritton, Roper, and Clayton (1988) and Ballance and Ballance (1992; 1993) found computer related stress was not related to computer experience and sex, other researchers did find a relationship. Females experienced technostress or resisted information technology more than males (Fine, 1979c; Elder, Gardner, & Ruth, 1987; Hudiburg, Brown, & Jones, 1993). Additionally, Heinssen, Glass, & Knight (1987) believed the less computer experience a female had the more

computer anxiety she experienced. Murphy, Coover, and Owen (1989) revealed men were better able to perform certain computer skills more successfully than females. Similarly, Reed and Overbaugh (1993) found men to have less computer anxiety as their computer experience increased. According to Baroudi and Levine (1997), "women were generally more scared of computers . . . scared they were going to break something or they were going to do something wrong and everything would explode" (p. 178).

#### Computer Experience, Skill Level and Other Characteristics

Murphy, Coover, and Owen (1989) suggested there were three levels of computer experience: (1) the beginning level of computer skills; (2) the advanced level of computer skills; and (3) the mainframe level of computer skills. Spotts and Bowman (1995), and Groves and Zemel (2000) also identified faculty members' levels of computer knowledge and experience while using instructional technologies in higher education (see Tables 1 & 2).

Some studies found that as an individual's computer experience increased so did their level of computer stress or resistance (Fine, 1979c; Gilroy & Desai, 1986; Honeyman & White, 1987; Ballance & Rogers, 1991; Hudiburg & Jones, 1991). However, others found that as a person's computer



experience increased, their computer anxiety decreased (Loyd & Gressard, 1984; Morrow, Prell, McElroy, 1986; Artwohl, 1989; Maurer & Simonson, 1993; Reed & Overbaugh, 1993; Hudiburg, Ahrens, & Jones, 1994; Popovich, 1994). Lastly, Hudiburg, Pashaj, and Wolfe (1999) reported computer related stress was affected by an individual's personal characteristics (e.g., extroversion and neuroticism).

Table 1

Percentage of Faculty with Good to Expert Technology Knowledge and Experience

Technology	Knowledge	Experience
Word processing	77%	73%
Video	53%	46%
Audio	50%	46%
Film	47%	40%
Computer spreadsheets	38%	34%
Statistical computing	36%	31%
Electronic mail	32%	31%
CAI <sup>a</sup>	23%	18%
Presentation software	16%	12%
Computer conferencing	16%	13%
Multimedia	13%	8%
Distance Learning	9%	6%

Note. From "Faculty Use of Instructional Technologies in Higher Education," by T. H. Spotts and M. A. Bowman, 1995, Educational Technology, 35(2), p. 56. Copyright 1995 by Educational Technology. Reprinted with permission.

<sup>a</sup>CAI is computer assisted instruction.

Table 2

Percentage of Faculty with Good to Expert Self-Rating of  
Technology Knowledge

Technology	Percentage
Word processing	86
E-mail	62
Computer spreadsheets	46
Internet/World Wide Web	42
Statistical computing	41
Presentation software	41
Multimedia	21
Computer aided instruction	21
Computer conference- BB <sup>a</sup>	14
Distance Learning	14

Note. From "Instructional Technology Adoption in Higher Education: An Action Research Case Study," by M. M. Groves and P. C. Zemel, 2000, International Journal of Instructional Media 27(1), p. 57. Copyright 2000 by International Journal of Instructional Media. Reprinted with permission.

<sup>a</sup>BB is bulletin boards.

### Workplace and Higher Education Differences

Unlike age, sex, and computer experience, there has been limited research conducted on the various types of computer users, and their levels of computer anxiety or technostress. One study found that students majoring in education had more computer anxiety than those in business (Raub, 1981), while another indicated that computer anxiety among education majors decreased as they obtained more computer training (Stevens, 1982). Similarly, Simonson, Maurer, Montag-Toradi, and Whitaker (1987) found that those in the business sector had lower levels of computer anxiety. While there appear to be no studies of librarians' computer anxiety or technostress levels, O'Daniel (1999) reported on the relationship between librarians' technostress and the implementation of a new automation system. O'Daniel believed as librarians became more knowledgeable about the system and spent more time using it, their technostress levels decreased.

### How People Are Affected by Computer Technology

Rapid technology growth is not always reliable or predictable. Some users resisted change while others accepted the new technology whole-heartedly. Rogers (1983) grouped people into five categories according to how they were affected by change: (1) Innovators were eager to try

new ideas. (2) Early adopters accepted the ideas and persuaded others by decreasing their fears. (3) Early majority were not the first to accept new ideas but they were not the last to accept those ideas. (4) Late majority were skeptical and cautious about accepting any new ideas, and (5) laggards were very suspicious of accepting any ideas at all until the four other groups had accepted the ideas. Only at that time were the laggards willing to consider accepting any new ideas (Rogers, 1983).

Rosen and Weil (1997) developed a different classification of technology users: eager adopters, hesitant prove-its, and resisters. Approximately ten to fifteen percent of the population were described as eager adopters. These users expected to have problems with technology and they found information technology exciting and challenging. Fifty to sixty percent of the population were categorized as hesitant prove-its. They preferred to wait until the information technology had been tested and they wanted to be convinced it was worthwhile to invest in and use the information technology they were testing. Making up thirty to forty percent, resisters avoided technology regardless of what was said or done to persuade them that the technology was useful (Rosen & Weil, 1997).

### Technostress

Craig Brod (1984), a clinical psychologist, coined the term technostress, defining it as an inability to cope with new computer technologies in a healthy way. Brod called this a modern disease of adaptation, which revealed itself in one of two ways: struggle to accept computer technology (which has been discussed previously) or over-identify with computer technology (Brod, 1984). Over-identification involved constant use of or heavy dependence on technology by computer users. Early adopters or innovators ran the risk of over-identifying with technology.

Due to the over-identification to technology, some people became more machine oriented and less sensitive to their own needs and the needs of others. They allowed themselves to become so absorbed into technology that they lost their self identities which is said to be a component of technostress since it relates to the over-identification of technology (Rosen & Weil, 1994).

### Causes, Components, Symptoms, and Coping Skills

There are three parts to technostress - nature of the stressor (causes), reactions or responses to the stressor (components), and results from the reaction (symptoms) (Dobb, 1990). Causes of technostress included not enough time to train, not knowing how to type, receiving poor

instructions, increased workload, not having enough interaction with people, inadequate wiring/electrical outlets, poor lighting, lack of equipment security, uncomfortable workspace, incompatible or noisy equipment, lack of maintenance knowledge, fear and apprehension of using new technology, and role and information overload (Bichteler, 1987; Champion, 1988; Figueiredo, 1994; Ryce, 2001). Components of technostress included performance anxiety, information overload, role conflicts, and organizational factors (Kupersmith, 1992; Ryce).

Technostress came from the difference between the knowledge needed for a task and the knowledge available, or the lack of knowledge of how to perform the task and what to do when exceptional conditions arose (Dobb, 1990). According to Selye, a common response of the body to any demand made on it is stress (Hudiburg, 1996). Selye was also concerned with what was going on inside the body when a person became stressed (Hudiburg, 1996). Other ways used to measure stress was determining if the person was sweating or if there was an increase in jaw muscle electromyography (e.g., clenched teeth). Other symptoms of technostress included muscle tension, paranoia, overstimulation, anticipatory disaffiliation, psychosomatic headaches, fatigue, sagging libido, psychic numbing, low self esteem, high anxiety,

impatience, anxiety at work, school, and home, headaches, eyestrain, increased heart rate, frustration, negative attitudes about computers, gastrointestinal disturbances, sleeplessness, back problems, and feeling indifference (Smith & Nelson, 1983; Koenenn, 1990; Figueiredo, 1994).

Individuals coping with technostress were recommended to do one or some combination of the following - eat, relax, stay healthy, cultivate a positive attitude, manage time, set realistic goals, not to worry about matters not in their control, seek additional training, and establish relationships with the business industry that will focus on enhancing the technological environment (Hickey, 1992; Kupersmith, 1992; McKenzie, Davidson, Bennett, & Clay, 1997). Organizational administrators trying to manage technostress were told to proceed slowly with technology implementation and allow for feedback, believe in each employee, foster cooperation, organize and filter information, distribute the expertise, provide hands-on practice, simplify the technicalities, lower the anxiety threshold, allow staff to ask questions regarding the need for and implementation of new technology, involve staff in the decision making process, allow personnel to pursue projects of interest and set priorities, allow vendors to give presentations on the new technology, keep the staff

informed of implementation progress, and promote the new technology (Bichteler, 1987; Hickey; Kupersmith). Hudiburg (1996) suggested two categories of coping responses: emotion-focused, or strategies to make people feel better, and problem-focused, or strategies to improve the situation and actually making people better (Davis-Millis, 1998).

#### Struggle to Adapt to Computer Technology

There are a multitude of reasons why people struggle to adapt to information technology. Reasons for not adapting included fear of failure, lack of interest, or technostress (Jacobsen, 1998). Likewise, there were a variety of causes (nature of the stressor), reactions (components), symptoms (responses/results), and coping skills that related to the adaptation of technology.

Factors leading to anxiety and difficulty in the use of technology according to Faerstein (1986), were the need for control or autonomy, resistance to change, the need for status or power, fear of failure or the unknown, feeling isolated, and role identity issues (Albritton, Clayton, Roper, & Sievert, 1988). Avoiding computers and their general locale, using excessive caution with computers, making negative remarks regarding computers, and using the computer short term were some behaviors of computer anxiety (Maurer & Simonson, 1984). By changing their thoughts and



attitudes about computers, most people could overcome their anxiety towards computers (Figueiredo, 1994).

### Technostress in Higher Education

Clute (1998) conducted a content analysis of the literature which revealed recurring themes related to technostress. Some of the participants from the studies that were analyzed were college students majoring in business and education (Hudiburg & Necessary, 1996b), and academic librarians, who participated in a technology resistance study over twenty years ago (Fine, 1979b). A survey created for measuring technostress only sampled individuals in the business industry, and college students majoring in business and education (Ballance & Rogers, 1991; Hudiburg, 1995). Research was also conducted by Jacobsen (1998) to determine why some faculty in higher education adopted technology while others did not.

### Faculty

According to a study conducted at UCLA, participating professors indicated they identified technology related stress as being a factor causing stress almost equal to the stress of household responsibilities, not having a social life, and other time pressures (McQueen, 1999). Professors were not as likely to use spreadsheets for data entry or use the Internet for research because they were scared (or never

learned to use technology or how to handle it) (Kerr, 1991). Older faculty (65+) were less likely to use technology and more likely to report computer stress (McQueen). Professors over 45 were less likely to use computers and information technology compared to those 35 and younger (Marklein, 1999). Nine out of 10 professors thought computers enhanced learning among students but two thirds of the professors said technology was stressful due to the increase in teaching, research, and publishing requirements (Marklein). A survey was conducted at the University of California which showed that 67% of professors were regularly stressed by emerging technology, 35% of professors used the Internet for research, and 38% of professors used technology for class preparation (Professors Stressed, 1999).

#### Academic Librarians

While faculty experienced some level of computer anxiety due to increased requirements in teaching, research, and publishing, so did academic librarians. In relation to academic libraries, computer anxiety had not been studied (Albritton, Clayton, Roper, & Sievert, 1988), but resistance to technology in libraries had been studied by Sarah Fine (1979a). Additionally, research has been conducted regarding librarians' attitudes toward technology and what aspects of technology librarians view as stressful (Ennis, 1997).

Resistance and computer anxiety were two components of technostress. Relating to the library staff, technostress existed in four areas. Fear, hostility, and apprehension (resistance behavior) was one area. Dissatisfaction and frustration with planning and implementation of automated systems was another area. The third and fourth areas were physical complaints, and inadequate training (Davis-Millis, 1998).

Table 3 reports the findings of major studies on technostress, technology resistance, computer anxiety in relation to sex, age, attitude, computer skills and experience, and academic achievement of psychology, education, business, liberal arts, and social science students as well as persons in the business environment. The researchers, participants, study design, and results for each study are identified in the table. The table follows the summary.

#### Summary

Information technology (IT) has changed the way administrators, faculty, academic librarians, and students work, teach, and learn. The effects that technology had on society, and in particular on higher education, have been positive and negative. As a result, there has been both resistance and acceptance of the increased development and

use of technology. Research on whether acceptance of technology might be dependent upon certain factors such as age, sex, and computer experience has been mixed.

There are varying reactions to changes caused by IT and one of those reactions is technostress. Individuals experience technostress in many ways. In some instances, people might not realize how the implementation and use of technology in higher education has affected them. Numerous causes, symptoms, and components of technostress have been suggested by prior researchers. Similarly, prior researchers have also presented many coping skills.

Table 3

Review of Literature Matrix			
	Topic of Research	Methodology	Outcome(s) / Recommendation(s)
Artwohl (1989)	keyboard skills; computer anxiety	content analysis	keyboarding skills is related to efficient use of computers which increased understanding of computers and decrease computer anxiety
Ballance & Ballance (1992)	computer related stress, in-class computer usage, technical college students - accounting, academic development, speech	descriptive stats	students' perception of unpleasant computer experiences are not related to in-class computer use; recommendation-clarify whether increased computer experiences are related to increase in computer related stress
Ballance & Ballance (1993)	self rated computer experience & technostress; 2 tech schools, 2 comm colleges, 2 univ	computer experience; hassles; descriptive stats	computer related stress not related to computer experience

Table 3 (Continued)

Review of Literature Matrix			
	Topic of Research	Methodology	Outcome (s) / Recommendation (s)
Ballance & Rogers (1991)	technical college students from english, accounting, electronics, business data processing areas; computer related stress	correlation	students w/ more computer experience have more computer related stress; 10 ten hassles - computer is down*(70%), computer junk mail*(69%), computer phone calls(69%), computer generated phone info(55%), need to update skills*(55%), slow computer speed(54%); lack of computer expertise*(54%), others not knowing how to use a computer(53%), keybrd typing errors*(52%), slow program speed(51%); appeared in Hudiburg(1989b); confirms CHS as measure of computer related stress arising from human-computer interaction; no correlations between GPA & measures of stress computer attitude or computer hassles

Table 3 (Continued)

Review of Literature Matrix			
	Topic of Research	Methodology	Outcome(s) / Recommendation(s)
Bichleter (1987)	technostress in libraries	interviews	3 groups of people-enthusiastic, those who are indifferent to hostile, and technofreaks -overly positive & technology will solve all problems; those resisting decline in work productivity, unwillingness/inability to be trained; absenteeism/tardiness; behavior changes-aggressiveness, negativism, withdrawal, argumentative, belittle co-workers; solutions-involve staff, establish promotion plan, planning committee make up persons from all levels; offer vendor presentations; hand holding; go slow; allow feedback; work closely w/those who may be disrupted the most; keep everyone up to date

Table 3 (Continued)

Review of Literature Matrix			
	Topic of Research	Methodology	Outcome(s) / Recommendation(s)
Champion (1988)	librarians & technostress	survey; workshops; observations	<p>symptoms- anxiety, denial, resistance, technophobia; panic; conflict; mental fatigue; intolerance; perfectionism; physical discomforts; fear of losing autonomy, promotion opportunities; control over environment; social isolation, change, loss of freedom, privacy, control, inability to keep up w/ rapid change; relationship problems; causes - inadequate wiring, electrical outlets; poor lighting; lack of equipment security; uncomfortable work space; incompatible/noisy equipment; less equipment to meet demands; frequent breakdowns; lack of maintenance knowledge; limited software; lack of funding; shortage of</p>



Table 3 (Continued)

Review of Literature Matrix			
	Topic of Research	Methodology	Outcome(s) / Recommendation(s)
Champion (cont.)	librarians & technostress;	survey; workshops; observations	<p>trained personnel;</p> <p>accidental data lost;</p> <p>conflictual relationships;</p> <p>power struggles;</p> <p>task/role changes; job</p> <p>insecurity; managers can -</p> <p>meet technology challenge;</p> <p>focus on people; devise</p> <p>strategy plan; 3 stages to</p> <p>adapting to change -</p> <p>perception/interpretation</p> <p>of change, peoples'</p> <p>feelings about</p> <p>technochange, how people</p> <p>cope w/ technochange;</p> <p>group support - team</p> <p>effort for dealing</p> <p>w/change; do not let</p> <p>documentation discourage</p> <p>you; know technostressors</p> <p>for identification</p> <p>purposes; get support from</p> <p>early adopters; design</p> <p>special work area; keep</p> <p>reminder list for rough</p> <p>times</p>

Table 3 (Continued)

Review of Literature Matrix			
	Topic of Research	Methodology	Outcome (s) / Recommendation (s)
Elder, Gardner, & Ruth (1987)	govt finance employees; sex, age, technostress	interviews; descriptive stats; correlation	sex & age correlated to technostress; females experienced more technostress; 50+ experienced more technostress; computer anxiety associated w/ females; males associated w/ negative computer attitudes; age may not be specifically related but the time period in which the computer user was educated
Fine (1979c)	librarians resistance to technology	questionnaires; interviews	females, older librarians more resistant; those who work w/ computer technology less likely to be resistant; attitudes toward computers & resistance/technostress-loss of privacy, job, control, interpersonal relationships & replace familiar, traditional processes

Table 3 (Continued)

Review of Literature Matrix			
	Topic of Research	Methodology	Outcome(s) / Recommendation(s)
Gilroy & Desai (1986)	undergrad private & state college students; MBA students; computer anxiety; sex; age; computer experience	questionnaire-Computer Anxiety Scale(CAS)	sex & computer experience predicts computer anxiety; men reduce anxiety by getting into computer course
Groves & Zemel (2000)	faculty; graduate teaching assistants; self rated technology knowledge	questionnaire-Spotts & Bowman	wp (86%); e-mail (62%); spreadsheets (46%); WWW (42%); statistics (41%); presentation (41%); multimedia (21%); computer aided instruction (21%); bulletin boards (14%); distance ed (14%)

Table 3 (Continued)

<b>Review of Literature Matrix</b>			
	<b>Topic of Research</b>	<b>Methodology</b>	<b>Outcome(s) / Recommendation(s)</b>
Harrison & Rainer (1992)	factor structures & concurrent validity for computer attitude scale(CAS), computer anxiety scale(CAIN), computer self efficacy(CSE); university personnel	factor analysis; concurrent validity; questionnaire	CAS- 3 factors- negative feelings about computers, positive feelings about computers, lack of understanding of computers; CAIN - 2 factors-high anxiety toward computer use; confidence, enthusiasm, and/or anticipation toward computer use; CSE- 3 factors- beginning level microcomputer skills; moderate to advanced level microcomputer skills, mainframe computer skills
Heinssen, Glass, & Knight (1987)	computer anxiety; assess computer anxiety rating scale(CARS)	correlation; validity/reliability	women reported higher levels of computer anxiety; women lacked same level of computer experience as men
Hemby (1998)	business computer students; age, sex, computer experience	Computer Anxiety Scale(CAS)- questionnaire; MANOVA	sex & age related to computer anxiety

Table 3 (Continued)

Review of Literature Matrix			
	Topic of Research	Methodology	Outcome(s) / Recommendation(s)
Hickey (1992)	technostress, libraries, media centers	case studies	"technostress...is usually not caused by computer ignorance but rather by the rate of change in familiar hardware and software(p.17)"; coping - recognize there is a problem, find balance between work and private life, don't worry over things you can't control, get involved w/ your organization & its changes, involve staff in decision making process, allow personnel to pursue projects that interest them
Honeyman & White (1987)	computer anxiety; teachers, school administrators; sex; age; computer knowledge	State Trait Anxiety Index(STAI)-questionnaire	sex & age did not effect levels of anxiety; previous knowledge of computers caused lower levels of anxiety

Table 3 (Continued)

Review of Literature Matrix			
	Topic of Research	Methodology	Outcome(s) / Recommendation(s)
Hudiburg (1989a)	technostress & college students	questionnaire-CHS - sum scores; descriptive stats	top 10 hassles - computerized junk mail (66.7%), computer system down (66.4%), lack of computer expertise (50.4%), optical price scanning (48.2%), keyboard-typing errors (47.1%), computerized mailing lists (46.7%), need to update skills (44.6%), programming error (43.6%), need to learn new software (43.6%), lack of help w/ computer problem (40.4%); recommendation - investigate difference between computer anxiety & computer related stress & how they related to computer attitudes

Table 3 (Continued)

<b>Review of Literature Matrix</b>			
	Topic of Research	Methodology	Outcome(s) / Recommendation(s)
Hudiburg (1989b)	revise CHS; psychology, social sciences, ed, bus majors	test-retest reliability; correlation; questionnaires	CHS moderately relates to perceived stress & somatic complaints; 69 item scale measures computer related stress- independent of computer attitudes & computer anxiety; recommendations- examine scale structure & factorial validity; explore relation of scale to other stress measures

Table 3 (Continued)

Review of Literature Matrix			
	Topic of Research	Methodology	Outcome (s) / Recommendation (s)
Hudiburg (1990)	students enrolled in psychology, business courses but majored in business, education, social sciences	correlation	CHS relate to somatic complaints, yrs used a computer, self rated computer knowledge; no relation to Rosen, Sears & Weil's computerphobia instrument; experienced stress seems to be a result of human-computer technology interactions ...persons who have more experience with and knowledge of computers tend to experience more computer related stress (p. 314); recommendation - evaluate dimensionality for computer related stress measure & computerphobia measures



Table 3 (Continued)

<b>Review of Literature Matrix</b>			
	<b>Topic of Research</b>	<b>Methodology</b>	<b>Outcome(s) / Recommendation(s)</b>
Hudiburg (1991)	computer hassles, somatic complaints, daily hassles; students taking business courses	correlation	CHS correlated w/ somatic complaints & other stress measures; recommendation - assess whether correlations observed in this study are generalizable to other samples
Hudiburg (1992)	CHS; students in psychology, education, computer science, computer info systems, business courses	factor analysis	8 constructs found - computer runtime problems, computer information problems, everyday computer technology, computers' impact on society, computer as person, computer processing speed, computer costs, computerized correspondence; recommendation - evaluate empirical performance of shortened version of CHS based on 2 most prominent factors -runtime & info problems

Table 3 (Continued)

Review of Literature Matrix			
	Topic of Research	Methodology	Outcome (s) / Recommendation (s)
Hudiburg (1995)	college computer users; technostress; assess stress of computer users	questionnaire-CHS	upper quartile( $\geq 38$ ) high stress; lower quartile ( $\leq 10$ ) low stress; recommendation - assess stress of other types of computer users

Table 3 (Continued)

Review of Literature Matrix			
	Topic of Research	Methodology	Outcome (s) / Recommendation (s)
Hudiburg (1999)	grant to revise CHS	questionnaire-CHS	10 most frequent hassles - slow program speed(84%); slow computer speed(78.2%); lack of computer expertise(76.5%); slow download/webpage loading time(76.5%); lack of help w/ computer problem (74.8%); slow web browser speed (71.4%); network/server is down(70.6%); viewing monitor too long(69.7%); computer peripherals problem(68.9%); busy website(68.1%)
Hudiburg & Jones(1991)	predicting academic performance of college students enrolled in computer course	correlation; questionnaire	CHS correlated w/ somatic complaints & self rated computer knowledge but not correlated to # of yrs using a computer; CHS & self rated computer knowledge predicts computer course grade; recommendation-factorial analysis of CHS

Table 3 (Continued)

Review of Literature Matrix			
	Topic of Research	Methodology	Outcome(s) / Recommendation (s)
Hudiburg, Ahrens, & Jones (1994)	college students; computer users' stress; somatic complaints; anxiety (age, sex, yrs in school, computer knowledge, major)	questionnaire-CHS; convergent validity; correlations	as computer knowledge increased, somatization & anxiety decreased
Hudiburg, Brown, & Jones (1993)	computer users' stress in business environment - business employees w/ information systems (sex, education, age, computer experience)	questionnaire-CHS; test-retest reliability; descriptive stats; correlation	women w/ educational degrees experienced computer stress; computer hassles correlated w/ somatic complaints & amount of education; recommendation - clarify sex effects by studying coping strategies for those experiencing computer stress
Hudiburg & Necessary (1996a)	somatization - physical symptoms; psychic - anxiety symptoms	questionnaire	computer users w/ high computer stress tend to have more psychic & physical symptoms
Hudiburg, Pashaj, & Wolfe (1999)	computer stress; personality	questionnaire; correlation; regression analysis	personal characteristics of computer users effect computer related stress

Table 3 (Continued)

Review of Literature Matrix			
	Topic of Research	Methodology	Outcome(s) / Recommendation(s)
Kupersmith (1992)	technostress, reference librarians	content analysis	librarians - 4 related contexts- performance anxiety, information overload, role conflicts, organizational factors; coping-relax, stay healthy, have positive attitude, manage your time, set realistic goals; what managers can do- believe in each other, foster cooperation, organize & filter information, provide hands-on practice, distribute the expertise, simplify the technicalities, lower anxiety threshold, set priorities
Loyd & Gressard (1984)	sex, age, computer experience, computer attitudes, students (h.s., community college, liberal arts college)	correlations; ANOVA; questionnaire-computer attitude scale(CAS)	the more computer experience the more positive the computer attitude; sex did not effect computer attitudes

Table 3 (Continued)

Review of Literature Matrix			
	Topic of Research	Methodology	Outcome(s) / Recommendation(s)
Maurer & Simonson (1993)	computer anxiety, relaxation training, previous computer coursework, achievement, cognition need; college students	questionnaire-CAIN, cognition scale; examine effectiveness of relaxation training for reducing stress; build body of knowledge related to computer anxiety; replicate Honeyman & White (1987) - stress was reduced after semester long course but not during 1 <sup>st</sup> part of semester	computer instruction can be effective in reducing computer anxiety; those w/ previous computer experience had lower computer anxiety; reduced anxiety occurred in 2 <sup>nd</sup> part of course; effectiveness of short or condensed courses and reduction of computer anxiety; cognition & computer anxiety reduction; personality; relaxation training slightly effective in reducing anxiety; reduction of computer anxiety in 1 <sup>st</sup> part of course

Table 3 (Continued)

Review of Literature Matrix			
	Topic of Research	Methodology	Outcome (s) / Recommendation (s)
McKenzie, Davidson, Bennett, & Clay (1997)	school librarians; teachers; technostress	recent study of technostress-methodology not identified	ways to cope - become aware of technostress level; examine time management skills & make adjustments when necessary; increase your awareness of & use of technology in classroom; take time to relax; seek training; establish cooperative/collaborative relationships w/ school & business/industry that focus on enhancing school's technological environment; demonstrate new technology; keep administrators informed of technostress levels
Meier (1988)	psychology/social work college students; sex, computer experience, computer skills; attitudes toward computers	questionnaire	developed Computer Aversion Scale(CAS), demographics-education, gender, computer ownership

Table 3 (Continued)

Review of Literature Matrix				
	Topic of Research	Methodology	Outcome(s) / Recommendation(s)	
Morrow, Prell, & McElroy (1986)	computer anxiety; college students	correlations	computer knowledge & experience relate to anxiety-low positive relationship (more knowledge and experience, less anxiety)	
Murphy, Coover, & Owen (1989)	self efficacy (Bandura, 1986) - estimation of one's ability to perform a task successfully	factor analysis; 2x2 MANCOVA	3 factors-beginning & advanced computer skills & mainframe computer skills; recommendation-self efficacy & sex need further investigation	
O'Daniel (1999)	coping with technostress	limited content analysis	list of Hudiburg's top 10 most common hassles (Hudiburg 1995)	
Popovich (1994)	computer anxiety; resistance; technostress; library staff-OHIOLink	survey creation	as implementation of new system progressed technostress/computer anxiety decreased	



Table 3 (Continued)

Review of Literature Matrix			
	Topic of Research	Methodology	Outcome(s) / Recommendation(s)
Raub (1981)	computer anxiety; college students; age sex, major, computer experience	questionnaires; interviews	low computer anxiety; high computer experience; no relationship between age & computer anxiety; business majors had less computer anxiety than education majors
Reed & Overbaugh (1993)	teacher education students; computer anxiety; computer experience	ANOVA; correlation	students w/ no prior computer experience had higher anxiety levels than those w/ computer experience
Ryce (2001)	librarians; technostress	methodology not indicated	coping- eat sensibly, exercise, and get enough sleep; librarians must remember that it is not necessary to 'know it all'; few librarians can be expected to be familiar with every feature of every database or computer application; communicate problems; offer feedback; stay informed; keep a sense of humor

Table 3 (Continued)

Review of Literature Matrix			
	Topic of Research	Methodology	Outcome(s) / Recommendation(s)
Sievert, Albritton, Roper, & Clayton(1988)	computer anxiety -library	analysis of variance	age & sex did not relate to anxiety; computer experience reduced anxiety; older less educated females did not have high anxiety
Simonson, Mauer, Montag-Toradi, & Whitaker(1987)	computer anxiety	reliability/validity; questionnaire- create CAIN (computer anxiety index)	business sector had lower anxiety; recommendation- re-evaluate &revise instrument
Smith & Nelson (1983)	librarian burnout	correlation	7 factors correlate to lib burnout-control of stress in one's life; gastrointestinal disturbances; headaches; sleeplessness; success on the job; back problems; job 10 yrs from now; librarians do not seem to burnout; recommendation- concentrate on librarians' personality types who show strong tendency to burnout

Table 3 (Continued)

Review of Literature Matrix			
	Topic of Research	Methodology	Outcome(s) / Recommendation(s)
Spotts & Bowman (1995)	faculty; computer knowledge	questionnaire	wp(77%); videos(53%); audio(50%); film(47%); spreadsheets(38%); e-statistics(36%); e-mail(32%); computer assisted instruction(23%); presentation(16%); computer conferencing(16%); multimedia(13%); distance ed(9%); no gender differences; COBA more knowledgeable than other colleges
Stevens (1982)	educator perceptions of computers	one way analysis	apprehension of modeling techniques & computer technology to aspiring educators; teachers less anxious in '81 than in '79; teachers need computer training

## CHAPTER III

### METHODOLOGY

#### Introduction

The Information Age has grown rapidly and has vastly changed society due to the continual growth in and improvement of technology (Senese, 1984; Hulbert, 1998). Higher education has also been affected by this change and growth. This in turn has affected the roles played by administrators, faculty, and academic librarians in higher education (Davis-Millis, 1998; Brand, 2000), who must define how technology will be used on their campuses, and how those campuses will be described after the implementation and utilization of technology. Finally, it has become necessary for administrators, faculty, and academic librarians to determine how they will support one another once the use of technology has been defined.

The University System of Georgia's (USG) mission states "individual institutions will be characterized by technology to advance educational purposes, including instructional technology . . ." (University System of Georgia Board of Regents, 2002, p.1). The goals of the USG include the increase of academic productivity through the use of current technology (University System of Georgia Board of Regents, 2002). Subsequently, while summarizing its mission statement

and goals, the University System of Georgia declared they would hold themselves "accountable to the citizens of Georgia for the effective and efficient use of . . . new technology . . . (University System of Georgia Board of Regents, 2002, p.2)."

Technology is being used in the USG's thirty-four institutions as an educational tool. Among those faculty members and academic librarians who use technology, some experience much difficulty adapting to and interacting with technology, consequently experiencing varying levels of technostress.

#### Research Questions

The researcher has determined a need to investigate whether computer skills relate to the levels of technostress among academic librarians, and faculty in the Colleges of Business and Education. The primary research question will be answered by the following sub-questions:

1. How do the business and education faculty and academic librarians rate their computer skills?
2. At what levels do the business and education faculty and academic librarians experience technostress?
3. Do differences in technostress and computer skills exist among business and education faculty and academic librarians, and if there are differences, do these

differences still persist once college unit/affiliation, age, sex, rank, tenure status, and classification status have been considered?

4. Is there a correlation between the self-rated computer skills of the business and education faculty, and academic librarians and the levels of technostress they may experience?

5. Does the correlation between the self-rated computer skills and levels of technostress still exist once college unit/affiliation, age, sex, rank, tenure status, and classification status have been considered?

6. What are the possible causes identified by business faculty, education faculty, and academic librarians in higher education when they experience technostress?

7. How do the business faculty, education faculty, and academic librarians cope with technostress?

#### Data Collection

#### Research Design

The researcher created a survey instrument based on the Computer Hassles Scale (Hudiburg, 1999) and Computer Skills Survey (May, 1998). The new instrument was used to collect data for determining the extent to which computer skills relate with levels of technostress among faculty in the Colleges of Business and Education, and academic

librarians. In addition to obtaining participants' ratings of their computer skills and severity levels of technostress, the instrument was also used to determine perceived causes of and solutions for coping with technostress. Demographic information was collected and frequencies (total number of times something occurs), means (total sum of all cases divided by the number of cases studied), and standard deviations (shows how much distribution exists between scores from the mean) (Fraenkel, Wallen, & Sawin, 1999) were used to describe the participants of the study. The demographic information was also used to determine if any differences in the levels of technostress and computer skills related to the participants' college unit/affiliation, age, sex, rank, tenure status, or classification status using correlations, and ANOVAs. Selected demographics were also used to determine correlations and differences, if any existed, between the participants' computer skills and/or technostress levels.

### Population

Surveying all computer users within the University System of Georgia would require time and costs not available to the researcher. Instead, the researcher selected three groups of computer users from the literature who

participated in similar studies. The participants were college students majoring in business and education (Hudiburg & Necessary, 1996b), and academic librarians, who participated in a technology resistance study over twenty years ago (Fine, 1979b). While limited research has been conducted on faculty, it has been determined that some students who major in business and education may become faculty in Colleges of Business and Education (Bureau of Labor Statistics, 2003). Hence, the three groups of computer users selected for participation in this study were College of Business (COBA) faculty, College of Education (COE) faculty, and academic librarians.

Hudiburg (1995) suggested that further research on technostress be conducted by collecting data from other types of computer users not previously studied. Hence another reason for the selection of faculty from the Colleges of Business and Education, and academic librarians. Additional reasons for selecting these groups included personal observations made by the researcher. The researcher noticed computer workstations in the COBA lecture classes. The researcher has observed business faculty using computers during their lectures, in addition to using the television with VCR, overhead panel for displaying transparencies, and white board. The COBA faculty were also



selected due to the nature of their work and involvement with the business industry. This involvement between the business industry and COBA faculty includes the rapid introduction, development, and utilization of technology in preparing business majors for the workplace after graduation.

The College of Education faculty was the second group of computer users identified by the researcher as participants for this study. The researcher made this selection based on personal observations as well. While attending classes in preparation for this study the researcher noticed little or no technology in the classroom (e.g., only observed television with VCR, overhead projector for viewing transparencies, and white board). In most instances if technology was in the classroom, the COE faculty teaching the researcher's classes only utilized the overhead projector and/or white board during lectures.

Furthermore, the researcher visited COE web sites of the University of Georgia, Georgia State University, Georgia Southern University, and Kennesaw State University to determine their mission in regards to technology use in their College of Education and programs offered. Mission statements indicated a commitment to the integration of emerging technologies that would enhance instructional

delivery, the learning process, faculty competence in using and encouraging technology use, and help students to understand new styles of learning and teaching. There was also a commitment to create leaders, encourage creative thinking, and diverse learning as well as responding to projected changes in technology through teaching, service, and research (Georgia Southern, 2002; Georgia State University, 2003; Kennesaw State, 2002; University of Georgia, 2002).

Finally, as an academic librarian, the researcher has daily exposure to technology due to job responsibilities and personal interests. This group of computer users was selected because of personal observations by the researcher in witnessing other academic librarians' interaction with and reaction to technology as the implementation of technology in the library has rapidly increased and changed. Additionally, librarians participated in a previous study dealing with technology resistance (Fine, 1979b).

Business and education faculty, and academic librarians employed at four institutions in the University System of Georgia with full graduate programs constituted the sampling frame ( $n=1,146$ ). Institutions with graduate programs were selected because of the emphasis in teaching, research, and service. The selected institutions (Georgia Southern

University, Georgia State University, University of Georgia, Kennesaw State University) are four-year public institutions with Colleges of Business and Education, and academic libraries. Two universities (Georgia Institute of Technology and Medical College of Georgia), with full graduate degree programs were eliminated due to the lack of a College of Business or a College of Education. State colleges and state universities except one, and all two year institutions were eliminated because they lack graduate programs or have non-equivalent enrollments.

#### Sample

The total population for the four institutions participating in the study was approximately 3,773 faculty including academic librarians from all college units (University System of Georgia, 2002). The sampling frame (see Table 4) consisting of the Colleges of Business and Education, and academic librarians was approximately 1,146 from Georgia State University, Georgia Southern University, University of Georgia, and Kennesaw State University (University System of Georgia). The number of faculty in the Colleges of Business for all four institutions is 490. The Colleges of Education faculty total 525 for the participating institutions. Lastly, 131 academic librarians are employed at these institutions. Participants' names, and

mailing and e-mail addresses were obtained by contacting their departmental secretaries, department heads/chairs, deans, or web site. During the second week of May 2003, the participants were notified by e-mail regarding the purpose of the study. All persons in the selected sample were asked to participate in the study. Those persons who chose not to complete the survey notified the researcher to have their contact information and numerical code removed from the participants list, and they no longer received correspondence about the study. Similarly, persons no longer employed at the selected institutions were also removed from the list. This information was provided to the researcher by the person distributing the packets at each institution. Names needing to be removed from the participants list were received before and after the survey packets were mailed (see Table 5).

The researcher attempted to obtain as many responses as possible. If the response rate was low, the researcher e-mailed each non-respondent requesting the person to participate in the study. The e-mail contained a link to the on-line survey. Non-respondents were asked to participate by completing the survey on-line or returning the paper survey via snail mail. These persons were also reminded of where to locate their numerical code found on the paper survey or

they could e-mail the researcher to obtain their code. After the removal of all uninterested or ineligible participants, the total sampling frame was reduced to 994 participants.

Table 4

Total Population for Selected Institutions

	GaSou	Ga State	KSU	UGA	Total
COBA <sup>a</sup>	95	175	78	142	490
COE <sup>b</sup>	76	139	34	276	525
LIB <sup>c</sup>	16	33	13	69	131

Note. N=1,146

<sup>a</sup>COBA is the College of Business Administration.

<sup>b</sup>COE is the College of Education.

<sup>c</sup>LIB is Library.

Table 5

All Eligible Participants by Unit for Each Institution

	COBA	%	COE	%	LIB	%	Total	%
GaSou	86	8.65	59	5.94	15	1.51	160	16.10
GaState	154	15.49	130	13.08	28	2.82	312	31.39
KSU	73	7.34	34	3.42	13	1.31	120	12.07
UGA	109	10.97	239	24.04	54	5.43	402	40.44
Total	422	42.50	462	46.50	110	11.10	994	

technological

### Research Instrument

Several instruments had been created to measure computer anxiety, computer stress, computer attitudes, computer phobia, and computer stress symptoms (Degoratis, Lipman, & Covi, 1973; Cohen, Kamarck, & Mermelstein, 1983; Oetting, 1983; Nickell, & Pinto, 1986; Rosen, Sears, & Weil, 1987). However, there was an instrument developed and revised to measure technostress by assessing the potential stressors resulting from the users' interaction with computer technology (Hudiburg, 1989b; Hudiburg, 1999). This instrument was known as the Computer Hassles Scale - Revised (CHS-R).

Hudiburg (1997) explained technostress could be measured in one of three ways: (1) assess the potential stressors, (2) measure the attitudes toward computers, or (3) assess the reactions to the stressors. The CHS-R was used to measure technostress by assessing the potential stressors summarized by eight items: (1) computer runtime problems, (2) computer information problems, (3) Internet/e-mail problems, (4) everyday computer technology, (5) computers' impact on society, (6) computer as person, (7) computer processing speed, and (8) computer costs. However, based on a factor analysis, the three items used to measure technostress for this study are (1) computer runtime

problems, (2) computer information problems, and (3) Internet/e-mail problems. Hudiburg (1992) recommended "further research to evaluate empirical performance of a shortened version of the Computer Hassles Scale" based on its sub-scales (p. 743). Hudiburg (1995) also suggested the instrument be used for assessing other possible relationships with categories of users not previously studied. Used primarily to find relationships with similar instruments, the CHS-R had not been used to assess the stress levels of computer users (Hudiburg). Consequently, these were the reasons for selecting the CHS-R where the three main items were used to assess technostress.

The Computer Skills for Faculty - A Faculty Self Assessment (May, 1998), was also included for participants to rate their level of computer skills. Examples of the skills respondents rated included "use of e-mail", "handle and use disks and cd-roms", "record, track, and report grades and attendance electronically", and "use proper computer start-up and shutdown procedures". The Computer Skills survey was used because it was designed and tested to address computer skills learned, taught, and/or experienced by faculty and academic librarians at institutions within the University System as perceived by the researcher. Compared to other instruments found, this

one appeared to have the most clear and succinct statements which identified the skills the researcher was trying to locate.

Open-ended questions were used to obtain a more narrative explanation of perceptions regarding the possible causes of and possible solutions for coping with technostress as perceived by those responding to the survey. Respondents were asked to provide answers in the demographics section relating to (1) college/unit affiliation; (2) faculty rank; (3) tenure status; (4) age; (5) software applications or programs used; (6) number of hours per week spent using computers; (7) teaching level; (8) sex; (9) faculty status; and (10) classification status. Lastly, some of the demographics (college unit/affiliation, teaching level, faculty status, rank, tenure status, classification status, and software applications used) selected had not yet been studied based on the review of the literature. For these reasons, a shortened version of the CHS-R was combined with the Computer Skills for Faculty Self Assessment, two open ended questions, and demographics section to create an instrument which was used to collect quantitative and qualitative data from participants.



## Validity and Reliability

### Computer Hassles Scale

Originally called the Computer Technology Hassles Scale, the CTHS was a 63-item Likert scale created in 1989 by Dr. Richard Hudiburg (1999), Psychology Professor at the University of North Alabama. The instrument was revised and renamed the Computer Hassles Scale - Revised (CHS-R). The CHS showed moderate test-retest reliability ( $r=.60$ ) and high internal consistency reliability (coefficient  $\alpha=.95$ ). The CHS was also a predictor of computer course grades ( $r=.32$ ), measured general stress ( $r=.54$ ) and stress responses ( $r=.57$ ) (Hudiburg & Necessary, 1996b; Hudiburg, 1997). The CHS-R correlated ( $r=.40$ ) with the somatization/anxiety rating while high internal consistency reliability (coefficient  $\alpha=.912$ ) was demonstrated with the CHS-R (Hudiburg, 1999).

Factor analysis was performed by Hudiburg (1992) on the CHS-R to determine the items or factors which made up the instrument. The items with the highest loadings determined what the CHS-R measured. Determined by the factor analysis, the CHS-R measured eight items - computer runtime problems, computer information problems, everyday computer technology, computers' impact on society, computer as person, computer processing speed, computer costs, and computerized

correspondence (Internet/e-mail). Computer runtime (coefficient  $\alpha=.96$ ) and computer information (coefficient  $\alpha=.89$ ) problems were considered to be the two major factors making up the CHS-R. Additionally, items within each factor received a high factor loading after the factor analysis. This factor loading helped to clearly define or explain each factor (Fraenkel, Wallen, & Sawin, 1999). As a result, statements with the highest weights from the major factors (computer runtime problems, computer information problems, and Internet/e-mail problems) were selected to create a shortened CHS-R.

Due to the length of the CHS-R (63 items), the researcher studied the factorial analysis conducted on those items (Hudiburg, 1992) and reduced the scale to 39-items by selecting the items with the highest loadings. The shortened CHS-R, 39-item instrument was found to provide reliable scores as indicated by a Cronbach's  $\alpha$  of 0.95 for data in the current study.

#### Computer Skills Survey

The Computer Skills for Faculty - A Faculty Self-Assessment (Computer Skills) survey was a 26-item Likert scale, created by Dr. Susan May, Terri Langan, and Carol Tyler (1998). The Computer Skills survey was modeled after an instrument created by Dr. May, Vice President of

Instructional Technology at Fox Valley Technical College, as a part of her doctoral research (S. A. May, personal communication, March 6, 2002). However, one item was removed because it duplicated another item on the scale; therefore, the Computer Skills survey was reduced to 25-items.

The original instrument was tested for validity but not reliability. Content validity was established when May gave a committee of reviewers copies of literature reviews which contained standards of competencies. The reviewers used the competencies to determine whether the self-rated survey measured the same competencies. Any feedback was given to the survey creator. Face validity was also conducted by instructors at Fox Valley Technical College who taught the workforce training courses. These instructors were asked to complete the survey and provide any feedback to the survey creator. Based on the feedback obtained from the reviewers, May revised the original instrument. The Computer Skills Survey, created by Dr. May, was based on the original survey created in 1998. However, validity and reliability information was not available for this instrument even though the instrument was pilot tested before implementation. For the current research, reliability analysis for the current study was performed on the 25 item

scale and the results indicated that the instrument was also highly reliable (coefficient  $\alpha=0.95$ ).

## Procedures

### Pilot Study

Initially, the researcher conducted a pilot study for one week to establish usability and participants' understanding of the newly created instrument. The researcher was unable to determine the reliability of the instrument because there were too few cases. Additionally, the results from the pilot study indicated which was better to investigate - severity level of potential computer hassles, frequency of potential computer hassles, or both. The instrument used for the pilot study consisted of four sections : (1) CHS-R statements, (2) Computer Skills statements, (3) open-ended questions, and (4) demographics. The length of the survey was also assessed. The instructions for the original CHS-R statements directed participants to select their responses based on the level of severity they experienced with each potential computer hassle. There was a possibility that participants responding to the CHS-R statements would answer based on frequency rather than on the severity level of their experience. With that in mind, the first section containing the CHS-R statements was sub-

divided into two parts; (a) severity level and (b) frequency.

Packets for the pilot study consisted of the instrument (reduced statements from the CHS-R, Computer Skills statements, two open-ended questions, and demographics), cover letters explaining the pilot and dissertation studies, and questions requiring feedback. The packets were mailed via intercampus mail. The cover letter explained the purpose of the study, asked the reviewer to participate, provided the address for the web based survey, and identified the five digit numeric code.

The pilot study was given to a panel of six reviewers consisting of members from the corps of instruction including one librarian with faculty status (see Appendix F). The reviewers were employed by Georgia Southern University and East Georgia College. The reviewers were asked to respond to the instrument (on paper or on-line) and provide feedback to questions pertaining to the survey (see Appendix I).

Reviewers accessing the web based survey were required to enter their five digit numerical code as the username and password provided in the cover letter. A reminder of where to find the numerical code was placed on the main web page which linked to the survey. The results from the web based

survey were not e-mailed to the researcher unless the reviewer responded to all questions. If any questions were omitted, the reviewer received a message listing all unanswered questions. The message also directed the reviewer to click the web browser's "BACK" button in order to return to those unanswered questions. By clicking the "BACK" button, all previous answers were stored until all responses were selected for the unanswered questions. All responses received were kept confidential. For each reviewer completing the survey on-line, their numerical code was included in the e-mailed response sent to the researcher after the reviewer typed his/her numerical code onto the web survey.

All survey responses and feedback from the questions were mailed or e-mailed to the researcher for analysis. Reviewers determined the directions were clear but the length of the survey was long. Yet there was no way to shorten the questionnaire because all the information being asked for and all the information explaining the purpose of the study was necessary. Furthermore, the reviewers found that investigating the severity level of the potential computer hassles was best because one could not measure how often (s)he experienced a particular hassle unless every occurrence of that hassle was recorded. Based on the

reviewers' comments, the survey instrument was revised to comprise (1) severity level of computer hassles (technostress) section, (2) level of computer skills section, (3) two open-ended questions, and (4) demographics. Lastly, the revised survey was analyzed accordingly to establish reliability (coefficient  $\alpha=0.95$ ).

#### Dissertation Study

After completing the pilot study, academic librarians, and business and education faculty from Georgia Southern University, Georgia State University, Kennesaw State University, and the University of Georgia were e-mailed during the second week of May 2003. The researcher wanted to notify the selected participants (1) to make them aware of the packets they would be receiving the following week in regards to the dissertation study, and (2) to give them the opportunity to be removed from the study as a selected participant. The following week, the researcher grouped packets by institution and mailed them via FedEx through her home library's Interlibrary Loan Service. The packets consisted of the refined instrument enclosed with a cover letter explaining the research project to all selected participants. A self-addressed stamped envelope was included for all non-Georgia Southern University participants. The cover letter explained the purpose of the study, asked for

the person to participate, provided the address for the web based survey, and identified the five digit numeric code. Participants were given the option of completing the survey instrument electronically and having the results e-mailed to the researcher or completing a numbered, color-coded paper copy and mailing the results back to the researcher for data analysis received from all non-Georgia Southern University respondents. The survey was copied onto four different colors of paper and each copy had a five digit numeric code randomly assigned to each participant from a table of random numbers (Centre for Innovation in Mathematics Teaching, 1995; Sungur, 2001) and was shown in the bottom right hand corner of each survey page. The numbered, color-coded paper copies were also used to track participants who did not respond so the researcher could follow-up by e-mail after the initial two weeks of data collection. Additionally, the four colors identified the institutions selected for participation.

Initially, participants accessing the web based survey were required to enter their five digit numerical code as their username and password before they gained access to complete the on-line survey. However, due to a server problem, participants were not prompted for a username and password. As a result, they received immediate access to the



on-line survey. Furthermore, the researcher was able to verify each respondents's numerical code as their results were submitted by e-mail. A reminder of where to find the numerical code was placed on the initial web page which linked to the survey. The results from the web based survey were not e-mailed to the researcher unless the participant responded to all questions. If any questions were omitted, the participant received a message listing all unanswered questions. The message also directed the participant to click the web browser's "BACK" button to return to those unanswered questions. By clicking the "BACK" button, all previous answers were stored until all responses were provided for the unanswered questions. All responses received were kept confidential. For each participant completing the survey on-line, their numerical code was included in the e-mailed response sent to the researcher after the respondent typed the numerical code onto the web survey. These numerical codes were used to track non-respondents. There was an extra radio button on the web survey found in the demographics section for participants to click in order to identify their institution. Regardless of the response submission method, respondents were not expected to identify themselves personally because this

information was not vital to the study. And all results (regardless of format) were collected for a two week period.

#### Paper Version of Survey

The survey used for this study had four sections: (1) CHS-R statements, (2) Computer Skills statements, (3) open-ended questions, and (4) demographics. When completing the CHS-R section, participants circled the number corresponding to the severity level of each potential computer hassle they experienced. The answer choices for severity level were 0=not at all, 1=rarely severe, 2=moderately severely, and 3=extremely severe. Next, participants completed the Computer Skills section. Each person rated his/her computer skill level by circling the number that most accurately reflected their current level for each skill listed. The choice of answers were 1=low, 2, 3=medium, 4, and 5=high. The business and education faculty, and academic librarians then answered two open-ended questions which asked what they perceived to be as possible causes of and possible solutions for coping with technostress. Lastly, business and education faculty, and academic librarians responded to the following demographic items: (1) college/unit affiliation; (2) faculty rank; (3) tenure status; (4) age; (5) software applications and programs used; (6) number of hours per week spent using

computer technology; (7) sex; (8) faculty status; (9) classification status; and (10) teaching level.

#### Web Version of Survey

Alternatively, participants also completed the instrument electronically by completing the web-based form posted on the Internet. Each business and education faculty member or academic librarian wanting to complete the instrument on-line used the same numeric code found on their colored paper copy of the survey by entering that numerical code on the web survey. If the numerical code was not entered, the participant would not be able to submit their results. Similar to the paper survey, the code was used to track those who had not responded to the survey in order for the researcher to follow-up after the initial two week period. Each participant completed the CHS-R section by clicking the radio button corresponding to the appropriate severity level of each computer hassle experienced. The answer choices were the same as the ones on the CHS-R section of the paper copy. Similarly, the Computer Skills section had clickable radio buttons corresponding to the number relating to the level of each computer skill for participants to identify their particular skill level. Again, the answer choices were the same as those on the Computer Skills section of the paper copy. Two open text

boxes were provided for respondents to type in their answers to the open-ended questions. Lastly, clickable radio buttons were provided for responding to the demographics section. If a participant omitted an answer to any question, a message appeared listing the survey items needing responses. By clicking the browser's "BACK" button, the participant's responses were saved until all responses were provided for the unanswered questions. Summarily, all responses from the CHS-R, Computer Skills, open-ended questions, and demographics were e-mailed to the researcher for data analysis.

#### Follow-Up

After a two week period, the researcher identified all non-respondents by their five digit numerical code. Those persons received an e-mail explaining the study, requesting their participation, reminding them where to find their numerical code, and telling the address of the web based survey. Again, non-respondents were given the chance to complete the survey on-line or on paper. They could complete the paper copy if they still had their copy; otherwise, a copy was not sent to them. They were told to complete the survey on-line and the researcher would provide them with their numerical code if it was requested by e-mail. A self-addressed stamped envelope was not provided to non-Georgia

Southern University participants during the follow-up process. On-line results were e-mailed and completed paper surveys were mailed to the researcher. Results were collected for an additional three week. Afterwards, all results were compiled for data analysis.

#### Data Collection

Initial data collection began on May 19, 2003 and lasted for two weeks. Only 16% of the surveys had been returned after that two week period. Between June 2 and June 9, non-respondents received another e-mail requesting participation and by the end of the week the response rate had increased to 22.5%. One last e-mail requesting participation from non-participants was distributed and surveys were collected June 10-24, 2003. By the end of this time period, the final response rate was 32.8% (see Tables 6 & 7).

Table 6

#### Participants by Submission Method of Survey

	n	Percent
paper	234	71.6
on-line	93	28.4

Table 7

Completion Rate of Participants by Unit for Each Institution

	COBA	%	COE	%	LIB	%	Total <sup>a</sup>	%
GaSou	21/86	6.42	22/59	6.73	11/15	3.36	54/160	17.7/16%
GaState	40/154	12.23	29/130	8.87	18/28	5.50	87/312	27.2/31%
KSU	17/73	5.20	20/34	6.12	6/13	1.83	43/120	13.8/12%
UGA	18/109	5.50	80/239	24.46	34/54	10.40	132/402	41.3/40%
Total	96	29.35/42%	151	46.18/46%	69	21.09/11%	316	100%

<sup>a</sup> Eleven participants did not identify their unit.

### Data Analysis

The researcher answered the overarching and sub-questions using descriptive and inferential statistics. Descriptive statistics were used to describe data in a clear and succinct way (Griffin, 1998). Inferential statistics is concerned with determining how likely it is that results based on a sample would be the same results obtained for an entire population (Gay, 1996). Question One was answered by relying on the data provided from the mean scores obtained from the Computer Skills section. The second question used results from the CHS-R section. Results were gathered by summing the responses provided. Using ANOVAs, scores obtained from the CHS-R, computer skills, and the demographic responses from question three were analyzed in SPSS to determine if any differences existed between computer skills and technostress levels before and after college unit, age, sex, tenure status, rank, and classification status had been considered. While comparing two or more group means, an analysis of variance (ANOVA) determines if statistically significant differences exist between the means (Griffin, 1998). Question four used the mean scores from the Computer Skills and the summed scores from the CHS-R. SPSS was used to perform a correlation test to determine if a negative or positive relationship existed between the computer skills level, and the level of technostress.

Using a correlation, question five relied on scores from the CHS-R and computer skills responses to identify if any relationships existed before and after considering college unit, age, sex, tenure status, rank, and classification status. Correlations determined whether two or more variables related. If there were relationships, the strength and direction of those relationships were revealed (Griffin). Questions six and seven were analyzed by the researcher by observing and commenting on any common themes found throughout the responses given for the possible causes of and possible solutions for coping with technostress. Lastly, survey usability and reliability results from the pilot study were analyzed.

#### Summary

The researcher determined a need to investigate whether computer skills related to the levels of technostress. Education and business faculty, and academic librarians from Georgia State University, Georgia Southern University, Kennesaw State University, and the University of Georgia were selected for participation in this study. Participants were given the option of completing the instrument containing four sections electronically or traditionally. Data collected was analyzed using quantitative and qualitative statistical methods using SPSS v. 11.5.



## CHAPTER IV

### REPORT OF DATA AND DATA ANALYSIS

The data and data analysis are reported in this chapter. A concise review of the intent of the research is also provided. Each sub-question followed by the overarching question will be addressed individually with an overall summary at the end of the chapter.

#### Introduction

The intent of this study was to investigate whether computer skills relate to the levels of technostress among academic librarians and faculty in the Colleges of Business and Education. Participants in this study were selected from four University System of Georgia institutions. These institutions have graduate programs, emphasize teaching, research, and service, and they are four-year public institutions that met the criteria of having Colleges of Business (COBA) and Education (COE), and an academic library (LIB).

Participants rated their experience level when they performed selected computer skills (25 items) as well as identified the severity level when they experienced certain computer hassles (39 items). Additionally, open-ended questions were used to obtain a more narrative explanation of business and education faculty, and academic librarians'

perceptions of what caused technostress and how they coped with that stress. Lastly, the demographics (college unit/affiliation, teaching level, faculty status, rank, tenure status, classification status, and software applications used) collected were used to describe the population.

#### Research Questions

The proposed study was designed to answer the following research question: Do computer skills relate to the levels of technostress among faculty in the Colleges of Business and education, and academic librarians? The following seven related sub-questions were addressed:

1. How do the Colleges of Business and Education faculty, and academic librarians rate their computer skills?
2. At what levels do the faculty in the Colleges of Business and Education, and academic librarians experience technostress?
3. Do differences in technostress and computer skills exist among faculty in the Colleges of Business and Education, and academic librarians, and if there are differences, do these differences still persist once college unit/affiliation, age, sex, rank, tenure status, and classification status have been considered?

4. Is there a correlation between the self-rated computer skills of the business and education faculty, and academic librarians and the levels of technostress they may experience?
5. Does the correlation between the self-rated computer skills and levels of technostress still exist once college unit/affiliation, age, sex, rank, tenure status, and classification status have been considered?
6. What are the possible causes identified by business faculty, education faculty, and academic librarians in higher education when they experience technostress?
7. When technostressed, how do the business faculty, education faculty, and academic librarians cope with technostress?

## Data Analysis

### Descriptive Statistics

Participants were categorized by teaching level (see Table 8), sex (see Table 9), age (see Table 10), faculty status (see Table 11), rank (see Table 12), tenure status (see Table 13), classification status (see Table 14), number of hours per weekly use of computers (see Table 15), institution (see Table 16), and software used (see Table 17-18). Education faculty represented the largest group within the sample. However, business faculty were under-represented

because they represented 42% of the sampling frame but 29.35% participated in the study. And academic librarians were over-represented since they represented 11% of the sampling frame and 21.09% participated in the study. More females responded than males while more Librarian III/associate professors and Librarian IV/full professors were represented. The majority of those who participated in the study were teaching faculty. Less than half of the sample participants used the computer 31 or more hours each week. UGA participants had the largest response rate (see Table 7). Additionally, business and education faculty, and academic librarians also identified the computer applications they used the most with e-mail ranking first (see Tables 17-18).

On a scale from zero (not at all) to three (extremely severe), the business and education faculty, and academic librarians from the selected institutions indicated how severe 39 different computer hassles had been for them when they used computer technology (see Table 19). They were also asked to rate their skill level relating to 25 computer skills on a scale from one (low skill) to five (high skill). Each person's computer skill level was determined by finding the mean score where the ranges were zero to 125 (see Table 19).

Sub-Question 1: How do the business and education faculty  
and academic librarians rate their computer skills?

Findings

Faculty from the College of Business reported the highest computer skill level with a rating of 3.81. College of Education faculty reported the lowest computer skill level of 3.65. Librarians reported a computer skill level of 3.67 (see Table 19). These differences, however, were not statistically significant, thus differences observed here may be due to sampling error.

Sub-Question 2: At what levels do the business and education  
faculty and academic librarians experience technostress?

Findings

Librarians reported the highest severity level of experienced computer hassles with a score of 46.19. Business faculty reported the lowest level of severity (41.72), and College of Education faculty reported a summed score of 42.33 (see Table 19). These differences, however, were not statistically significant, thus differences observed here may be due to sampling error.

Table 8

Participants by Teaching Level

	n	Percent
undergraduate	41	13.0
graduate	78	24.7
both	154	48.7
not applicable	43	13.6

Table 9

Participants by Sex

	n	Percent
male	155	49.1
female	161	50.9

Table 10

Participants by Age

	n	Percent
24-40	76	24.1
41-50	103	32.6
51-60	107	33.9
61-70	30	9.5

Table 11

Participants by Faculty Status

	n	Percent
adj/temp/visiting <sup>a</sup>	20	6.6
full-time	284	93.4

<sup>a</sup>Adjunct/temporary/visiting

Table 12

Participants by Rank

	n	Percent
asst. professor/ lib II	84	28.3
assoc. professor/ lib III	87	29.3
full professor/ lib IV	87	29.3

Table 13

Participants by Tenure

	n	Percent
tenure	159	50.3
tenure-track	64	20.3
non-tenured	77	24.4
not applicable	16	5.1

Table 14

Participants by Classification

	n	Percent
teaching faculty/staff lib/archivist w/ faculty status	205	65.7
lib/archivist w/out faculty status	60	19.2
department chair/head	9	2.9
dean/assist. dean <sup>a</sup>	23	7.4
research faculty <sup>b</sup>	5	1.6
dir/admin faculty	3	1.0
	7	2.2

<sup>a</sup>Some assistant deans used the title Associate Dean.

<sup>b</sup>These faculty members conduct research 90% of the time.

Table 15

Participants by the Number of Hours per Week the Computer is Used

	n	Percent
1-5	6	1.9
6-15	47	14.9
16-30	129	41.0
31+	133	42.2



Table 16

Participants by Institution

	n	Percent
GaSou	58	17.7
GaState	89	27.2
KSU	45	13.8
UGA	135	41.3

Table 17

Participants by the Computer Applications/Software They Used

	n	Percent
e-mail	314	99.7
word processing	313	99.4
Internet	306	97.1
presentation	280	88.9
library databases	277	87.9
spreadsheets	258	81.9
library catalog	256	81.3
databases	168	53.3

Table 18

Other Software/Applications Used by Participants

Category	Software/Application Name
Statistical/Math	SPSS, SAS, JMP, Nud*ist, STATA, LimDep
Web Authoring	FrontPage, DreamWeaver, Flash, Authorware, PageMaker, XML Composer
Graphical	PhotoShop, Fireworks, iPhoto, Illustrator, CAD
Accessories	Sound, calculator, games
Calendar	Groupwise
Reference/Research/Library	Wharton Data Research Services, MindManager, OCLC, Procite, Reference Manager, EndNote, library automation
Desktop Publishing	MS Publisher
Courseware/Educational	test banks, WebCT, ArcView, QuestionPoint
Business	Accounting, check writing, Quicken, TurboTax
Video Editing	GSP, Fatham, Polycom, Digital Video
Programming	Visual Basic, case tools, IDEs
Clerical	N6
Document Creation	Acrobat, NViVo
Other	subscription services, mainframe, simulation, palm pilot, naturally speaking, Micrograde, PocketPC, WinZip

Table 19

ANOVA Summary Table of Computer Skills Means and Total Severity Scores of Technostress Experienced by All Business and Education Faculty, and Academic Librarians

Unit	n	Computer Skills		Severity Levels	
		M	SD	M	SD
COBA	96	3.81	.78	41.72	19.28
COE	151	3.65	.86	42.33	20.36
LIB	69	3.67	.71	46.19	17.74
MS		.79		463.27	
df		2,315		2,315	
F		1.22		1.22	
p		.30		.30	

\*p < .05.

Sub-Question 3: Do differences in technostress and computer skills exist among business and education faculty and academic librarians, and if there are differences, do these differences still persist once college/unit affiliation, age, sex, rank, tenure status, and classification status have been considered?

Findings

As previously noted, there were no statistically significant differences among the three groups regarding technostress and computer skills. Therefore, technostress

and computer skills did not differ between unit, sex, age, tenure, rank, or classification among COBA and COE faculty, and academic librarians' computer skills (see Table 19).

Additionally, ANOVAs were calculated for each unit to determine any differences between COBA and COE faculty, and academic librarians' computer skills and their severity levels of computer hassles while considering their unit, sex, age, tenure status, rank, and classification status. There were no statistically significant differences between males and females in terms of their computer skills or technostress among any of the three groups examined (see Table 20). However, statistically significant differences were found in computer skills across the rank of education faculty (see Table 21). Associate professors in the College of Education had the highest computer skill level while COE full professors had the lowest computer skill level. Next, statistically significant differences in computer skill levels existed across the tenure status of academic librarians (see Table 22). Non-tenured librarians' computer skills were higher than those academic librarians with tenure. Finally, analyses of academic librarians' and COBA and COE faculty's age and their classification status for determining any differences among their computer skills and

severity levels were not performed due to an insufficient number of cases in the sample.

Table 20

ANOVA Summary Table of Computer Skills and Severity Levels of Technostress by Sex

Computer Skills									
Unit	Males			Females			df	MSE	F
	M	SD	n	M	SD	n			
COBA	3.88	.73	51	3.97	.76	30	1,80	.57	.10
COE	3.58	.92	69	3.74	.78	66	1,135	.79	.91
LIB	3.46	.84	11	3.57	.70	29	1,36	.49	.01
Severity Total									
Unit	Males			Females			df	MSE	F
	M	SD	n	M	SD	n			
COBA	41.53	19.73	51	43.27	19.95	30	1,80	400.12	.25
COE	45.17	20.76	69	41.52	20.04	66	1,135	425.53	1.11
LIB	45.91	15.80	11	47.10	21.29	29	1,36	372.89	.08

\*  $p < .05$ .

Table 21

ANOVA Summary Table of Computer Skills and Severity Levels of Technostress by Rank

Computer Skills												
Unit	Asst. Prof			Assoc. Prof			Full Prof			df	MSE	F
	M	SD	n	M	SD	n	M	SD	n			
COBA	4.07	.62	27	3.77	.90	22	3.87	.72	31	2,80	.57	.88
COE	3.66	.81	37	3.81	.81	53	3.48	.93	45	2,135	.70	3.65*
LIB	3.79	.72	20	3.32	.75	12	3.25	.58	8	2,36	.49	.88
Severity Total												
Unit	Asst. Prof			Assoc. Prof			Full Prof			df	MSE	F
	M	SD	n	M	SD	n	M	SD	n			
COBA	38.85	16.17	27	44.73	18.70	22	43.90	23.09	31	2,80	400.12	.18
COE	42.59	22.45	37	43.87	21.53	53	43.47	17.57	45	2,135	425.53	.10
LIB	44.05	18.14	19	52.70	19.57	10	41.29	19.27	7	2,36	372.89	.68

\*p&lt;.05.

Table 22

ANOVA Summary Table of Computer Skills and Severity Levels  
of Technostress by Tenure

Computer Skills									
Unit	Tenure			Non-Tenure			df	MSE	F
	M	SD	n	M	SD	n			
COBA	3.87	.76	55	4.00	.71	26	1,90	.64	.17
COE	3.71	.89	92	- <sup>a</sup>	-	-	1,148	.73	.73
LIB	3.02	.76	9	3.67	.66	27	1,61	.45	8.49*
Severity Total									
Unit	Tenure			Non-Tenure			df	MSE	F
	M	SD	n	M	SD	n			
COBA	43.76	20.80	55	39.08	16.85	26	1,90	374.33	1.11
COE	43.48	20.09	92	-	-	-	1,148	420.76	.58
LIB	49.44	24.23	9	46.30	16.87	27	1,61	284.76	.54

\* $p < .05$ .

<sup>a</sup>- indicates no cases were available to calculate.

Sub-Question 4: Is there a correlation between the self-rated computer skills of the business and education faculty and academic librarians and the levels of technostress they may experience?

### Findings

Pearson's correlation coefficients were calculated for scores between computer skills and technostress for each unit. Negative weak relationships were found (see Tables 19, 23-24 and Figures 1-3). In general, similar levels of negative correlations were observed across the three groups. The negative weak correlation showed that individuals with higher levels of computer skills tended to have lower levels of technostress.



Table 23

Correlations Between Computer Skills and Severity Levels of Technostress of All Academic Librarians, and Business and Education Faculty by Unit, Sex, Age, Rank, Tenure, and Classification

	r	p	n
Unit			
COBA	-.28*	.01	96
COE	-.30*	.00	151
LIB	-.34*	.00	69
Sex			
Males	-.29*	.00	155
Females	-.32*	.00	161
Age			
31-40	-.20	.10	71
41-50	-.35*	.00	103
51-60	-.42*	.00	107
61-70	-.16	.39	30
Rank			
instructor/LIB I	-.12	.51	32
asst. prof/LIB II	-.23*	.04	84
assoc. prof/LIB III	-.46*	.00	87
full prof/LIB IV	-.33*	.00	87
Tenure			
tenured	-.37*	.00	159
tenure-track	-.29*	.02	64
non-tenure	-.16	.16	77
not applicable	-.25	.35	16
Classification			
teaching faculty	-.31*	.00	205
lib/archivist w/ faculty status	-.24	.06	60

Note: Groups with fewer than 10 observations were not reported.

<sup>a</sup>Some assistant deans used the title Associate Dean.

<sup>b</sup>These faculty members conduct research 90% of the time.

\*p < .05.

Table 24

Mean Scores for Business and Education Faculty and Academic Librarians by Selected Demographics

Demographic	n	Severity	Computer Skills
Teaching Status			
undergraduate	41	42.51	3.80
graduate	78	42.54	3.51
both	154	43.24	3.85
not applicable	43	43.35	3.41
Sex			
Male	155	43.34	3.67
Female	161	42.67	3.74
Age			
31-40	71	40.58	4.02
41-50	103	44.39	3.78
51-60	107	43.58	3.58
61-70	30	43.67	3.10
Rank			
instructor/LIB I	32	40.44	3.49
asst. prof/LIB II	84	41.74	3.82
assoc. prof/LIB III	87	45.21	3.73
full prof/LIB IV	87	43.29	3.61
Classification			
teaching faculty	205	42.98	3.70
lib/arc w/ facstatus	60	46.00	3.72
dept. head/chair	23	39.96	3.89
Tenure			
tenured	159	43.78	3.72
tenure-track	64	43.67	3.73
non-tenure	77	40.87	3.68
not applicable	16	40.06	3.53

Note: Groups with fewer than 10 observations were not reported.

Sub-Question 5: Does the correlation between the self-rated skills and levels of technostress still exist once college unit/affiliation, age, sex, rank, tenure status, and classification have been considered?

### Findings

In general, results showed that similar levels of negative correlations were found for each variable and category examined, with a few exceptions (see Tables 24-25). As the computer skills for both males and females increased, their technostress levels tended to decrease. Similarly, the higher the classification status of the participants and the less computer skills (s)he had, the more technostress they experienced.

Figure 1. Bivariate correlation Between Computer Skills and Severity Levels of Technostress Among All Business Faculty.

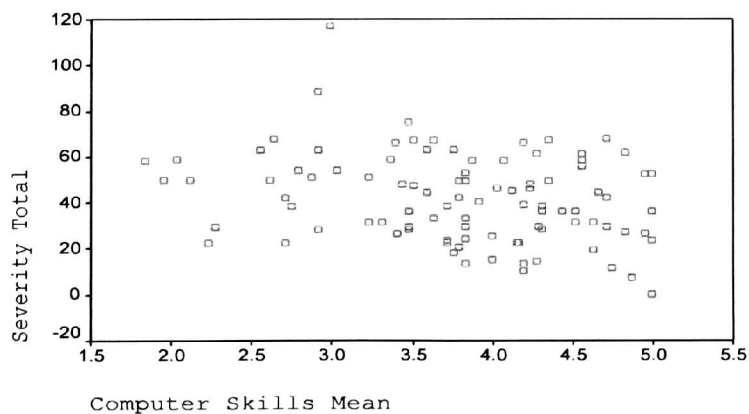


Figure 2. Bivariate correlation Between Computer Skills and Severity Levels of Technostress Among All Education Faculty.

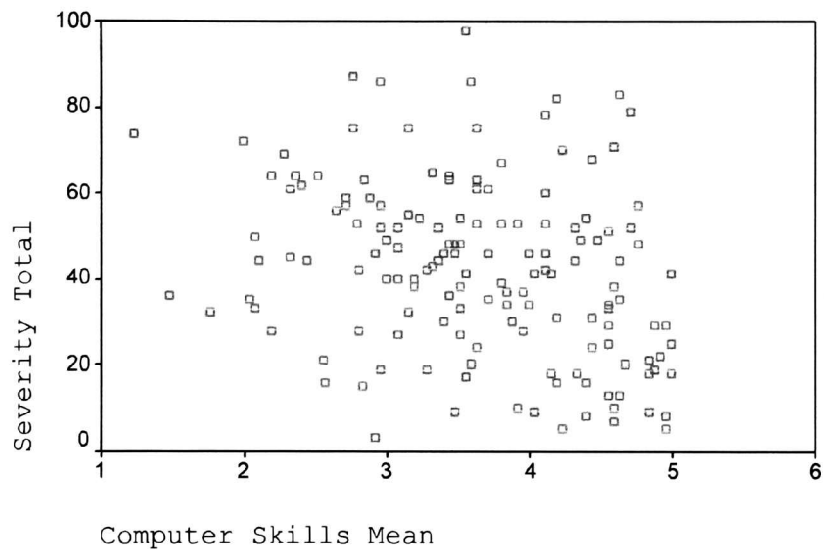


Figure 3. Bivariate correlation Between Computer Skills and Severity Levels of Technostress Among All Academic Librarians.

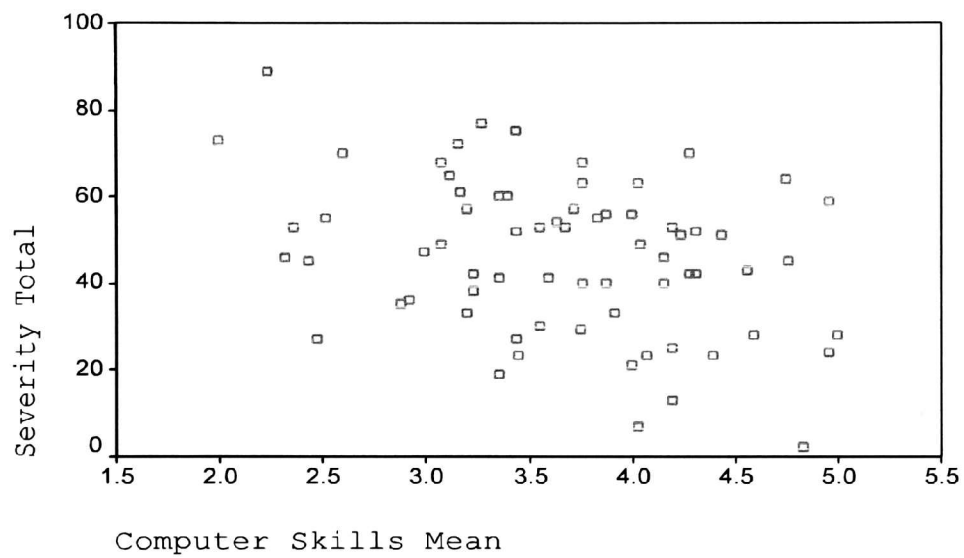


Table 25

Correlations Between Computer Skills and Severity Levels of Technostress of Each Participant Group by Unit, Sex, Age, Rank, Tenure, and Classification

		r	p	n
Sex				
	COBA			
	Males	-.33*	.00	60
	Females	-.19	.27	35
	COE			
	Males	-.25*	.02	72
	Females	-.34*	.00	79
	LIB			
	Males	-.22	.31	23
	Females	-.39*	.00	46
Age				
	COBA			
	31-40	.24	.36	16
	41-50	-.55*	.00	38
	51-60	-.27	.17	27
	61-70	-.01	.97	11
	COE			
	31-40	-.28	.10	32
	41-50	-.18	.23	44
	51-60	-.48*	.00	57
	61-70	-.20	.43	17
	LIB			
	31-40	-.22	.30	23
	41-50	-.24	.29	20
	51-60	-.49*	.01	23
Rank				
	COBA			
	astprf/LIB II	.01	.92	27
	ascprf/LIB III	-.51*	.01	22
	fprof/LIB IV	-.37*	.03	33
	COE			
	astprf/LIB II	-.22	.18	37
	ascprf/LIB III	-.39*	.00	53
	fprof/LIB IV	-.30*	.04	45
	LIB			
	astprf/LIB II	-.41	.06	20
	ascprf/LIB III	-.62*	.03	12

Table 25 (continued)

		r	p	n
Tenure				
COBA	tenured	-.38*	.00	56
	tenure-track	.07	.76	21
	non-tenure	-.34	.25	13
COE	tenured	-.33*	.00	92
	tenure-track	-.35*	.03	37
	non-tenure	-.40	.08	19
LIB	tenured	-.59	.06	10
	non-tenure	-.11	.44	45

Note: Instr/Lib I is instructor or Librarian I; astprf/Lib II is assistant professor or Librarian II; ascprf/Lib III is associate professor or Librarian III; and fprof/Lib IV is full professor or Librarian IV. Dir/admin is director or administrative.

<sup>a</sup>Includes assistant deans who may be called Associate Deans.

<sup>b</sup>These faculty members conduct research 90% of the time.

<sup>c</sup>Pearson's correlation coefficient could not be calculated.

\*p< .05.

Sub-Question 6: What are the possible causes identified by business faculty, education faculty, and academic librarians in higher education when they experience technostress?

### Findings

Participants responded to an open-ended question which asked them to identify possible causes of their technostress while using computer technology. Hudiburg (1997) identified eight categories for measuring causes of technostress. Recurring causes of technostress among academic librarians, and COBA and COE faculty were grouped according to Hudiburg's categories: (a) computer crashes and freezes (runtime problems); (b) difficulty keeping up with changes, hardware and software upgrades (information overload or information problems); (c) lack of technical support (information problems); (d) having no time to train (information problems); (e) too much e-mail (information problems); (f) increase in productivity and availability expectations (impact on society) (g) lack of knowledge (information problems); and (h) slow speed (CPU, Internet) (runtime problems). COBA and COE faculty, and academic librarians also perceived other causes of technostress (see Table 26 and Appendix J). Comments from several participants were (1) "Stress occurs when programs fail, when instructions are not clear and when hardware



crashes. I don't need to know "how" the computer works. I just need it to work." (2) "Incomprehensible and/or threatening error messages-e.g. 'You have committed an illegal error and will be shut down.' The fact that the computer makes you click 'OK' when it informs you that something . . . has gone wrong. No, it's not OK!" (3) High expectation of using computer technology to perform job and produce output. This polarizes the employees who are eager to explore and ride with new technology from those who refuse to try new technology and do not trust change through employing new technology.

Table 26

Causes of Technostress as Perceived by COBA and COE faculty,  
and Academic Librarians

Cause	Frequency
computer information problems	178
• difficulty keeping up, too many passwords	
computer runtime problems	119
• hardware failure, computer crashes	
computers' impact on society	70
• increase in expectation to use computers, increase in demand or time to use computers	
Internet/E-mail problems	48
• too much email, spam	
everyday computer technology	42
• confusing, threatening computer terminology, answer cannot be found	
computer processing speed	41
• slow CPU/Internet connection	
computer as person	8
• lack of human interaction	
computer costs	2
• software costs	

Note: Hudiburg (1997) identified eight categories for measuring causes of technostress.

Sub-Question 7: How do the business faculty, education faculty, and academic librarians cope with technostress?

Findings

Participants responded to another open-ended question which asked them to identify possible solutions to their technostress. Responses included physical and mental solutions (see Table 27 and Appendix K). The researcher grouped the responses into categories according to similar themes as she perceived them. The solutions which seemed to work the most either by themselves or in some combination were (a) calling for help (increase knowledge and skills), (b) screaming or yelling (complain), (c) walking away (manage time), (d) leisurely talking to someone (relax or socialize), and (e) doing something non-technical or non-computer related (perform non-technology related tasks). Comments from the participants included (1) "I eat.", (2) "Attempt to find someone who can provide assistance.", (3) "I usually grab my cordless mouse and fling it across the room at a high velocity. Then I gripe....a lot....then I reboot and try to find a backup mouse."

Table 27

Solutions for Coping With Technostress as Perceived by COBA  
and COE faculty and Academic Librarians

Solution	Frequency
increase knowledge and skills	114
• ask for help, attend training workshops	
relax or socialize	77
• take nap, talk to people	
manage time or projects/tasks	77
• multi-task, back up data	
complain	54
• threaten computer, yell and curse	
try to fix the problem	29
• reboot computer, start project over	
exercise	24
• yoga, play basketball	
change attitude/expectations	24
• find humor in situation, control anger	
eat	12
• drink tea, eat popcorn/candy	
perform non-technology related tasks	1
• clean office	

### Summary

The data collected and analyzed in this study determined whether computer skills relate to the levels of technostress among business and education faculty, and academic librarians from selected institutions within the University System of Georgia. Demographics were used to describe the participants. Common themes for the causes of and solutions for relieving technostress were identified.

Even though there were no significant differences found, business faculty reported having the most computer skills and the lowest technostress levels. Education faculty reported having the lowest computer skills but librarians experienced more severe technostress levels. The participants identified computer information and computer runtime problems more than any other problems as two causes of technostress. They also reported increasing their knowledge and skills as the way in which they would cope with their technostress instead of eating or performing non-technology related tasks. In conclusion, the major finding revealed a statistically significant relationship between the computer skills levels of the academic librarians, business and education faculty and their severity levels of technostress which means that as their computer skills increase, the levels of technostress they experience decrease.

## CHAPTER V

### SUMMARY, CONCLUSIONS, AND IMPLICATIONS

Technology has rapidly grown over the last decades and there has been an increased struggle to keep up with technology (Moore, 1965; Brand, 2000). Society has moved from the Industrial Age to the Information Age (Hulbert, 1998). Change has occurred because of the move to the Information Age. Society has been affected by this change in numerous ways, especially in higher education. The roles that administrators, faculty, students, and academic librarians play in higher education have been affected by technology (Drake, 2000; Landsberger, 2001).

The struggle to adjust to the fast technological change increased for the majority of the population, especially those in higher education (Davis-Millis, 1998; Brand, 2000). Change is an inevitable part of society and individuals handle change in different ways. Positive and negative effects of technology has made an impact on society, especially in higher education (Hulbert, 1998). As a result, there has been both resistance and acceptance of the increased development and use of technology. Acceptance or resistance to technology may be dependent upon certain factors such as age, sex, and computer experience (Coopersmith, Regan, & Dick, 1975; Hemby, 1998; Albritton,

Roper, & Clayton, 1988; Mitchell, 2000). As a result, the intent of this study was to investigate in more detail the levels of technostress among multiple groups of higher education computer users and the relationship between their computer skills and technostress levels.

#### Summary

Participants in this study were selected from four University System of Georgia institutions. These institutions with graduate programs were selected because of their emphasis in teaching, research, and service. Participants were notified by e-mail regarding the study and the expected arrival date of packets consisting of the survey. They were also told the survey could be completed on-line and if they did not wish to participate how to be removed from the study. Data collection lasted five weeks. During the first two weeks, data was collected from respondents and those who did not respond received an e-mail requesting their participation. Follow-up e-mails were sent out one week apart from each other resulting in the last three weeks of data collection. The quantitative data collected was analyzed using frequencies, means, standard deviations, ANOVAs, and correlations with SPSS, and qualitative data was used by finding recurring themes

provided by respondents after answering two open-ended questions.

### Analysis of Research Findings

The major findings of this study may be summarized as follows:

1. Business faculty reported their computer skills as the highest over education faculty and academic librarians even though their mean score was not statistically different.
2. Although their severity scores were not statistically different, academic librarians perceived themselves to experience more severe levels of technostress than business faculty and education faculty.
3. Education faculty reported the lowest computer skills level, and they perceived to experience lower levels of technostress than academic librarians but they did not experience more technostress than business faculty.
4. Although these were not statistically significant findings, males reported lower computer skill levels than females in all three units. Females in the College of Business and female academic librarians reported higher levels of technostress than males in the same units. Additionally, females in education reported lower levels of technostress than males in their unit.



5. Assistant and associate professors in education reported higher computer skill levels resulting in a significant difference in the levels of their computer skill. However, full professors in the same unit reported the lowest levels of computer skills.
6. Based on statistically significant results, tenured academic librarians reported lower computer skill levels than non-tenured librarians.
7. The levels of technostress among all three units decreased as their levels of computer skills increased.
8. Academic librarians, education and business faculty used a wide variety of software applications or other computer technology but they mainly used e-mail, word processing, and the Internet.
9. Participants identified computer information and computer runtime problems more than any other problem as causes of their technostress.
10. Solutions for reducing technostress as reported by the participants included calling for help, screaming or yelling, walking away, leisurely talking to someone, and doing something non-technical or non-computer related.

Discussion of the major findings and how they compare to the related literature in Chapter II appears in the next

section. While some of the findings were new, there were some findings that had been discussed previously in the literature and they will be presented also.

#### Discussion of Research Findings

##### Faculty and Academic Librarians' Use of Technology

Approximately 83% of the academic librarians, and faculty in the Colleges of Business and Education used computers at least 16 or more hours each week. When using the computer, business and education faculty, and librarians used e-mail, word processing, and the Internet the most. In comparison, 73% of the professors studied at UCLA used the Internet for research and class preparation, and librarians were not a part of the sample (Professors Stressed, 1999). Similarly, word processing (73%), video (46%), and audio (46%) were used by professors according to Spotts and Bowman (1995). Whereas, Groves and Zemel (2000) found professors had more experience using word processing (86%), e-mail (62%), and spreadsheets (46%).

The time in which faculty and academic librarians are spending on their computers has increased over the last few years. The faculty and academic librarians continue to use the Internet, word processing, and e-mail when preparing for instruction, communication, and research. Even though the faculty and academic librarians are spending more time using

their computers for completing these tasks do not suggest they understand how or what they are doing to complete those tasks.

#### Age and Generational Differences

Review of the literature revealed that Gen Xers (ages 21-35) grew up playing computer video games, watching music videos on television, and computer skills were a fundamental part of their elementary education (Effective Managers, 2001; Zemke, Raines, & Filipczak, 2000; Tsacoumis, 2002). Additionally, those 50 or older were more technostressed than those under 30, 30-39, and 40-50. Persons 40-50 years old had the second highest level of technostress. Those under 30 had the third highest level while those 30-39 years old had the lowest level of technostress (Elder, Gardner, & Ruth, 1987). Thus the Matures and some Baby Boomers were said to be more technologically challenged (Elder et al).

Although participants ages 51-60 reported the most severe levels of technostress while those ages 24-30 reported the lowest level of technostress in the current study, these findings were not statistically significant. Furthermore, data analysis to determine if the participants' age was related to their computer skills or technostress was not performed for this study due to the insufficient sample sizes. There is no definitive explanation as to why the

sample was so small. However, a couple of speculated reasons could be the timing in which the survey was distributed or sampling error. As a result, the researcher will include in the recommendations section that further research of this demographic be conducted.

#### Differences Between Females and Males

Fine (1979c), Elder, Gardner, and Ruth (1987), Hudiburg, Brown and Jones (1993), and Reed and Overbaugh (1993) found males experienced less computer anxiety and less technostress or resisted information technology less than females as their computer experience increased. Heinssen, Glass, and Knight (1987) also believed the less computer experience females had the more computer anxiety they had. Even though there were no significant differences found, the results of the researcher's study revealed that females reported higher computer skill levels and lower technostress levels than males. Females in the Colleges of Business and female academic librarians tended to experience more severe levels of technostress than males in their units. And females in the Colleges of Education perceived to experience less severe levels of technostress than males in the same unit.

#### Computer Experience, Skill Levels, and Other Characteristics

In previous studies, as a person's computer experience increased, the levels of computer anxiety decreased (Loyd & Gressard, 1984; Morrow, Prell, McElroy, 1986; Artwohl, 1989; Maurer & Simonson, 1993; Reed & Overbaugh, 1993; Hudiburg, Ahrens, & Jones, 1994; Popovich, 1994). The researcher was able to find the same results in the current study as in previous studies where the higher the reported computer skills rating of the librarians, and business and education faculty, the less severe the technostress they experienced.

Other characteristics studied in the current research included faculty rank, tenure status, and classification of the three groups. Associate professors in the Colleges of Education reported the highest computer skill level while COE full professors reported the lowest computer skill. This finding between COE faculty's rank and their computer skills was statistically significant. Another statistically significant finding occurred between the tenure status of academic librarians' and their level of computer skills. Non-tenured academic librarians' computer skills were higher than those academic librarians with tenure. Finally, the researcher was unable to determine if the classification status of business and education faculty, and academic librarians were related to their computer skills or technostress levels due to insufficient sample sizes.

### Workplace and Higher Education Differences

There has been very limited research completed in this area. Raub (1981) found that students majoring in education had more computer anxiety than those in business. Simonson, Maurer, Montag-Toradi and Whitaker (1987) also found those in the business sector had lower levels of computer anxiety. Stevens (1982) found that as education majors increased their computer skills, their computer anxiety levels decreased. Similarly, O'Daniel (1999) believed as librarians became more familiar and comfortable with a new library automation system, their technostress levels decreased. Some similarities were found by the researcher in this study even though the results were not statistically significant. In the current study, business faculty reported their computer skills the highest over education faculty and academic librarians. And the business faculty reported the lowest technostress levels as well. Education faculty also reported the lowest computer skills levels but identified their severity level of technostress above the academic librarians but below the business faculty. Academic librarians experienced more severe levels of technostress than business faculty and education faculty.

### Causes of Technostress

Bichteler (1987), Champion (1988), Figueiredo(1994), and Ryce(2001) found several causes of technostress to include not enough time to train, not knowing how to type, receiving poor instructions, increased workload, not having enough interaction with people, inadequate wiring/electrical outlets, poor lighting, lack of equipment security, uncomfortable workspace, incompatible or noisy equipment, lack of maintenance knowledge, fear and apprehension of using new technology, and role and information overload. Similar causes have been found in addition to some others not mentioned in the literature. Education and business faculty, and academic librarians reported similar causes of technostress (e.g., computer crashes and freezes, information overload, lack of technical support, having no time to train, too much e-mail, increase in productivity and availability expectations, lack of knowledge, and slow CPU and Internet speed as causes of their technostress).

Based on the eight categories defined by Hudiburg's (1999), academic librarians and business and education faculty identified computer information problems as the category which causes them the most stress and computer runtime problems was reported as the second cause. Knowing what causes an employees technostress is important because

administrators as well as the employees can begin to find ways to reduce or eliminate technostress in the workplace. Other causes of technostress can be found in Chapter IV under sub-question six.

#### Solutions for Coping with Technostress

Hickey (1992), Kupersmith (1992), and McKenzie, Davidson, Bennett, and Clay (1997) discovered people ate, relaxed, stayed healthy, cultivated a positive attitude, managed time, set realistic goals, not worried about matters not in their control, sought additional training, and established relationships with the business industry to help deal with their technostress levels. Similar coping techniques were identified by business faculty, education faculty, and academic librarians. These coping techniques included calling for help, screaming or yelling, walking away, leisurely talking to someone, and doing something non-technical or non-computer related. However, a large number of faculty members and academic librarians perceived that obtaining additional training or knowledge would help them cope with their technostress. Because of this finding, the researcher suggests that administrators implement more training for their employees before considering any other coping techniques. Knowing these coping techniques will help individuals as well as administrators participate with



reducing or eliminating stress on the job. Reduced job stress may help with decreasing absences from work and increase morale among the organization. Other techniques can be found in Chapter IV under sub-question seven.

### Conclusions

The intent of this study was to determine whether computer skills relate to the levels of technostress among faculty in the Colleges of Business and Education, and academic librarians. Major conclusions from the study included (1) negative weak relationships existing between computer skills and technostress levels among the three participant groups, (2) business faculty reporting the highest computer skills rating even though the results were not statistically significant, (3) although academic librarians reported the most severe level of technostress, their level of severity did not differ significantly from the severity levels of technostress among the business and education faculty, (4) no statistical differences based on sex, rank, or tenure existed in computer skills levels or the technostress levels between the three participant groups, (5) although not statistically significant, females reported lower technostress levels contrary to the literature reviewed, and (6) causes of and solutions for

coping with technostress varied depending on the task and the person completing the task.

### Implications

Several implications can be drawn from this study. The implications should be able to help all faculty and academic librarians in higher education as well as administrators. Results based on rank and tenure in relation to the participants' self-reported computer skills and the severity in which they experienced technostress were significant. Full professors in education and tenured academic librarians reported the lowest levels of computer skills. This may be due to their lack of expected computer use on the job or their previous computer experience may have been little or non-existent. Second, the current research investigated do a previously defined condition relate to the computer skills of three newly studied groups of computer users. Technostress is the current name of this previously studied condition and the current research found that as one's computer skills level increase, their technostress levels decrease. As a result, computer training opportunities in various forms (e.g., on-line, conferences, workshops) should be provided for all computer users to help decrease their stress levels and increase their skills. Third, even though females reported lower technostress levels, no significant

differences were reported for computer skill levels or severity of technostress between males and females. This finding may have been due to sampling error or the timing in which the survey was distributed for data collection.

Fourth, causes of and solutions for coping with technostress were revealed. One hundred and seventy-eight participants reported computer information problems more than any other problem as the reason for causing their technostress. One hundred and fourteen participants reported they would try to increase their computer skills or knowledge more than any other coping solution as a way to cope with their technostress. This information is important because the more knowledgeable computer users become about what technostress is, what causes technostress, and how technostress can be relieved, the better they will be able to control their stress levels as well as help others control their stress.

The results of this study imply that higher education administrators should be able to make better informed decisions regarding the purchase and implementation of new computer technology. They should know that cost is not the only factor for considering new hardware or software. Their employees' attitudes toward change should be considered. Time tables and reasons for implementing computer technology should be discussed with employees and opportunities for

feedback should be made available. Support for the hardware and/or software should be considered and in place before the installation. Employees should receive some time away from their regular job duties in order to receive regular training on the newly implemented technology. Incentives should be created by the administrators to encourage employees to stay current with new technology as technology becomes available in their offices. Administrators should also consider the creation of stress relief programs that encourage employees to follow some of the reported ways for coping with technostress. Additionally, the relief program could be a part of the employees' work day.

There is potential for further study of technostress and computer skill levels among other types of computer users besides those studied in this research and those studied who were identified in the review of literature. Other variables should also be investigated (e.g., personality type, learning style, requirements for tenure and promotion). There are other forms of technology besides computer technology (e.g., photocopiers and fax machines) that should be taken into account when conducting a study such as this.

### Dissemination

Several groups could benefit from the results of this study. These groups include (a) business faculty, (b) education faculty, (c) academic librarians, (d) researchers who have conducted similar studies for the purpose of continued research, (e) the instrument creators so they can see how their instrument was used in relation to their own research, and (f) higher education administrators. Study participants were given the opportunity to receive a copy of the research results upon request. Those who have requested the results will receive them via e-mail after the completion of the dissertation. The instrument creators are some of the researchers who have conducted similar studies and they have been told by the student researcher they will receive a copy of the study upon completion of the dissertation. Those business and education faculty, and academic librarians who do not receive the results may have the opportunity of attending conferences or workshops where the results of the study will be presented. Some information regarding technostress has been provided at one research symposium and one poster board session. A full presentation was given at a conference in October 2003 that academic, public, private, school, and corporate librarians attended.

### Recommendations

Based on the findings, conclusions, and implications of this study, the following recommendations are suggested:

1. Investigate other types of computer users, in particular faculty in colleges of science and technology, liberal arts, health and human services, and information technology or similar computer users.
2. Conduct additional research on the severity of technostress levels and the reported computer skill levels of computer users as they relate to their sex, age, and classification.
3. Investigate other variables such as other forms of technology (e.g., fax or xerox machines), learning styles, attitudes towards technology, and personality types of the participants.
4. Look at whether or not institutional type (research, regional, four year, or two year) has any relation to computer skills and technostress.
5. Consider performing pre- and post-tests on subjects who receive computer skills training. Additionally, determine attitudes and stress levels before and after the same training.
6. Determine if coping strategies really work to reduce or eliminate technostress.

7. Find out if outside forces (e.g., administration, job expectations, economics, institutional culture, institution mission, or state legislation) play a role in the amount of computer users' computer skills. Determine if these same forces effect the levels of technostress people experience.
8. Research the effects of different tasks and their complexities when using computer technology on technostress levels.
9. Find out what kinds of computer tasks may cause more or less technostress.
10. Research whether faculty and academic librarians have more technostress when they teach, conduct research, or perform service.
11. Determine if the relationship between business faculty and the business sector is a reason why business faculty have more computer skills and less technostress.
12. Investigate the environment in which faculty and librarians work and determine if these environments promote or deter computer skills training, and the reduction or increase of technostress.
13. Find out what training programs are available for improving computer skills or reducing technostress.

14. Investigate perceptions of administrators' role in providing computer skills training and stress reduction programs.
15. Investigate administrators' perceptions of what causes their employees' technostress and how they help those employees cope with that stress.
16. Examine how knowing and understanding computer terminology may effect levels of technostress and computer skill levels.
17. Conduct additional research on other types of librarians (e.g., school, public, corporate), their use of computer technology, and technostress levels.
18. Investigate the role of computer technology use in higher education in regards to tenure and promotion requirements and how those requirements may or may not effect technostress levels.

This study attempted to investigate whether computer skills relate to the levels of technostress among faculty in the Colleges of Business and Education, and academic librarians. The analysis of the data revealed a negative weak relationship that as computer skills increased, technostress levels decreased among these three groups. In order for these and other computer users to experience less stress, they will have to keep up with the rapid change of



technology and take part in some form of training on a regular basis. "Changes break patterns that we are comfortable to, and that can be rather threatening. The key is to make sure that we are the masters, and that computer and other formats of technology are tools we manipulate. IN SHORT, WE ARE THE ONES WHO ARE IN CHARGE" (Rocha, 2001)!

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## APPENDICES

## APPENDIX A:

### Data Analysis Matrix

**Data Analysis Matrix**

	Literature Review	Instrument Item that Addresses Question
1. How do the Colleges of Business and Education faculty, and academic librarians rate their computer skills?	Simonson, et al (1987), Sievert, et al (1988), May (1999), Hudiburg (1999), Groves & Zemel (2000), Fine (1979c)	self-rated computer skills - Section II 1-26;
2. At what levels do the faculty in the Colleges of Business and Education, and academic librarians experience technostress?	Simonson et al (1986), Hudiburg (1989a, 1993, 1995, 1996), O'Daniel (1999), Ballance & Rogers (1991), Ballance & Ballance (1993), Fine 1979c),	computer hassles scale - Section I 1-39
3. Do differences in technostress and computer skills exist among faculty in the Colleges of Business and Education, and academic librarians, and do these differences persist once college unit/affiliation, age, sex, rank, tenure status, and classification status have been considered?	Sievert, et al (1988), Hemby (1998), Hudiburg & Jones (1991), Hudiburg, Pashaj, & Wolfe (1999), Fine (1979c), Gilroy & Desai (1986), Meier (1988), May (1999), Stevens (1982), Morrow et al (1986), Hudiburg (1989a, 1991, 1996), Harrison & Rainer (1992), Figueiredo (1994), Meier (1988)	computer hassles scale - Section I 1-39; demographics - Section IV 1-10

**Data Analysis Matrix**

	Literature Review	Instrument Item that Answer Question
4. Is there a correlation between self-rated computer skills of business and education faculty, and academic librarians and the levels of technostress they may experience?	Ballance & Ballance(1993); Ballance & Rogers(1991); Elder, et al(1987); Heinssen, et al(1987); Hudiburg(1990); Hudiburg, et al(1994); Maurer & Simonson(1993); Morrow, et al(1986); Sievert, et al(1988); Raub(1981)	Computer skills - Section II 1-26; computer hassles scale - Section I 1-39
5. Does the correlation between the self-rated computer skills and levels of technostress still exist once college unit/affiliation, age, sex, rank, tenure status, and classification status have been considered?	Ballance & Ballance(1993); Ballance & Rogers(1991); Elder, et al(1987); Heinssen, et al(1987); Hudiburg(1990); Hudiburg, et al(1994); Maurer & Simonson(1993); McQueen(1999); Morrow, et al(1986); Raub(1981); Sievert, et al(1988);	Computer skills - Section II 1-26; computer hassles scale Section I 1-39
6. What are the possible causes identified by business faculty, education faculty, and academic librarians in higher education when they experience technostress?	Smith & Nelson (1983);Figueiredo (1994); Champion (1988); Artwohl (1989); Ryce (2001)	open ended question - Section III 1-2

Data Analysis Matrix			
	Literature Review	Instrument Item that Addresses Question	
7. When technostressed, how do the business faculty, education faculty, and academic librarians cope?	Hudiburg (1995, 1996); Mauer & Simonson (1993); Champion (1988); Ryce (2001); Kupersmith (1992); Bichleter (1987); Hickey (1992)	open ended question - Section III 1-2	
Overarching Research Question: Do computer skills relate to the levels of technostress for faculty in the Colleges of Business and Education, and academic librarians?	Simonson et al(1987); Stevens(1982); Hudiburg, et al(1993); Hudiburg & Necessary (1996a)	computer hassles scale - Section I 1-39; self rated computer skills - Section II 1-26; demographics - Section IV 1-10	

APPENDIX B:

Paper Copy of Survey Instrument

**The Relationship Between Computer Skills and the Levels of Technostress  
Among Faculty and Academic Librarians from Selected Institutions Within  
the University System of Georgia**

**Section I: Computer Hassles Survey**

**Directions:** Listed below are a number of ways in which a person can feel hassled by computers and computer technology. Please respond to each of the 39 potential hassles by circling the number indicating how **SEVERE** the hassle has been for you.

	not at all	rarely severe	moderately severe	extremely severe
1. crashed program	0	1	2	3
2. lost program	0	1	2	3
3. crashed system/lockup	0	1	2	3
4. electrical surges- data are lost	0	1	2	3
5. computer keyboard lockup	0	1	2	3
6. damaged storage media-disks,tapes	0	1	2	3
7. lost data	0	1	2	3
8. poorly documented software	0	1	2	3
9. poorly written computer documentation	0	1	2	3
10. incompatible software program	0	1	2	3
11. poor user/computer interface	0	1	2	3
12. slow program speed	0	1	2	3
13. slow computer speed	0	1	2	3
14. lack of computer expertise	0	1	2	3
15. lack of help with a computer problem	0	1	2	3

(Over Please)

Numeric Code:  NumCode

	<u>not at all</u>	<u>rarely</u> <u>severe</u>	<u>moderately</u> <u>severe</u>	<u>extremely</u> <u>severe</u>
16. need to update skills	0	1	2	3
17. need to learn new software	0	1	2	3
18. keyboard typing errors	0	1	2	3
19. software confusion	0	1	2	3
20. incomprehensible computer instructions	0	1	2	3
21. increased computer use expectations	0	1	2	3
22. increased time demand	0	1	2	3
23. too little computer information	0	1	2	3
24. too much computer information	0	1	2	3
25. slow web browser speed	0	1	2	3
26. busy website	0	1	2	3
27. slow download or web page loading time	0	1	2	3
28. unsolicited e-mail (spamming)	0	1	2	3
29. too many e-mail messages	0	1	2	3
30. dead web link (error 401 message)	0	1	2	3
31. www domain name not recognized	0	1	2	3
32. web sites with frames	0	1	2	3
33. web sites with java script	0	1	2	3
34. web sites with too many graphics	0	1	2	3
35. web search engine query language	0	1	2	3
36. web sites with too many commercials (e.g. pop up ads)	0	1	2	3

(Over Please)

Numeric Code:  NumCode



	<u>not at all</u>	<u>rarely severe</u>	<u>moderately severe</u>	<u>extremely severe</u>
37. too much internet information				
38. security of personal information on the Internet	0	1	2	3
39. inadequate Internet skills	0	1	2	3

### Section II: Computer Skills

**Directions:** As a form of self-assessment, please rate your skill level with the following 25 computer functions by circling the number for each item that most accurately reflects your current level of skill (1 =low skill; 3= medium skill; 5=high).

	<u>low skill</u>	<u>medium skill</u>	<u>high skill</u>		
1. Use proper computer start-up and shutdown procedures.	1	2	3	4	5
2. Handle and use floppy disks and CD-ROMs.	1	2	3	4	5
3. Use various keyboard functions and shortcuts.	1	2	3	4	5
4. Use the full functionality of a mouse (left and right click).	1	2	3	4	5
5. Navigate through a Windows/Mac environment.	1	2	3	4	5
6. Select printer properties, preview and print documents.	1	2	3	4	5
7. Modify the desktop and display settings.	1	2	3	4	5

(Over Please)

Numeric Code:  NumCode

	<u>low skill</u>	<u>medium skill</u>	<u>high skill</u>		
8. Manage & organize files using drives, directories, and sub-directories.	1	2	3	4	5
9. Install/uninstall software.	1	2	3	4	5
10. Use e-mail to send messages to and receive messages from individuals and groups.	1	2	3	4	5
11. Send, receive, and save e-mail attachments.	1	2	3	4	5
12. Use calendar function (e.g., Outlook/Groupwise, etc.)	1	2	3	4	5
13. Use word processing to create, store, retrieve, and revise instructional materials.	1	2	3	4	5
14. Use presentation software(e.g., PowerPoint) to create technology based presentations.	1	2	3	4	5
15. Set-up, operate, and troubleshoot computer and projection equipment for presentations.	1	2	3	4	5
16. Use e-mail as interaction tool.	1	2	3	4	5
17. Use web site to support instruction or library service(s).	1	2	3	4	5
18. Use tools (e.g., WebCT) to design and deliver Internet course(s) or library service(s).	1	2	3	4	5
19. Record, track, and report grades and/or attendance electronically.	1	2	3	4	5
20. Use spreadsheets (e.g. Excel) for keeping records and analyzing data.	1	2	3	4	5
21. Use databases (e.g. Access) for keeping records and analyzing data.	1	2	3	4	5
22. Use a web browser, search engines, and directories to search for, find, and bookmark pertinent information on the Internet and World Wide Web for class/library and personal development purposes.	1	2	3	4	5

(Over Please)

Numeric Code: \*1111 NumCode

	<u>low skill</u>	<u>2</u>	<u>medium skill</u>	<u>4</u>	<u>high skill</u>
23. Access and use list-servs and discussion groups.	1	2	3	4	5
24. Access on-line professional groups and organizations related to your field.	1	2	3	4	5
25. Locate professional growth opportunities in your field (e.g. on-line conferences).	1	2	3	4	5

### Section III: Open-Ended Questions

**Directions:** Please answer the following two questions. If you need additional space, please feel free to add more pages.

a. What do you perceive as possible causes of stress while using computer technology?

b. How do you cope with stress when using computer technology?

(Over Please)

Numeric Code:  (NumCode)

# **Section IV: Demographics**

**Directions:** Circle each answer that best describes you for the following 10 categories.

1. College/Unit Affiliation

- a. Business
- b. Education
- c. Library

2. Teaching level

- a. undergraduate
- b. graduate
- c. both
- d. not applicable

3. Sex

- a. male
- b. female

4. Age

- a. 24-30
- b. 31-40
- c. 41-50
- d. 51-60
- e. 61-70

5. Faculty status

- a. adjunct/temporary
- b. full-time
- c. other \_\_\_\_\_

6. Faculty rank

(Circle all that apply)

- a. temporary/visiting
- b. instructor
- c. assistant professor
- d. associate professor
- e. full professor

7. Tenure status

- a. tenured
- b. tenure track
- c. non-tenure track
- d. not applicable

(Over Please)

Numeric Code: NumCode

## 8. Classification status

- a. teaching faculty
- b. librarian w/ faculty status
- c. librarian w/out faculty status
- d. department chair/head
- e. dean
- f. other \_\_\_\_\_

## 9. Applications used

(Circle all that apply)

- a. database (e.g., Access)
- b. library on-line catalog
- c. spreadsheet
- d. presentation
- e. e-mail
- f. word processing
- g. Internet (e.g., search engines, WebCT, blackboard.com)
- h. library databases (e.g., GALILEO, other licensed databases - CDs or web interfaced paid for by institution)
- i. Other \_\_\_\_\_

10. Average number of work  
hours per week spent using  
computer technology

- a. 1-5
- b. 6-15
- c. 16-30
- d. 31+


**Thank you for taking the time to complete this  
survey.**

Please return your completed survey to Sonya S. Gaither  
Shepherd, Zach S. Henderson Library, Georgia Southern  
University, PO Box 8074, Statesboro, GA 30460. If you  
should have any questions regarding the survey, the  
research topic, or results of the study, please feel  
free to contact me at (912) 486-7820 or  
**senithia@frontiernet.net.**


Note: Font size reduced to meet format requirements.

## APPENDIX C:

Web Based Version of Survey Instrument



# **The Impact of Computer Skills on the Levels of Technostress Among Faculty and Academic Librarians Within the University System of Georgia**



Type Numerical Code Here (Required)

└

A response is required for each numbered item.

## **Section I: Computer Hassles Survey**

**Directions:** Listed below are a number of ways in which a person can feel hassled by computers and computer technology. Please respond to each of the 39 potential hassles by clicking the button next to the number indicating how **SEVERE** the hassle has been for you during the **past two months**.

### **1. crashed program**

☐ 0 (not at all) ☐ 1 (rarely severe) ☐ 2 (moderately severe) ☐ 3  
(extremely severe)

### **2. lost program**

☐ 0 (not at all) ☐ 1 (rarely severe) ☐ 2 (moderately severe) ☐ 3  
(extremely severe)

### **3. crashed system/lockup**

☐ 0 (not at all) ☐ 1 (rarely severe) ☐ 2 (moderately severe) ☐ 3  
(extremely severe)

### **4. electrical surges-data are lost**

☐ 0 (not at all) ☐ 1 (rarely severe) ☐ 2 (moderately severe) ☐ 3  
(extremely severe)

### **5. computer keyboard lockup**

☐ 0 (not at all) ☐ 1 (rarely severe) ☐ 2 (moderately severe) ☐ 3  
(extremely severe)

**6. damaged storage media-disks, tapes**

0 (not at all) 1 (rarely severe) 2 (moderately severe) 3  
(extremely severe)

**7. lost data**

0 (not at all) 1 (rarely severe) 2 (moderately severe) 3  
(extremely severe)

**8. poorly documented software**

0 (not at all) 1 (rarely severe) 2 (moderately severe) 3  
(extremely severe)

**9. poorly written computer documentation**

0 (not at all) 1 (rarely severe) 2 (moderately severe) 3  
(extremely severe)

**10. incompatible software program**

0 (not at all) 1 (rarely severe) 2 (moderately severe) 3  
(extremely severe)

**11. poor user/computer interface**

0 (not at all) 1 (rarely severe) 2 (moderately severe) 3  
(extremely severe)

**12. slow program speed**

0 (not at all) 1 (rarely severe) 2 (moderately severe) 3  
(extremely severe)

**13. slow computer speed**

0 (not at all) 1 (rarely severe) 2 (moderately severe) 3  
(extremely severe)

**14. lack of computer expertise**

0 (not at all) 1 (rarely severe) 2 (moderately severe) 3  
(extremely severe)

**15. lack of help with a computer problem**

0 (not at all) 1 (rarely severe) 2 (moderately severe) 3  
(extremely severe)



**16. need to update skills**

188

0 (not at all) 1 (rarely severe) 2 (moderately severe) 3  
(extremely severe)

**17. need to learn new software**

0 (not at all) 1 (rarely severe) 2 (moderately severe) 3  
(extremely severe)

**18. keyboard typing errors**

0 (not at all) 1 (rarely severe) 2 (moderately severe) 3  
(extremely severe)

**19. software confusion**

0 (not at all) 1 (rarely severe) 2 (moderately severe) 3  
(extremely severe)

**20. incomprehensible computer instructions**

0 (not at all) 1 (rarely severe) 2 (moderately severe) 3  
(extremely severe)

**21. increased computer use expectations**

0 (not at all) 1 (rarely severe) 2 (moderately severe) 3  
(extremely severe)

**22. increased time demand**

0 (not at all) 1 (rarely severe) 2 (moderately severe) 3  
(extremely severe)

**23. too little computer information**

0 (not at all) 1 (rarely severe) 2 (moderately severe) 3  
(extremely severe)

**24. too much computer information**

0 (not at all) 1 (rarely severe) 2 (moderately severe) 3  
(extremely severe)

**25. slow web browser speed**

0 (not at all) 1 (rarely severe) 2 (moderately severe) 3  
(extremely severe)

**26. busy website**

189

0 (not at all) 1 (rarely severe) 2 (moderately severe) 3  
(extremely severe)

**27. slow download or web page loading time**

0 (not at all) 1 (rarely severe) 2 (moderately severe) 3  
(extremely severe)

**28. unsolicited email (spamming)**

0 (not at all) 1 (rarely severe) 2 (moderately severe) 3  
(extremely severe)

**29. too many email messages**

0 (not at all) 1 (rarely severe) 2 (moderately severe) 3  
(extremely severe)

**30. dead web link (error 401 message)**

0 (not at all) 1 (rarely severe) 2 (moderately severe) 3  
(extremely severe)

**31. www domain name not recognized**

0 (not at all) 1 (rarely severe) 2 (moderately severe) 3  
(extremely severe)

**32. web sites with frames**

0 (not at all) 1 (rarely severe) 2 (moderately severe) 3  
(extremely severe)

**33. web sites with java script**

0 (not at all) 1 (rarely severe) 2 (moderately severe) 3  
(extremely severe)

**34. web sites with too many graphics**

0 (not at all) 1 (rarely severe) 2 (moderately severe) 3  
(extremely severe)

**35. web search engine query language**

0 (not at all) 1 (rarely severe) 2 (moderately severe) 3  
(extremely severe)

**36. web sites with too many commercials** 190

☐ 0 (not at all) ☐ 1 (rarely severe) ☐ 2 (moderately severe) ☐ 3  
(extremely severe)

**37. too much internet information**

☐ 0 (not at all) ☐ 1 (rarely severe) ☐ 2 (moderately severe) ☐ 3  
(extremely severe)

**38. security of personal information on the internet**

☐ 0 (not at all) ☐ 1 (rarely severe) ☐ 2 (moderately severe) ☐ 3  
(extremely severe)

**39. inadequate internet skills**

☐ 0 (not at all) ☐ 1 (rarely severe) ☐ 2 (moderately severe) ☐ 3  
(extremely severe)

## **Section II: Computer Skills**

**Directions:** As a form of self-assessment, please rate your level of skill with the following 25 computer functions by clicking the button next to the number for each item that most accurately reflects your current level of skill (1 =low; 3=medium; 5=high).

**1. Use proper computer start-up and shutdown procedures.**

☐ 1 (low) ☐ 2 ☐ 3 (medium) ☐ 4 ☐ 5 (high)

**2. Handle and use floppy disks and CD ROMs.**

☐ 1 (low) ☐ 2 ☐ 3 (medium) ☐ 4 ☐ 5 (high)

**3. Use various keyboard functions and shortcuts.**

☐ 1 (low) ☐ 2 ☐ 3 (medium) ☐ 4 ☐ 5 (high)

**4. Use the full functionality of a mouse (left and right click).**

☐ 1 (low) ☐ 2 ☐ 3 (medium) ☐ 4 ☐ 5 (high)

**5. Navigate through a Windows/MAC environment.**

☐ 1 (low) ☐ 2 ☐ 3 (medium) ☐ 4 ☐ 5 (high)

**6. Select printer properties, preview and print documents.**

☐ 1 (low) ☐ 2 ☐ 3 (medium) ☐ 4 ☐ 5 (high)

**7. Modify the desktop and display settings.**

☐ 1 (low) ☐ 2 ☐ 3 (medium) ☐ 4 ☐ 5 (high)

**8. Manage and organize files using drives, directories, and sub-directories.**

☐ 1 (low) ☐ 2 ☐ 3 (medium) ☐ 4 ☐ 5 (high)

**9. Install/uninstall software.**

☐ 1 (low) ☐ 2 ☐ 3 (medium) ☐ 4 ☐ 5 (high)

**10. Use e-mail to send messages to and receive messages from individuals and groups.**

☐ 1 (low) ☐ 2 ☐ 3 (medium) ☐ 4 ☐ 5 (high)

**11. Send, receive, and save e-mail attachments.**

☐ 1 (low) ☐ 2 ☐ 3 (medium) ☐ 4 ☐ 5 (high)

**12. Use the Outlook/Groupwise, etc calendar function.**

☐ 1 (low) ☐ 2 ☐ 3 (medium) ☐ 4 ☐ 5 (high)

**13. Use word processing to create, store, retrieve, and revise instructional materials.**

☐ 1 (low) ☐ 2 ☐ 3 (medium) ☐ 4 ☐ 5 (high)

**14. Use presentation software (e.g., PowerPoint) to create technology based presentations.**

☐ 1 (low) ☐ 2 ☐ 3 (medium) ☐ 4 ☐ 5 (high)

**15. Set-up, operate, and troubleshoot computer and projection equipment for presentations.**

☐ 1 (low) ☐ 2 ☐ 3 (medium) ☐ 4 ☐ 5 (high)

**16. Use e-mail as a course interaction tool.**

☐ 1 (low) ☐ 2 ☐ 3 (medium) ☐ 4 ☐ 5 (high)

**17. Use a web site to support a course.**

☐ 1 (low) ☐ 2 ☐ 3 (medium) ☐ 4 ☐ 5 (high)

**18. Use tools (e.g., WebCT) to design and deliver internet courses.**

☐ 1 (low) ☐ 2 ☐ 3 (medium) ☐ 4 ☐ 5 (high)

**19. Record, track, and report grades and attendance electronically.**

☐ 1 (low) ☐ 2 ☐ 3 (medium) ☐ 4 ☐ 5 (high)

**20. Use spreadsheets (e.g. Excel) for keeping records and analyzing data.**

☐ 1 (low) ☐ 2 ☐ 3 (medium) ☐ 4 ☐ 5 (high)

**21. Use databases (e.g. Access) for keeping records and analyzing data.**

☐ 1 (low) ☐ 2 ☐ 3 (medium) ☐ 4 ☐ 5 (high)

**22. Use a web browser, search engines, and directories to search for, find, and bookmark pertinent information on the internet and World Wide Web for class and personal development purposes.**

☐ 1 (low) ☐ 2 ☐ 3 (medium) ☐ 4 ☐ 5 (high)

**23. Access and use list-servs and discussion groups.**

☐ 1 (low) ☐ 2 ☐ 3 (medium) ☐ 4 ☐ 5 (high)

**24. Access on-line professional groups and organizations related to your field.**

☐ 1 (low) ☐ 2 ☐ 3 (medium) ☐ 4 ☐ 5 (high)

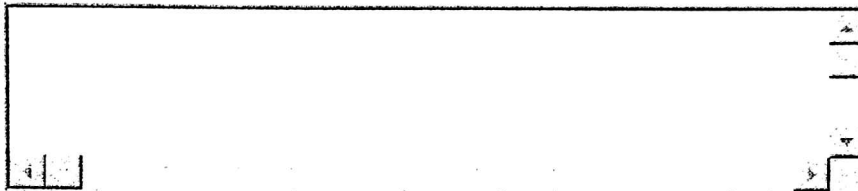
**25. Locate professional growth opportunities in your field (e.g. on-line conferences).**

☐ 1 (low) ☐ 2 ☐ 3 (medium) ☐ 4 ☐ 5 (high)

### Section III: Open-Ended Questions

**Directions:** Please answer the following two questions.

**1. What do you perceive as possible causes of stress while using computer technology?**



**2. How do you cope with stress when using computer technology?**



### Section IV: Demographics

**Directions:** Click each answer that best describes you.

**1. College/unit affiliation**

☐ Business ☐ Education ☐ Library

**2. Teaching level**

☐ undergraduate ☐ graduate ☐ both ☐ not applicable

**3. Sex**

☐ male ☐ female

**4. Age**

☐ 24-30 ☐ 31-40 ☐ 41-50 ☐ 51-60 ☐ 60-70

**5. Faculty status**

- ☐ adjunct/temporary   ☐ full-time   ☐ other \_\_\_\_\_

**6. Faculty rank**

- ☐ temporary/visiting  
☐ instructor  
☐ assistant professor  
☐ associate professor  
☐ full professor

**7. Tenure status**

- ☐ tenured   ☐ tenure track   ☐ not applicable

**8. Classification status**

- ☐ teaching faculty  
☐ librarian with faculty status  
☐ librarian without faculty status  
☐ department chair/head  
☐ dean  
☐ other \_\_\_\_\_

**9. Applications used (select all that apply)**

- ☐ word processing  
☐ spreadsheet  
☐ presentation  
☐ email  
☐ internet (i.e., search engines, WebCT, blackboard.com)  
☐ library databases (i.e., GALILEO, other licensed databases - CDs or web interfaced paid for by institution)  
☐ library on-line catalog  
☐ database (i.e., Access) \_\_\_\_\_  
☐ other \_\_\_\_\_

**10. Number of hours per week spent using computer technology**

☐ 1-5 ☐ 6-15 ☐ 16-30 ☐ 31+

**11. Institution**

☐ Georgia Southern ☐ Georgia State ☐ Kennesaw State ☐ UGA

**Thank you for taking the time to complete  
this survey.**

**Your responses will be emailed to Sonya S. Gaither Shepherd. If  
you should have any questions regarding the survey, the research  
topic, or results of the study please feel free to contact me at (912)  
486-7820 or [sgaither@gasou.edu](mailto:sgaither@gasou.edu).**



APPENDIX D:

Institutional Review Board Approval Letter

Georgia Southern University  
Office of Research Services & Sponsored Programs

**Institutional Review Board (IRB)**

Phone: 912-681-5465  
Fax: 912-681-0719

Ovrsight@gasou.edu

4 College Plaza, P.O. Box 8005  
Statesboro, GA 30460-8005

**To:** Ms. Sonya Shepard  
Department of Leadership, Technology, and Human Development

**Cc:** Dr. Mia Alexander-Snow  
Department of Leadership, Technology, and Human Development

**From:** Office of Research Services and Sponsored Programs  
Administrative Support Office for Research Oversight Committees (IACUC/IBC/IRB)

**Date:** May 19, 2003

**Subject:** Status of Application for Approval to Utilize Human Subjects in Research

---

After an expedited review of your proposed research project titled "The Impact of Computer Skills on the Levels of Technostress Among Faculty and Academic Librarians From Selected Institutions Within the University of Georgia," it appears that (1) the research subjects are at minimal risk, (2) appropriate safeguards are planned, and (3) the research activities involve only procedures which are allowable under the following research category:

Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

*Therefore, as authorized in the Federal Policy for the Protection of Human Subjects (45 CFR §46.101), I am pleased to notify you that the Institutional Review Board has approved your proposed research.*

**This IRB approval is in effect for one year from the date of this letter.** If at the end of that time, there have been no changes to the expedited research protocol, you may request an extension of the approval period for an additional year. In the interim, please provide the IRB with any information concerning any significant adverse event, **whether or not it is believed to be related to the study**, within five working days of the event. In addition, if a change or modification of the approved methodology becomes necessary, you must notify the IRB Coordinator prior to initiating any such changes or modifications. At that time, an amended application for IRB approval may be submitted. Upon completion of your data collection, please notify the IRB Coordinator so that your file may be closed.

**C:** Dr. Tom Case, IRB Chairperson  
Dr. Bryan Riemann, IRB Associate Chairperson  
Ms. Melanie Reddick, IRB Administrative Assistant

Page 10  
Study 1  
2008  
10/10/08

# APPENDIX E:

Letter & E-mails Requesting Participation in Study

**From:** "Mrs. Sonya S. Gaither Shepherd" <senithia@frontiernet.net>  
**Reply-To:** senithia@frontiernet.net  
**Date:** 04 May 2003, 04:31:08 PM  
**Subject:** Request for Participation in Dissertation Study

---

Dear Colleague:

You are being asked to voluntarily participate in a study to determine to what extent computer skills impact levels of technostress among academic librarians, and faculty in business and education colleges from selected institutions within the University System of Georgia. It is also the intent of this study to inform the faculty, academic librarians, and higher education administrators about technostress. The information obtained will also assist higher education administrators with making well-informed decisions regarding the implementation and training of new computer technologies. Packets containing the instrument will be mailed during the week of May 19, 2003. Participating in this study should take no more than 10 minutes.

Approximately 1,126 business and education faculty, and academic librarians from Georgia Southern, Georgia State, Kennesaw State, and UGA will be asked to participate. Should you elect not to participate, you will not be penalized and your work status at your place of employment will not be affected in any way. If you've decided not to participate, please email me at senithia@frontiernet.net. Your name and linked numerical code will be removed from the participant list and you will no longer receive correspondence regarding this study.

As a participant, if you should have any questions regarding the study or you would like to obtain the study results please feel free to contact me at senithia@frontiernet.net or (912) 486-7820. Alternatively, you may contact my dissertation chair, Dr. Mia Alexander-Snow, at masnow@gasou.edu or (912) 681-0201. If you have any questions about your rights as a research participant, you may contact the Coordinator of Georgia Southern University's Institutional Review Board (IRB) at the Office of Research Services at (912) 681-5465.

Thank you for your time and consideration. I realize your time is valuable and limited.

Sincerely,  
Sonya S. Gaither Shepherd, Doctoral Candidate  
College of Education  
Georgia Southern University



DEPARTMENT OF LEADERSHIP,  
TECHNOLOGY, & HUMAN DEVELOPMENT  
POST OFFICE BOX 8131  
STATESBORO, GEORGIA 30460-8131  
TELEPHONE (912) 681-5307  
FAX (912) 486-7104

COUNSELOR EDUCATION  
EDUCATIONAL LEADERSHIP  
EDUCATIONAL ADMINISTRATION  
INSTRUCTIONAL TECHNOLOGY  
SCHOOL PSYCHOLOGY  
SPECIAL EDUCATION

Dear Colleague:

You are being asked to voluntarily participate in a study to determine to what extent computer skills impact levels of technostress among academic librarians, and faculty in business and education colleges from selected institutions within the University System of Georgia. It is also the intent of this study to inform the faculty, academic librarians, and higher education administrators about technostress. The information obtained will also assist higher education administrators with making well-informed decisions regarding the implementation and training of new computer technologies. Participating in this study should take no more than 10 minutes.

Approximately 1,126 business and education faculty, and academic librarians from Georgia Southern, Georgia State, Kennesaw State, and UGA will be asked to participate. Should you elect not to participate, you will not be penalized and your work status at your place of employment will not be affected in any way. If you decide not to participate, please email me at [senithia@frontiernet.net](mailto:senithia@frontiernet.net). Your name and linked numerical code will be removed from the participant list and you will no longer receive correspondence regarding this study. However, if you elect to complete the survey, you may do so by completing the enclosed survey or completing the survey on-line at <http://www.gasou.edu/~sgaither/technostress-welcome.htm>. You will be asked for a username and password in order to access the survey on-line. The five digit numerical code found on the bottom of the paper survey is your username and password. After accessing the survey, you will be required to type your numerical code on the on-line survey again for identification purposes. This code will only be used to identify non-respondents so I may request their participation. Self addressed stamped envelopes are enclosed for participants not located at the researcher's home institution. All data will be kept in a secure location, only my dissertation chair and myself will have access, and the list linking numerical codes to individuals will be destroyed immediately after data collection is completed.

Completion and return of the survey either by mail or on-line submission constitutes permission to use your responses in this study. Paper submissions should be mailed to Sonya Shepherd, Georgia Southern University, Zach S. Henderson Library, PO Box 8074, Statesboro, GA 30460. On-line submissions will be e-mailed to [senithia@frontiernet.net](mailto:senithia@frontiernet.net). Results will be summarized and depicted in tabular form within the dissertation. As a participant, if you should have any questions regarding the study or you would like to obtain the study results please feel free to contact me at [senithia@frontiernet.net](mailto:senithia@frontiernet.net) or (912) 486-7820. Alternatively, you may contact my dissertation chair, Dr. Michael D. Richardson, at [mdrich@gasou.edu](mailto:mdrich@gasou.edu) or (912) 681-5079. If you have any questions about your rights as a research participant, you may contact the Coordinator of Georgia Southern University's Institutional Review Board (IRB) at the Office of Research Services at (912) 681-5465.

I realize how busy you are and that your time is valuable. I want to thank you for taking the time to participate in this study.

Sincerely,

Sonya S. Gaither Shepherd  
Doctoral Candidate

**From:** "Mrs. Sonya S. Gaither Shepherd" <senithia@frontiernet.net>  
**To:** senithia@frontiernet.net  
**Date:** 07 Sep 2003, 10:58:16 AM  
**Subject:** Follow-up Request for Participation in Dissertation study (fwd)

---

Sonya Senithia Gaither Shepherd wrote:

Dear Colleague:

You are being asked to voluntarily participate in a study to determine to what extent computer skills impact levels of technostress among academic librarians, and faculty in business and education colleges from selected institutions within the University System of Georgia. It is also the intent of this study to inform the faculty, academic librarians, and higher education administrators about technostress. The information obtained will also assist higher education administrators with making well-informed decisions regarding the implementation and training of new computer technologies. Packets containing the instrument were mailed during the week of May 19, 2003. The last day for participating in this study is June 9, 2003. Participating in this study should take no more than 10 minutes.

Approximately 1,126 business and education faculty, and academic librarians from Georgia Southern, Georgia State, Kennesaw State, and UGA were asked to participate. Should you elect not to participate, you will not be penalized and your work status at your place of employment will not be affected in any way. If you've decided not to participate, please email me at senithia@frontiernet.net. Your name and linked numerical code will be removed from the participant list and you will no longer receive correspondence regarding this study.

You may complete the study on-line at <http://www.gasou.edu/~sgaither/technostress-welcome.htm>. You will be asked for a username and password in order to access the survey on-line. The five digit numerical code found on the bottom of the paper survey is your username and password. After accessing the survey, you will be required to type your numerical code on the on-line survey again for identification purposes. If you have discarded your paper survey with your numerical code and you would like to complete the survey on-line, please email me at senithia@frontiernet.net and I will email your numerical code to you.

As a participant, if you should have any questions regarding the study or you would like to obtain the study results please feel free to contact me at senithia@frontiernet.net or (912) 486-7820. Alternatively, you may contact my dissertation chair, Dr. Michael D. Richardson, at mdrich@gasou.edu or (912) 681-5079. If you have any questions about your rights as a research participant, you may contact the Coordinator of Georgia Southern University's Institutional Review Board (IRB) at the Office of Research Services at (912) 681-5465.

If you have completed the survey and the results have been (e-)mailed, please disregard this email and thank you for your participation. Again, thank you for your time and consideration. I realize your time is valuable and limited.

Sincerely,  
Sonya S. Gaither Shepherd, Doctoral Candidate  
College of Education  
Georgia Southern University

**From:** "Mrs. Sonya S. Gaither Shepherd" <senithia@frontiernet.net>  
**To:** senithia@frontiernet.net  
**Date:** 07 Sep 2003, 10:57:20 AM  
**Subject:** Follow-Up Request#2 for Participation in Dissertation Study (fwd)

---

Sonya Senithia Gaither Shepherd <senithia@frontiernet.net>  
06/10/03 11:00AM >>>

Dear Colleague:

Please forgive the repetitiveness of my request. You have been asked to voluntarily participate in a study to determine to what extent computer skills impact levels of technostress among academic librarians, and faculty in business and education colleges from selected institutions within the University System of Georgia. Packets containing the instrument were mailed during the week of May 19, 2003. The last day for participating in this study was scheduled for today (June 9, 2003). However, with the permission of my committee, the deadline for collecting data has been extended until a minimum response rate of 35% has been obtained. Thus far, 22.5% has been obtained. Participating in this study should take no more than 10 minutes.

Business and education faculty, and academic librarians from Georgia Southern, Georgia State, Kennesaw State, and UGA were asked to participate. Should you elect not to participate, please email me at senithia@frontiernet.net. Your name and linked numerical code will be removed from the participant list and you will no longer receive correspondence regarding this study. You may complete the study on-line at <http://www.gasou.edu/~sgaither/technostress-welcome.htm> <<http://www.gasou.edu/~sgaither/technostress-welcome.htm>>. You will be asked for a username and password in order to access the survey on-line. The five digit numerical code found on the bottom of the paper survey is your username and password. After accessing the survey, you will be required to type your numerical code on the on-line survey again for identification purposes. If you have discarded your paper survey with your numerical code and you would like to complete the survey on-line, please email me at senithia@frontiernet.net and I will email your numerical code to you.

As a participant, if you should have any questions regarding the study or you would like to obtain the study results please feel free to contact me at senithia@frontiernet.net or (912) 486-7820. Alternatively, you may contact my dissertation chair, Dr. Michael D. Richardson, at [mdrich@gason.edu](mailto:mdrich@gason.edu) or (912) 681-5079. If you have any questions about your rights as a research participant, you may contact the Coordinator of Georgia Southern University's Institutional Review Board (IRB) at the Office of Research Services at (912) 681-5465.

If you have completed the survey and the results have been (e-)mailed, please disregard this email and thank you for your participation. Again, thank you for your time and consideration. I realize your time is valuable and limited.

Sincerely,  
Sonya S. Gaither Shepherd, Doctoral Candidate  
College of Education  
Georgia Southern University

APPENDIX F:

Pilot Study Review Panel



Mrs. Mary Addison, Educational Technology Support Specialist  
Georgia Southern University

Dr. Linda Blankenbaker, Assistant Professor (Retired)  
Georgia Southern University

Dr. Gerald Kehr, Adjunct Professor  
East Georgia College

Dr. Charles Webb, Adjunct Professor  
East Georgia College

Dr. Catherine Woody, Director  
Georgia Southern University's Dublin Center Office

Dr. Rebecca Ziegler, Assistant Professor  
Georgia Southern University

APPENDIX G:

Letters Granting Permission to Use Instruments



March 5, 2002

1825 N. Bluemound Drive  
P.O. Box 2277  
Appleton, WI 54912-2277

Phone (920) 735-560  
TTY (920) 735-567  
FAX No. (920) 735-258  
www.foxvalleytech.com

David L. Buettner, Ph.D.  
President

Ms. Sonya S. Gaither Shepherd  
Instructional Technology Librarian  
Zach S. Henderson Library  
Georgia Southern University  
P.O. Box 8074  
Statesboro, GA 30460

Dear Ms. Gaither Shepherd:

Please consider this formal permission to use the survey instrument developed and used at Fox Valley Technical College called *Computer Skills for Faculty—A Faculty Self-Assessment* in your doctoral research work. You have my permission to use this instrument and modify it in any way you would like for your specific research application and to satisfy the intent of your study.

If I can be of any further assistance regarding the use of this instrument, please feel free to contact me at (920) 735-2401 or at [may@fvtc.edu](mailto:may@fvtc.edu). Thank you.

Sincerely,

A handwritten signature in cursive script, appearing to read "Susan A. May".

Dr. Susan A. May  
Vice President for Instructional Services

David L. Buettner, Ph.D. President	David Poeschl, Ph.D. Chairperson	Kirry Alaily Vice Chairperson	Donald Waldvogel Secretary	Richard Loeschner Treasurer	Brad Gehring Member	Rose Lussier Member	Robert Lyle Member	Sally Mielke Member	Lee Siudzinski, Member
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An Equal Opportunity Employer and Educator



UNIVERSITY  
of NORTH  
ALABAMA

Florence, Alabama 35632-0001

College of Arts and Sciences  
Department of Psychology  
UNA Box 503  
(256) 765-4351  
Fax (256) 765-4911

May 22, 2002

Sonya S. Gaither Shepherd  
Instructional Technology Librarian  
Zach S. Henderson Library  
Georgia Southern University  
P.O. Box 8074  
Statesboro, GA 30460

Dear Ms. Shepherd:

I grant you permission to use the Computer Hassles Scale in order to complete the research for your dissertation. I grant you permission to modify the instructions and response format for the Computer Hassles Scale.

Sincerely,

Richard A. Hudiburg, Ph.D.  
Professor of Psychology

From: [illegible]  
To: [illegible]  
Date: [illegible]  
Subject: [illegible]

## APPENDIX H:

E-mails Granting Permission to Reprint Tables

**From:** "Spotts, Thomas H." <tspotts@bsu.edu>  
**To:** "Mrs. Sonya S. Gaither Shepherd" <senithia@frontiernet.net>  
**Date:** 31 Jul 2003, 04:00:22 PM  
**Subject:** RE: requesting permission to reprint table from article you wrote (fwd)

---

Sonya,

You have our permission as authors to reprint the content from the table with proper reference. I am pleased that it may be of some benefit to you. I doubt the publisher of \_Educational Technology\_ objects but you might also want to check their policy.

Best wishes,

Tom Spotts

-----Original Message-----

**From:** Mrs. Sonya S. Gaither Shepherd [<mailto:senithia@frontiernet.net>]  
**Sent:** Thursday, July 31, 2003 8:57 AM  
**To:** Spotts, Thomas H.  
**Subject:** requesting permission to reprint table from article you wrote (fwd)

Dr. Spotts,

I am writing in regards to a 1995 article that was published in \_Educational Technology\_ and was written by you and Dr. Mary Ann Bowman. It was volume 35 issue 2 pages 56-64.

I am writing my dissertation and have found a table (Table 1: Percentage of Faculty with Good to Expert Technology Knowledge and Experience) in your article to be most useful in my literature review. I would like to reprint that table with your permission? I will make proper reference to that table should I obtain your permission.

Thank you for your time and assistance.

**From:** EdTecPubs@aol.com  
**To:** senithia@frontiernet.net  
**Date:** 01 Aug 2003, 02:24:04 PM  
**Subject:** Re: requesting permission to reprint table from article published in journal ...

---

Yes, you may use the table in your dissertation, free of any charge. Please be sure to credit the authors and the magazine.

Lawrence Lipsitz  
Editor  
Educational Technology Magazine

<http://webmail.frontiernet.net/index.cgi/printmsg/print?folder=INBOX&pos=14&form=prin...> 8/4/2003

**From:** "Mrs. Sonya S. Gaither Shepherd" <senithia@frontiernet.net>  
**To:** PLSleeman@aol.com  
**Date:** 05 Aug 2003, 07:51:12 PM  
**Subject:** requesting permission to reprint table from article published in journal you edit (fwd)

---

Dr. Sleeman,  
Please see my email below. I have not received a response from Dr. Ledfobr.

Thank you for your assistance.  
Sonya S. Gaither Shepherd

-----Forwarded message -----

Dr. Ledford,

I am writing in regards to a 2000 article that was published in The International Journal of Instructional Media and was written by Melissa Groves and Paula Zemel. It was volume 27 issue 1 pages 57-65. At the time both persons were at the University of Tennessee and have since left the institution.

I am writing my dissertation and have found a table in their article to be most useful in my literature review. I would like to reprint that table but I am unable to locate Dr. Groves or Dr. Zemel in order to obtain their permission.

Since the article was published in The International Journal of Instructional Media, would it be possible for me to ask you for permission to reprint the table as long as I make proper reference to that table? If you are not the person I should be making this request to, will you please direct me to the person who might be able to assist me?

Thank you for your time and assistance.



**From:** PLSleeman@aol.com  
**To:** senithia@frontiernet.net  
**Cc:** PLSleeman@aol.com  
**Date:** 06 Aug 2003, 12:31:12 PM  
**Subject:** Re: requesting permission to reprint table from article published in journal ...

---

Dear Sonya:

You have permission to use the chart from Groves and Zemel manuscript which appeared in Vol 27 #1-pages 57-65 in IJIM. You will not need permission from the authors as the manuscript is copyrighted by IJIM. You have permission to reprint the table for use in your dissertation. As you specified, proper citation must

be noted in your writing noting the authors and IJIM as the publisher.

Hoping that all goes well, I remain

Dr. Phillip J. Sleeman  
Ex. Editor-IJIM

<http://webmail.frontiernet.net/index.cgi/printmsg/print?folder=INBOX&pos=1&form=print...> 8/6/2003

APPENDIX I:

Pilot Study Questions Answered by Pilot Study Participants

### **Instructions for Pilot Study**

The Relationship Between Computer Skills and the Levels of  
Technostress Among Faculty and Academic Librarians from  
Selected Institutions Within the University System of  
Georgia

by Sonya S. Gaither Shepherd

**I. Read the cover letter for clarity and understanding.**

- Was anything left out that needs to be included?
- What needs to be explained that was not?
- What needs to be removed? Is the cover letter too lengthy or too wordy?

**II. Read the directions for each Section I-IV.**

- Were the directions clear?
- What was unclear?
- What needs to be added/changed/removed?

**III. Complete the instrument.**

- How long did it take you to complete the survey?
- Did anything confuse you - wording, meaning, etc?
- What needs to be changed?
- When you completed the instrument did you answer based on the frequency or the severity of hassle occurrences? Why?
- Which would be better - frequency or severity of hassles? Why?

**IV. Return your completed survey and all comments.**

- send to Sonya S. Gaither Shepherd PO Box 8074 or [sgaither@qasou.edu](mailto:sgaither@qasou.edu) by April 14, 2003.

## APPENDIX J:

Participants' Comments on Possible Causes of Technostress

- My technostress is usually due to network failures. other kinds of problems & failures don't bother me much typically.
- New software
- As a faculty member, e-mail gives students the perception that I am always available and that I can solve their tech problems over e-mail.
- Different vendor equipment; lack of training documentation
- server problems that keep reoccurring and are not solved by those responsible after reporting problems repeatedly. Wall Street Journal access for example via EZ Proxy. Printer problems are continual. I try to be more philosophical about them because the glitches occur as the library tries to figure out how to save paper and ink which is commendable. I do wonder about public relations aspects of delays because our students are used to instant gratification.
- Stress occurs when programs fail, when instructions are not clear and when hardware crashes. I don't need to know "how" the computer works. I just need it to work.
- Lack of transparent platforms from U. administrators or no universally used program. Lack of sufficient documentation for U. required uses.
- Lack of speed. Ads on display screen.
- Slow computer time. Spam. Overuse of computer( e.g., on-line "courses".
- E-mail spam. Slow loading of some web sites.
- Organizing data.
- Bossy computer software that does inexplicable or inappropriate things. Most of the time I am pretty patient, but I REALLY HATE MS WORD. I hate the way it tries to second guess what I am writing. For example, I hate the way it automatically capitalizes the next word after a period as if there were no such thing as an abbreviation. And I have completely given up trying to outline or list things. The damned program takes over and rearranges the levels until I am so frustrated I could spit. Another stressor is a program that is billed as "user friendly" but is only friendly to a part of the user population. Take Voyager, the University System's choice for an online catalog. Perhaps it is "user friendly" to the visitors to the

library (though I couldn't vouch for it), but it is actively user hostile to those of us who have to work with the technical clients. It is labor intensive and full of bugs and weirdness. I have to wonder if anyone involved in the ! programming had any library whatsoever, when I consider the way it sorts.

- Frustration associated with lock-ups, crashes, and slow processing.
- While I have not had this problem recently, not knowing how to use a software you have to use is a cause of stress; having a computer that is insufficient for running needed software is also stressful. Changing commercial database interfaces also cause stress, especially when new interfaces are implemented during or at the very beginning of a semester.
- Lack of appropriate training in hardware/software usage.
- Working in a networked environment can be confusing. Our webmaster is trying to organize this better for us.
- Slow download speed. Inadequate training(for some).
- Increased expectations for productivity and service. Exponential increase in information.
- Pop-up ads. Junk and offensive (XXX) unsolicited e-mail. Virus problems.
- Vocabulary terms that are too technically oriented. The terms are often far more confusing than the function itself. Terms need to be used that are comprehensible to the average computer user.
- Down time, slow speed, sitting for long periods of time with relatively small screen, ergonomics, lack of skill by others with whom I communicate.
- Using multiple software/programs at the same time causes computer crashes. Spam.
- The internet- slow download times, dead links, dead-end pages. Computer programs/software- a program that one's dept. might want to use may not be supported by "support". Inability to find answers to questions that aren't covered in basic computer classes because they're too case specific.

- The occasional hardware problem or Operating System or software misbehavior that causes computer to freeze.
- The one time I remember feeling stress related to my computer is when the technology people wanted to reformat everyone's hard drive based on a standard set up. That meant that all the programs I've installed and configured had to be redone.
- For me in particular, it is the unreliability of the Windows environment, whether it is Win 98, or 2K or XP. A second cause of stress while using computers are related to network limitations and bandwidth.
- The problems we have with printers, especially those attached to public workstations, dwarf any and all other computer problems we have. Files that won't print, files that print wrong, printers that jam, print release stations that take patrons' money but don't print...you name it. If we could fix printer problems, I could deal with all other sources of technostress.
- Prolonged use causes discomfort in hands, wrists, neck and back. Also, the ever-changing versions of software programs means you're always learning a new product.
- 1. The heavy dependence on icons, which are often incomprehensible to me. The commands in pull-down menus are scarcely any clearer! 2. The fact that what one wants to do is often buried deep in so many layers of menus. 3. Incomprehensible and/or threatening error messages-e.g. "You have committed an illegal error and will be shut down." 4. The fact that the computer makes you click "OK" when it informs you that something(usually incomprehensible) has gone wrong. No, it's not OK! 5. A mouse strikes me as just about the clumsiest possible way to manipulate information on a screen. How about something like a pointer?  
6. I am not a good keyboarder, and probably could never be: I have small hands, and when I stretch them across the keyboard, I do not have sufficient strength in my fingers to press the keys easily. 7. The constant change in computer products that usually does not represent real improvement. For instance, the newer version of Netscape on our library computers is slower than the older one. I resent constantly having to readjust because something on the computer has been changed, when I reap no apparent benefits from the

change! 8. I am a good reference librarian, skilled and experienced at finding information. But I resent the fact that most questions at the reference desk these days are not about finding information, but about sorting out computer problems- e.g. "Why won't the printer accept my ID?" 9. Since we are in fact getting so many computer questions that are not information questions, per se, we should have a computer help desk staffed by computer trouble shooting experts all the hours that the library is open. 10. I feel like, with computers, the skills needed to access and manipulate information have overwhelmed the information itself! We have less and less time and opportunity to actually learn something interesting, because we are kept so busy constantly learning new computer skills. 11. In hypertext, the fact that you can so easily go off on a tangent just by clicking a link, and that it's often so hard to get back on track. 12. I have a theory that hypertext is weakening people's ability to follow a line of thought- whether it is a coherent argument or a narrative plot line. A book naturally imposes a linear discipline on our scattered thoughts. Hypertext does not. 13. Something that's constantly happening to me is that I will lean on the mouse or hit a key by accident and do something that I didn't want to do, and that's sometimes hard to undo. 14. The fact that people will so often use computer technology when their aims could be achieved just as efficiently or more so without it. E.g., I have sat through so many pointless PowerPoint presentations! 15. I think that the biggest toll that technostress takes on my job productivity is that I tend to procrastinate on or avoid tasks that I know will cause me technostress. For example, after getting into a big mess and irrevocable losing valuable data while trying to create a web page, I have put off doing anything that involves HTML.

- The obvious unlimited amount of info. available. No breaks to match a walk to library or even (like in early days of computers) a walk to computer center to punch cards, pick up printouts, and interact with people there.
- Most of the stress comes from not recognizing that there are good reasons for what is happening, and that



they are not random or personal, and simply need to be addressed and solved.

- Poor support and equipment.
- For the most part, I don't associate stress with my computers. The only stress comes from not having access to them, heavy volume of e-mail, and occasionally not understanding how to work with a particular piece of software.
- Too many patches for Microsoft or Endeavor software.
- Lack of funding and time provided by library administration for training.
- 1. Ergonomic environment(or lack of), e.g. lighting, furniture 2. System always crashing and having to start over 3. System locking up and losing documents 4. Slow access to web.
- Low skill set.
- Unfamiliarity with equipment and programs. Using a tool that is set up and controlled by someone else, e.g. systems personnel. Using non-current equipment or programs that don't do what you want them to do.
- Information overload, rapid technological change, ergonomic issues, unrealistic expectations about availability and need for information.
- Slow response time, ill-organized web sites, pace of technological change is too fast, and need more human interaction, less machine interaction.
- Learning something new all by myself. I really need someone to ask questions of as I learn.
- When things are not easy and logical to follow... e.g., not user friendly.
- Lack of knowledge, software/hardware failure.
- Primarily Section I, statements 15, 16 & 17 from survey.
- High expectation of using computer technology to perform job and produce output. This polarizes the employees who are eager to explore and ride with new technology from those who refuse to try new technology and do not trust change through employing new technology.
- Time management.

- Poor design of web sites; viruses; slow/poor connection; "opt-out" privacy policies; Windows memory leaks and resulting crashes.
- Lack of time to be trained in new software.
- SPAM.
- Posture and stress on eyes.
- Too time consuming; too many new programs- can't keep up; university demands more computer expertise.
- Slow computer speed that results in lost time, or worse, "freezing" of computer. Hardware problems that are ill-supported by technology staff. Jammed printers.
- Spam, keeping up with changing systems, and slow response.
- Too many e-mails/too much SPAM.
- Keeping up with e-mail is probably the biggest cause of computer-related stress in my work.
- Intensity of focus while using the computer makes for lower tolerance of impediments- same as driving in traffic. Some personalities have trouble releasing that focus and backing off to let the stress flow off or around them. The focus also tends to increase one's overall anxiousness to "finish the task" rather than just backing off and doing it at a more relaxed pace. (The racetrack effect)
- 1. System failures. Often our server goes down while I am in the middle of my work. On a few occasions I came to work on the weekend only to discover that the server was down or that there was some system problem. This is extremely frustrating. 2. Galileo search engines that retrieve too little or too much data requiring multiple searches.
- Screen resolution; sitting posture; frustration with operations that require too many mouse clicks (e.g., attaching files to e-mail).
- Other users!
- Confusing instructions.
- When your computer doesn't boot at all and you don't know where to begin to solve the problem.

- Computer technology is designed, frequently, from the point of view of the creator, not the user. "Elegant" solutions, those that reduce the intrusion of the computer and to its needs on the task and the users needs, are too infrequent.
- Lack of support by institution to keep equipment and software upgraded to levels that do not interfere or impede productive work. Lack of adequate documentation and training for programs.
- The expectations of others that everything can/must be done on a computer, or the fact that much of our work is set up on computer and cannot be done without it.
- Lack of willingness to take time to learn about use of computers- hardware and software.
- Lack of skills to access information wanted; dealing with programs, databases, etc. for the first time without adequate documentation or instructions; systems crashing.
- Increased demand- too much to do, and computers lead to higher expectations- Faculty now do all key-boarding rather than secretaries so work has shifted.
- Continued lock up.
- Probably eye strain, physical problems from overuse; lack of knowledge to utilize full functionality; lockouts; slow access.
- High expectations of our patron groups in relation to the low priority given to library technology needs by funding decisions and campus wide technology support.
- Poor instructions(written documentation), and power outages.
- Time!
- Lack of support(information, training, practice) and lack of appropriate user for the technology- software particularly software changes inordinately fast without adequate justification for the upgrade/enhancement for the user. (Upgrades for systems consideration- which are mainly unseen- are excluded.
- When the computer freezes or locks; slow programs.

- Formatting problems using Microsoft Word when creating long (20-30 pages) documents that require the use of an outline.
- Trying to apply Mac knowledge to PC systems; viruses!
- Too many e-mails; extra time demand.
- Probably the most stressful situation is when a computer is crashing (locking up) frequently when no clear explanation or pattern is sufficient to the events. If this happens when you are under the gun to produce, then it is extremely stressful.
- The frustration of not being able to resolve software and hardware problems on my own.
- Time constraints.
- Relying so heavily on it for everyday operations that is stressful when it occasionally fails.
- Web slowdown- computer acting up- bad documentation.
- I feel like I am "too available"- like I should always be checking my e-mail and discussion boards.
- Lack of adequate documentation. New software depends too much on help function which isn't always helpful.
- Lost data, slow access. Too many e-mails and pop-ups.
- Unexpected events- crashed, page shutdowns, etc.
- The unavailability of network connection at all times.
- Being reliant on such a connection to upgrade web-based courses adds to my stress. I have to think through when I can do my work.
- Unavailability of computer or internet connection. Not being able to understand the cause and impact when something unexpected happens.
- Not having the latest version of software such as MS Office when students already do.
- Lack of training and lack of time to keep up with the latest technology.
- Waiting time while computer runs- especially when working at remote locations.
- Stress for others? Stress for me? The one major stressor for me is when the technology- working with the machines- takes precedence over working with people. I am very customer service oriented and I

always want to pay the most attention to people- not to the technology.

- Viruses and incompatible software.
- Anti-technology attitude. Faculty refused to learn anything new. Low ability to cope.
- Glued to computer for long time, body is tense, and so many back/hand pains, due to incorrect posture.
- Insufficient understanding/info/support on simple tasks.
- My main concern is not enough training to use the power of the computer. We seem to spend a lot on hand work but very little on training.
- Too much to know about them to use them to the maximum advantage.
- It is supposed to make life easier and it doesn't.
- Constant state of change, frequent updates making current version obsolete or difficult to use, and poor user interfaces/"techy" language.
- Lack of information.
- Lack of time for training.
- Information not organized, high quality info. (peer review journal) not available digitally, windows products too sensitive and incompatible, and html in word/excel= garbage.
- Poor program/system design- Microsoft products especially.
- Slow web browsing speed, and library has restricted access to on-line journals and publications.
- Slow computers, crashing, and incompatibility of software.
- Ease of use ? to dependency. When systems fail, the inconvenience is magnified by the dependency.
- The need to complete everything in a hurry and also the need to do everything over- after all "you do have it saved on the computer, don't you?" I wish the old saying, "We never have time to do it right, but we always have time to do it over" was not so true about computer work.
- Other than carpal tunnel problems, I think my major problem is the increased demands of output and

timeliness- more documents in nanoseconds seems to be the implicit organizational and professional theme.

- The feeling of never getting caught up with everyone else.
- Slow response time, being blocked from a particular database or electronic journal, keeping current on upgrades and new developments, out of office replies sent to the list server address with the result that hundreds of e-mail messages are received in a day, spam but is easy to delete, computer viruses, cookies placed on your computer, maintaining privacy information, and assisting the same person with the same operations (keystrokes) on a computer every day of work for months at a time. (Written step by step instructions didn't help either.)
- 1. Way too many e-mails 2. Expectations from students and peers that I should always be available and respond immediately to their request. I'm really sick of people thinking I should always be available! 3. Poorly written computer manuals and help functions make it hard for me to figure out stuff on my own 4. Expectations from peers and supervisors that I use more technology than I want to- for example, I find PowerPoint mainly a distraction in my own teaching and learning, but everyone expects me to use it! 5. With computer technology we can store and analyze more data than is necessary or even important, so we waste time computerizing and storing and accessing crap that we don't need- we store up much crap because we can... rather than thinking through what we need and why.
- 1. Cost of software 2. learning curve involved with learning new software 3. skill/knowledge base of others.
- Too much unsolicited information (e-mails, ads, viruses), and increasing expectation for rapid processing of information due to increasing computer use.
- Having problems/things that don't work (computer freezing; internet slow; e-mail attachments won't download; PowerPoint figures won't transfer to WORD document; internet downloads like REAL PLAYER, ACROBAT, etc. don't work right; etc.) And you don't know how to fix it nor is there someone to whom you can turn for help (or if there is they don't seem to

be able to help). Also, increasing demand for using computer and information overload (from e-mail, etc.) that wastes your time.

- Lack of appropriate training for some applications, though mostly I get along fine. Obscene and excessively commercial spam.
- Technology failure. Inappropriately prepared people who attempt to provide technical support.
- Difficulty in communicating: a. across operating systems, and b. across different versions of the same application.
- My lack of technical expertise since support from college 'experts' is laughably inept.
- Sheer volume of it all and that I'm expected to do it all myself. "Secretaries" no longer do this work, so all typing, formatting, tables/charts, overhead transparencies, copying, correcting, etc.; no assistance.
- Ineffective support from our college's computer help desk. System down. Constant changes in our school's programs/software, etc.
- When the technology doesn't work as it is supposed to.
- I have access to a very good computer analyst in my office. I have learned much from him about hardware and software and our combined knowledge and perspectives solves a lot of technology problems that challenge us every day in the research work we do. If I did not have easily accessible support, I might be more "stressed" by the technology.
- Finding the time to not only keep up with continuous changes related to computer technology in the library field (e.g. library management systems) but also in learning about what's being developed. As an aside, another "hassle" factor, though relatively minor, might be the increasing proliferation of user Ids and passwords to keep up with (just part of "information overload")!
- New programs/software needed in teaching, but these programs and software are complicated to learn and use.
- Constant upgrades and advancements that arrive before one is use to the previous versions.

- Access to individuals who know how to use new or sophisticated statistical software packages.
- Crashed programs- power failure- slow response.
- Having to "mouse" a lot- I like command structured software much better. Very slow processing time/response time. Illogical program for workflow. Poor documentation. Not enough ports to access outside systems.
- Programs that don't install properly or mess up something else. Programs that crash repeatedly. Slow response time.
- Fear of the unknown. Too high expectations that computers always "work". Too low expectations that computers always "fail".
- Too many trivial internal e-mails. Slow computer speed.
- Lockups of programs/keyboard. Overly complex programs- can't get it to do what I want. Spam.
- Network crashes, frequent changes in software that require significant adaptation, inadequate training for new systems, poor system support/maintenance (which leads to more crashes).
- Rely too much on computers. Not prepared when they are down.
- My eyesight and lack of keyboarding skills. I have to wear a different pair of eyeglasses when working on the computer (my bi-focals don't accommodate the screen-to-eye distance). I also have to look at the keyboard while typing.
- Having experienced none, I have no sense of what the causes might be.
- Too much computer based work. Inability to fix problems efficiently and effectively that occur with computer programs, etc.
- Poorly designed web-sites that require a lot of time to find what you need. Lack of sufficient instructions in on-line databases. Computer programs that put you in a loop if you make a mistake. Slow loading web-sites. Message "you have performed an illegal operation" and the resulting closing out of a program.



- Most stress occurred when I switched from MacIntosh to Windows- pretty much had to because everyone else at work used Windows. Although Mac was very user friendly, I have found Windows(even 6 years after switching) to be clumsy and non-intuitive. I discovered this early on when it was explained to me that to turn off the computer, click on "Start"!
- My hardware is outdated so quickly.
- The constant inundation of new information via e-mail and the web creates a stressful sense of always being behind. While the computer has increased the speed at which information can be retrieved, the expectations of students and faculty are even higher.
- Lack of support for "outside the box" request.
- Some people's expectations are too high. They assume everything should be fast and easy. They get stressed when they discover how much time and effort is necessary. Physical stress(ergonomics) is also a problem.
- When it doesn't perform as advertised.
- Neck and shoulder pain.
- My most annoying event is a browser disconnect in the middle of a long, unsaved e-mail composition!
- Working with individuals who are unsophisticated with computers.
- Computer breakdowns.
- The most stress happens when you are working away and then crash, bang! Oh, yes, there you sit in the dark. Data lost forever.
- Time constraints.
- The proliferation of spam, viruses, worms and security threats.
- It is difficult to allocate the time needed to learn and remain proficient in the use of computer based instructional programs- WebCT in my case- given that I teach only one class a year. I feel compelled to model the use of this technology to my graduate students for their educational benefit yet I find it hard to set aside the time to learn and stay proficient.
- Slow response. Lost work.

- On-line surveys that compel you to fill in every field before they work even though you may not want to fill in all fields.
- Keeping up with all the software upgrades and interface changes. As a law librarian working in cataloging and database management, I use a lot of different databases and software programs. These are (or certainly seem to be) constantly upgrading and changing interfaces. The on-line cataloging software we used changed from a client text based interface to a java script web based interface last year which was a huge change. As a supervisor I also had to facilitate this change for my staff. Now another database we used frequently is changing its interface as well. On top of this a lot of on-line databases we use for research do the same thing and it is just hard to keep up. My other main source of stress is printing and getting printers to work with the computer application. For instance getting our special computer which prints spine labels to work with the new database interface.
- Pop-up messages that interfere with getting work done.
- Periodic slowness of system. I rarely feel true stress(distress) when using my computer. Most of my stress is really annoyance: We've been changing e-mail systems lately and have had major glitches with "mysterious messages" ("server does not recognize your password," etc. which is aggravating but hopefully will soon be resolved). The new system is supposed to screen spam, but some is still coming through-spam is a major aggravation!
- Old operating system would lockup, but that's no longer a problem with XP.
- Time, and tools advanced.
- For me, it's mainly a result of never being able to afford (time and money) to take courses in computer skills. I can do the basics and have had to learn through trial and error. Having just finished a doctoral program and dissertation, I can't tell you just how much stress I experienced just with the technical aspects of writing the dissertation (tables, etc)!

- I need more technical problem-solving skills to help my students. I need to learn about audio and video streaming.
- Information overload. (#1)- Problems and no one to help answer them- lack of support.
- Lack of computer/technology/instructional support!! Trying to get time sensitive tasks done- always seems to be the time when some part of the technology fails- time consuming. Can't keep up with e-mails. Not just sheer volume, but each message that requires an action makes for a lot of work just to keep up. We need instructional technologists to help us create/maintain new software(and hardware) technology course applications. It's so time consuming to develop, say, a learning simulation; with little reward as an instructor in a research-based institution, without any support for this. I am in great need, too, for a person who can program- to interface instrumentation with software tailored for my applications. Lack of funds to obtain software needed and upgrades. Stupid- buy office software and lab software for instruction. Each faculty member should buy separately- word processing, presentation, statistical, data collection/reduction, spreadsheet, etc.
- Sometimes not enough time to set up programs, not enough space.
- Low stress activity- main nuisance is periodic lock-up due to multi-tasking.
- Lack of time to improve my skills classes/resource people are available here at GSU (Ga. State- Atlanta) but I don't have time to learn new things such as digital camera, video editing, publishing.
- Poor support from user services; lack of space; frequent down time.
- Poor instructions on user programs(e.g. search engines).
- Lack of experience, knowledge, and interest.
- The major cause of stress for me is when I leave computer-related work to the last minute. It seems when I do this my minor problem becomes larger.
- Intersection of external time pressures and random computer or network glitch.

- I am required to use some program or procedure without adequate instruction or documentation to use the program or procedure without instruction. Experience is a great thing in understanding instructions from the computer program.
- Poor or incomplete directions- either written or visual when asking for assistance those with knowledge prefer to show me and not walk thru with me doing the keyboarding, thus saving time for them but leaving me with additional questions later.
- Microsoft's poor quality software, viruses, spam.
- Expectations higher than skills, time pressure.
- Equipment malfunction or poor functionality accompanied by low, slow, or undependable tech support so I'm not disabled while waiting for help.
- Instructions are mostly self taught and can be frustrating trial and error.
- Continued changes in technology.
- Time wasted when things don't work as they should. When the Internet or computer is slow or software locks up. When software has a poorly designed user interface and the software provider does not seem to have much interest in improving the user interface.
- Too much info. to sort to find quality.
- Loss of data, limited storage on disks, increasing demands for tech knowledge to stay involved in higher education, time needed to learn about new technology, rapid changes in technology, and cost.
- Time limits. You have a class in a computer lab teaching them software and only so much time to cover materials. The timing must be perfect- few errors can occur.
- The technology itself rarely causes any stress for me. The only stress I have related to my computer is the workload created by the enormous amount of e-mails which I receive and to which I must respond.
- Too much information and applications.
- Disjunction of tasks/needs and having updated, current software installed by central computer support.
- Pressure to use technology simply for the sake of using technology, fulfilling a mandate, new operating

systems that do not allow functions previously allowed with other O.S. (e.g. updates to MS Office), lost data, poor help manuals/on-line help (inaccessibility; incomplete directions).

- For me, the most stress comes when a. I've been working on something for a while, the computer/system/program crashes and I lose my work, and b. Difficulty connecting to the Internet at home or work. Basically, when technology doesn't perform the way it should and it hampers my productivity.
- Just looking at screen for so long.
- Time available to learn and practice new skills.
- Time issues, and student expectations are very high regarding on-line availability of everything.
- Inexperience and fear that the system/server will freeze or crash, resulting in lost data.
- Spam, pop-ups, system crashes, and printer problems.
- An intimidation of something different than has been used in the past and a lack of knowledge.
- Time and computer lock-ups.
- The pressure to become more technologically adept is somewhat stressful, e.g. the drive to use the computer and internet in the classroom, WebCT, etc.
- Slow computer or connection speeds or computers that have some kind of error. Also, trying to do something that requires a lot of concentration using the computer while also working a busy service desk can be stressful.
- We have good, but insufficient, computer help. Our person works for too many people. On-campus courses are not geared to faculty & types of uses they make of computers- rather, they are clerically oriented. I am book review editor of a journal & get e-files in many forms that are hard or impossible to use, & I have no technical support dealing with this type of problem. No one helps with instructional software - we are on our own with that. In recent budget cuts we have just lost virtually all clerical aid, so we now must do all our own computer related clerical work too. Frankly, this seems like a waste of my time!

- Unwillingness to appreciate the o/s benefit of technology & how it has enabled me to do so much more w/in a 24/7 period.
- Loss of operational equipment-goes out & do not have good alternatives until fixed.
- Undoubtedly the most stressful cause for me is when my hard-drive has crashed. It's happened to me three times- all within a 9 month period. Each time I was paralyzed from pretty much accomplishing anything and stressed about what would be retrieved/saved or not. Each "saga" lasted 1-2 months. Needless to say I am now nearly very diligent about backing up my files. Slow speed with e-mail and internet was stressful when working from home (not at my University)- but then I got DSL and it's been delightful.
- Lack of skill. Lack of time.
- My biggest stress producer is the Front Page software and the creation of adequate web-pages. Fortunately, we have enough trained support staff to help get out of difficulty. They will also create web-pages for me.
- Strange things happening for no apparent reason.
- Technical delays, and amount of time to debug.
- Not being able to connect to sites when want to. Not being able to access all stuff at work from home computer (attachments, etc.). Can't follow any help pages- they are useless.
- Software assumes and controls interfaces, so software does things that are not wanted and it is hard to stop it. Example- automatic bulleting, automatic snap to grid.
- Computer freezing up. Spam- porn especially.
- Fear of "Fatal" errors. Lack of understanding of some programs.
- Too much information via internet and increased expectancy of performance because of electronic data basis and communication.
- Technical problems- lock-ups, etc. Lack of familiarity with hardware and/or software.
- For me the biggest stressor is not being able to get expert help, because I hate to read or click the "Help" tutorials.

- Lack of adequate training in software packages prior to use and no time to take training and development courses if appropriate ones available nor to experiment/explore features to improve skills.
- Inability to reach desired result in timely manner(e.g. web links not updated, computer/programs freezes, no clear search terms). Searching help sections of software programs for answers to specific questions is often time consuming and often I still do not get the answer to my problem.
- Frequent system software changes- e.g. e-mail programs here have changes twice within the last 3 months.
- Different interfaces in databases, unclear web pages, wide range of searching techniques that a user has to learn.
- Level of computer technology literacy.
- Slow computer speed and computer crashes.
- Same stress as all other work. Too much to do in too little time. Technology has increased expectations for productivity, but has not made us any wiser.
- The very fact that one has to use the computer and particular software is stressful. Now, students automatically assume that presentations must be in PowerPoint, which makes those presentations even more banal than before.
- Too many e-mails, spam, learning new software, computer shutting down.
- Too many interruptions. Computers that won't do what you tell them.
- Lack of customer orientation from software/hardware/services (e.g. Presumption that everyone knows what you know/talk the same language; "one size fits all" solutions; technology solutions "for the university" that put increasing demands on users with no added benefit (e.g. grades online, student evaluations on-line); software/technology solutions made without input from likely users). Overselling software abilities. Poor documentation. Too easy access to people- bombarded with e-mails requests and newsletters from people I have are irrelevant- and way too much SPAM including pornography.

- Computer crashes or system/server goes down.
- We expect immediate response- and of course, the only time loading is a problem when you are in a hurry.
- Information overload is one big issue. The amount of junk information is aggravating, but even the real information is daunting. Another frustration is the rapidity with which software is reconfigured. Often my only reason to buy an upgrade is to be able to share files. I rarely need the new functions and added minor bells and whistles.
- I experience very few, if any, level of stress when using the computer.
- Lack of knowledge/familiarity with the software and/or hardware.
- "Bugs" in software. System "locks" and have to reboot. Poor instructions or "help" with software.
- computer technology actually alleviates a lot of stress.
- The ringing of the telephones and people walking into the office.
- Lack of skill and knowledge.
- Occasionally computer will freeze when you are in the middle of a long document. Computer at home is slow due to old type connection. Generally, though, I do not consider computer related stress to be a serious problem.
- Information overload.
- Many things happen with the computer that are beyond my control- program freezes up for no apparent reason, etc.
- I love computer technology- the only stress I feel is shutting it down. There's always one more thing I should do. Walking away is hard!
- Lack of time to learn new software.
- Probably the loss of work time.
- Incompatibility of programs and files is a huge problem for me, because I refuse to use most Microsoft products on principle. I believe that software choice is necessary to innovation and quality, so I use non-Microsoft products whenever practical. I also believe



that Microsoft provides a distinctly sub-optimal product, relative to their corporate capabilities. When files get messed up by Microsoft, or web sites only work in IE, I get extremely irritated. It should also be nice to have more IT support for non-Microsoft programs.

- When computers don't respond by performing the work a person needs to do, stress levels rise. Also, when computers run slowly, stress rises.
- The fact that administrators think throwing a computer at a problem will help one produce more, when it might slow one down instead. Many of the promises developers make are pie-in-the-sky-by-and-by and the functionality you think you are getting is for "future releases".
- The uncertainties of obsolesces and the loss of valuable information that has not been filed properly for retrieval. The difficulties of keeping up with technological changes that are more efficient (from one viewpoint) but not more effective (in the long run).
- Lack of tech (help desk) support which is not the case with me.
- Inexplicable external (assumptive) expectations that faculty use the computer in the first place.
- The system upgrades (RAM, Hard drive space, processor) are not provided as rapidly as required for the software used. Over-use of e-mail for communicating trivia, advertising. The main source of stress for me is that computers are now inescapable. My job reaches out to me via the Internet- at home, on the road, even on vacation. A compulsion to go online is real and enduring.
- Lack of knowledge and time.
- Too many e-mail messages. Holding onto e-mail messages too long until my box is too full. Having more than one e-mail address to check.
- Computer/program malfunction ("crashing" or "lock-up").
- Slow computer, slow internet, constant upgrades necessary.
- University infrastructure problem.

- Lack of skill.
- Finding time to learn how to use applications.
- When a program freezes and I need to spend extra time to reboot. Too much e-mail. Attachments which won't open.
- The need to be adept at so many skills, if a project of any complexity is to be accomplished. Not having access to all of the hardware/software needed. Not having adequate online help and tutorials. Lack of consistency in search interfaces.
- Our technologies now allow us to be almost constantly "available," with an increased expectation that we respond to communications from every constituency. This is no longer a reasonable expectation, but I feel guilty when I deliberately close off communication avenues temporarily, like when I turn my cell phone off. Mounting levels of e-mail in my inbox cause me a significant amount of stress, cumulatively.
- time pressures, multi-tasking.
- I don't have much stress using technology. I am confident and comfortable and consider learning new applications a welcome challenge unless under time pressures. Then there is some stress.
- poor untested software.
- lack of understanding, hardware, software.
- we have no systems person to help us when there are problems or changes. We have had to figure out too much on our own. Sometimes we have little or no training or inadequate training.
- lack of computer skills, lack of computer knowledge.
- too much to do.
- lack of knowledge about the program and lack of quick access to technical expertise to resolve problems, software that does not do what you need done.
- the main causes for me are (1) inadequate PC for my job, and (2) lack of technical support, especially during program upgrades.
- lack of space, lack of automatic backup of files, slower speed than is possible.

- insufficient knowledge about computers and the internet.
- being afraid because you don't understand how it works; not being able to look at the task in a new way-that is, with technology you may need to think about how to get to the end result in a different way; worrying that you could break something or lose your work; thinking that others understand technology but you don't; not wanting to look dumb by asking questions; the real physical stress of holding your body rigid or in a position for too long without taking breaks and doing stretches; not practicing enough-thinking that something should be easy to do.
- not understanding that it is a fallible system.
- not enough skill to perform functions needed; outdated hardware & software; extra duties with computers but no other duties taken away.
- lack of knowledge of how to use certain programs.
- not understanding the terminology and how to troubleshoot when something goes wrong; trying to keep up with the constant changes and upgrades.
- I need the computer & rely on it; when I can't get it to work, I get stressed.
- slow speeds.
- too much info-sometimes when dialed up..the speed is slow...so I do other things while waiting.
- trying to do something & program won't let you do it-although it should.
- too much data; patron confusion over the huge number of resources to choose from; not enough knowledge about how to use the online resources, such as the Georgia GIS Clearinghouse and too busy to adequately seek out training and master these; trying to learn low-level GIS, and then using so sporadically, so forget how.
- unstable software; constant accessibility to students and the outside world-need to constantly check & respond to e-mail; transferring file from machine to machine.
- passwords that don't work; remembering passwords.

- expecting immediate online response; spam; frequent upgrades and relearning that is unwarranted.
- the time to learn new functions. While I may see the benefit of learning something new, and recognize that ultimately using certain software will save time, & resist investing the time for learning since I feel so stressed out because of time management problems, demands on my time, work load, etc.
- down time; slow speed.
- lack of motivation to learn the new technology (not me); using computers that have not been updated (Windows); I use a MAC usually, so I sometimes stress when I have to use Windows, and it can't normally do the things my MAC can.
- screen quality; the user's brain bonds with the computer information & people need to remember the computer is only a tool.
- lack of information about computer software shortcuts.
- Lack of training in how to use computer technology properly and effectively makes it difficult to do what I need to do. It is stressful because it is difficult to use. Learning to use WebCT to teach online courses is very stressful because it is complex and some of the technical support makes you feel stupid when you seek help. Lack of compatibility between MacIntosh, which I use, and IBM computers causes problems for me sometimes. Also the browser Navigator, which I have, does not work as well as some of the other browsers. It is difficult to get technical support and advice; have to go through many people to get help and then you have to wait. Technical support does not know as much about Macintosh as IBM computers. Also I lack adequate typing skills.
- No documentation for use in learning to operate the technology. New technology provided "at the last minute."
- not enough knowledge and skills.
- basic secretarial functions. I used to have a secretary to do all my piddly little typing jobs but now, that we have computers, the expectation is to do one's own menial filing + secretarial work, which takes one's time away from professional duties.
- not having someone to ask when I run into a problem.

- lack of knowledge about how to operate the computer or access information; problems with the software; loss of records & information.
- not enough clear instructions, particular WebCT.
- I don't really feel these stresses. I enjoy the ability to use technology as a tool in my teaching, research & service.
- no time to learn what's needed.
- events I cannot control.
- lack of knowledge.
- lack of confidence.

APPENDIX K:

Participants' Comments on Solutions for Coping with  
Technostress

- Try to avoid using computer technology when already stressed. Try to use computer technology for short periods of time - not over an hour.
- Go home and use my own computer.
- I try to give my students boundaries to guide their expectations.
- Attempt to find someone who can provide assistance
- Try a couple of basic things and if those fail find help usually a colleague or staff person in our Systems Department. A consultation with one of these knowledgeable folks usually takes care of problems in a timely manner. Good and steady support here helps reduce the stress level BIG TIME!!
- I bang my mouse on my desk and scream or swear, depending on where I am and who's nearby. It helps!
- Turn it off- relax- try again- then ask.
- Get help.
- Try to educate myself so the next time I can fix things myself.
- Call for help (WebCT help line, IT services).
- Go play basketball.
- I yell at Word a lot. With Voyager, I have worked with our systems librarian and service site coordinators to identify and document bugs and recommend enhancements. Then I put my nose to the grindstone.
- Get up and walk around, talk to a colleague, listen to music, eat( which I try to avoid).
- Remain calm. Ask for help. Self-educate if needed. Make need for more powerful computer clear. Take a walk.
- Reboot.
- Ask a person to help me.
- Take a break and come back to it later.
- Walk, eat.
- Get control of anger, and take a walk.
- I seek help.
- Do not consider it stress- part of functioning- things will go wrong and they do.
- I either try to fix it(if possible) or try not to worry about it.
- Deep breaths in and out followed by pulling hair should stress continue.
- Take a break from task doing and then seek help with problem if persists and can't seem to solve it.
- I rarely attribute stress to working with my computer. It's a positive thing for me. I feel that if something malfunctions I can fix it. I also am surrounded by

wonderful tech support people who help me if I can't fix things.

- I usually grab my cordless mouse and fling it across the room at a high velocity. Then I gripe....a lot....then I reboot and try to find a backup mouse.
- Not too well...get stomach pains and feel frustrated and useless.
- I listen to music while I work; and, take breaks from the computer when needed-such as stretching or go outside for fresh air.
- 1. Cry for help!!! 2. Gripe and make sour jokes about the computer. 3. I have a "computer hate wall" (now, actually, a bulletin board), where I post computer jokes. 4. For a while, I kept an "Anti-scrapbook" into which I posted printouts of error messages and other computer annoyances. It really seemed to help me let off steam!
- I use alternate means like hard copy books, journals, and so forth. For example: I choose to do this survey the old fashioned way. I break up org. sessions with other activities. I am in charge! I remind myself that it is just another tool I have control of!
- Reminding myself that I am in charge, and that my task is to remain patient and deal with the problem without allowing it to stress me. The question: "Is this worth dying over?" is very useful, since the answer is always no. This helps me keep everything in proportion.
- Take a break!
- Since I don't feel much stress with the computer, I don't really employ coping mechanisms. When I have problems, I am well supported through my school's info. technology help office.
- The same way I do with any stress related situation. Take a deep breath and then take the problem apart.
- Curse Bill Gates.
- Just keep starting again or call computer support. I don't feel as stressed when I know others are experiencing the same problems. Sometimes, problems are not communicated successfully.
- Ask for help.
- Take a mini-break, e.g. stretch. Ask for help. Try a different approach, sometimes lo-tech or even no-tech.
- I know when and where to go for help and am not hesitant to ask. I break up my day in such a way that I'm not at the computer for extensive periods of time.
- Take a break, stop and perform non-computer related task, make a phone call rather than using e-mail.



- My husband and son both have degrees in Computer Science. Mercifully, I can ask them for help when I don't get help at the University.
- Go for help.
- If a malfunction, I try to understand the cause of the problem to reduce the chances of it happening again. If doing something new, I try to get help ahead of time or be able to contact help while doing task.
- The best approach to cope with it is to continue to increase your technological horizon and stay with the trends and current... Stress occurs when one realizes he/she is behind and feels helpless or hopeless in keeping up with it.
- Get help from office support and/or college computer support services.
- Reboot.
- Use system back up on our network; purchase DSL at home to avoid dial up delays; delete SPAM without reading.
- Reduce computer usage and talk about stress with colleagues.
- Exercise and stretching.
- Don't use at home, only at work. Eat popcorn!
- Do work in advance of when it has to be completed.
- Switch to faster computer, if you can get access, whenever conducting a project that requires speed.
- Delete, delete, delete. I lag development pace- catch up when it is steady state. Work on something else while computer grinds.
- I just roll up my sleeves and get to work!
- I try to take little breaks of varying sorts including trips outside the office to deliver items or have a work related chat with a colleague. Also sometimes step out and do some ergonomic exercises and deep breathing. Work with non-PC tasks. I consciously try to refrain from focusing too much on finishing my task if it is within a clearly defined completion point- that way I reduce the racetrack effect.
- Scream, yell, then try to refocus in some task that doesn't require computers.
- I usually know what to expect, so I don't usually experience stress. I have a person to help in my department, and most of my colleagues know the technology better than me. They help.
- Web surf.
- Call for assistance.
- Avoid it.

- 1. Go to the help documentation. 2. try clicking around various menu options. 3. Ask someone, usually tech. help, if the product is causing difficulties for a student, but rarely for myself. 4. When coupled with feelings of impotence in other work duties, I cry; my eyes tear up and I have to... 5. go take a walk.
- I work on something else for a while. I play one of the games on the computer. I take a walk. I log out and go home.
- It depends on what caused the stress. If server down, do something else and go back to computer later.
- I give up. Ask for help.
- Stop what I am doing and ask for assistance.
- Work longer to try and walk through the mess.
- Bang the mouse or keyboard.
- Get up and leave, exercise, an occasional scream, or share with others: misery loves company.
- Lots of exercise.
- Endure, take a break, or verbally let off steam.
- Get support service in college.
- I don't switch to upgraded OS or Apps. unless there is compelling reason... larger functional reason to do so. You don't have time to keep relearning.
- By turning it off or moving to another computer which is a pain in and of itself.
- Take long walks, workout, and call for assistance.
- Ask someone for assistance or change activities.
- Do we?
- I listen to classical music or familiar tunes.
- I ask for help.
- Take a break.
- I don't really feel stress.
- Honestly? I cuss at it- shut down the computer and scream "Die!" Then I laugh and turn it back on. It's childish, but it makes me feel as though I've won.
- Establish times to "check in" and make it often so I do not get behind.
- Keep plugging away until I figure it out or find someone who can help me.
- Take a break and come back later.
- 1. Swear. 2. Look for help files or network status reports. 3. Get help. 4. Switch to a different task. 5. Complain bitterly.
- I try to remember that the computer is a tool and not the "be all to end all!" Nevertheless, I am dependent on the computer. The wireless environment is helping make network connection more readily available.

- Research the problem. Call for help from college computer support personnel when I can't solve the problem myself. Then I ask the questions so I can better understand the situation for the future.
- I curse under my breath. I have kicked a computer or two over the past 25 years.
- Try to learn more, try to learn a little at a time, try to learn something new when I have opportunity to actually use knowledge.
- Try to multitask when the computer is slow.
- I have a 2-year diploma in computer information systems from N. Metro Technical College. I completed the program to enhance my library skills, and to become far more proficient with both hardware and software. One way I cope with "stress" is to continually take classes, workshops, etc. in order to keep my skills honed.
- Take a break from computer.
- I do not experience stress from using technology. I experience stress from people who want to blame technology for their own limitations.
- Get up once an hour or so, when I remember, and search web for alternative sources of tracking computer/program glitches.
- I really don't feel stressed- I just hope to have others to call on when problems occur.
- Call the IT person.
- I yell at computer and then e-mail IT guy and leave.
- Seek help from support group.
- Seek help.
- Call office of Instructional Technology for support.
- Grit teeth, breathe slowly, and hope Bill Gates sells out.
- Frequent breaks.
- Ask for help.
- Stop working and do something else.
- Cuss at the thing. It usually responds to that.
- Get up and walk around, take aspirin, threaten my computer with the hammer I keep in my desk drawer! (The computer even listens.)
- I swear.
- Focus on what I need to know and worry less about "keeping up with the Joneses".
- Get up and take a break.
- I simply don't use it and I resist the push to learn more. I think technology is over rated... so I don't bother! For example, I'm sure it would have taken me longer to do this survey on line- so I did it by hand!

- Always listen to internet radio, take a break, and consult others if I need help.
- I no longer try to "file" e-mails. I no longer read all of my e-mail. I try to take breaks from computer use. I stop using the computer when I get a headache.
- Do the best that I can. Work around problems or just not use the program/function that isn't working.
- The delete button works well enough I guess.
- Either work around it (e.g. go to another computer or come home to work on my own computer).
- I switch off the computer and return after a brief period of time.
- Walk away.
- Shut it down, wait 10 minutes, and start over.
- Usually yell and get frustrated. Try as best as I can to find support from tech. folks. Move on to something else and try to attack problem later.
- Step away from computer and yell! Then call computer desk for help!
- I think one must be comfortable with constant change; one cannot expect to learn programming, software or hardware once- coping with technology is a life-long process. I don't strive for perfection- just getting the job done. There are many "right" ways to work with a piece of software or ways to write a program. If one looks for the one right way, he or she will most likely be frustrated.
- Try to utilize campus resources when necessary in order to obtain help and support(e.g. the information technology services department staff).
- Getting training, asking technology specialists for help to solve problems, also alternative ways in doing things when using technology is difficult.
- I try to attend workshops whenever possible, and I go to yoga classes when I can.
- Become frustrated.
- Acceptance.
- Stress is minimal- we have excellent technical support in house. If I am feeling stressed, I get up and walk around or work on something else.
- Computer technology is just a tool- and when using a tool, sometimes things don't quite work right the first time- so I think about what I have done and what output I got and try to improve it the next time. If you treat the computer as a magic wizard, then it will probably throw lightning bolts at you. I just treat it and use it as a tool- a tool that has pluses and

minuses- just like I would a hammer or sewing machine or a telephone.

- Delete. What can you do? Just deal with it.
- Turn off computer. Stop using complex programs.
- By walking away from it for 30 minutes or so and then returning calm and resolved.
- Limited use outside of work.
- Take a deep breath; get up and walk around; make a cup of tea. Use the fixed focal length glasses that work for the computer screen distance.
- Don't experience stress.
- Take break; ask for help.
- Fume and fuss. Thrash around to try to solve problem. Reboot the computer. Call our computer support unit. Ask a colleague for help. Attend instructional sessions to learn new skills. Pray for calmness.
- I use Bill Gates' name in vain.
- Good support staff and friends who help troubleshoot.
- I have limited the number of times per day that I check e-mail (down from 10\* to about 5/day), which keeps me from getting too distracted. Taking classes or tutorials to become more proficient (and efficient) is also helpful.
- Get through it.
- I try to keep things in perspective, and encourage others to do so as well. Most of my stress comes from other people's interaction with machines, not from the machines.
- Shoot the damn thing! (kidding) I call on computer help desk and I also use a private computer consultant.
- Take a break.
- Walk away.
- Stay away from unsophisticated users, or direct them to help-desks.
- Kick the computer.
- I usually call more knowledgeable persons to help me.
- Stop working at that time and begin again later.
- I'm fatalistic.
- I try to use the resources of technical support staff when I'm in a jam. Also try to manage my e-mail time and focus my attention to it at the beginning, middle and end of each day- although I'm frankly not very good at that.
- Scream. Hit head. Complain to anyone about me.
- Swearing.
- Eat!! No, really I don't think I have an effective way of doing this. I am on some e-mail discussion list

where I can ask questions. I also try to keep up with professional reading and attend users group conferences- of course money for travel is tight so I can't go to as much continuing education as I would like to.

- Ask for assistance.
- Zap spam without opening it. For slow response time, have other tasks I can do to fill in. Sometimes, taking a total break from the computer helps.
- Adjust your expectations.
- Try and practice.
- Basically, I don't cope unless there is a colleague or more knowledgeable peer available who can assist me.
- Ask for help! Have patience with my students when they have tech problems.
- Throw something.
- When I'm having trouble, I do everything I can to solve problem- use help programs, or other help items; try doing task differently; call for help to a friend who is an instructional technologist or our computer help folk in our college. (In other words, get help after I try to fix problem) I also call my friend, the instructional technology person to rant and vent, as I know she understands the frustration of doing certain processes. Take classes to learn new software. Buy software reference/how to books (out of my own pocket).
- Grin and bear it; call on others to help.
- Stress is minimum; play basketball 2 ½ hours every Tuesday to keep it relieved.
- Try to think how far I've come and all I've learned. I try to model use of tech. for my students.
- Very little real stress- just perform other tasks until problem can be solved.
- Work through it.
- Ask for help or just skip whatever I was trying to do.
- I try to be proactive and work as far in advance as I can.
- Take a break.
- I only use what I must use. I ask lots of questions.
- Complain!
- I have a Mac and e-mail filters.
- Use alternative approaches to get things done. Patience.
- Sledge hammer (joke). Try to fix, get frustrated, ask for help, wait, get really frustrated, work around it (use home equipment or other method to accomplish goal).

- Come back at it again if I've had too much at one sitting.
- Just work through it.
- Try to be patient and not stress out, do another task while one task is operating. Get up and stretch, get a drink of water.
- Turn it off when I've had enough.
- Walk away if too stressful- take a break. Ask for assistance- computer support at work, or tech support lines. Have student assistants who are able to work with the technology needed.
- Have technical assistance available to respond to the unexpected but inevitable. You can not both teach the material to 40 students and simultaneously add late registrants to course (not on roll in computer), teach someone how to log on, and figure out that a mouse is disconnected.
- I stick with the basic workings of the technology.
- Take a walk.
- Ask my husband, a computer whiz, for help! Walk away grumbling. Phone WebCT for help. Abandon the attempted task if possible.
- Try to fix the problem. Walk away from it for a while (I am filling out this survey because my computer is running Norton diagnostic software because my e-mail program isn't working. Ironical!)
- Breathe.
- Ask for help. Give myself enough time to be able to handle problem that may arise. Freak out. Use an alternative means.
- Call Network Support.
- Yelling usually works for me.
- Take the steps one at a time and double check my work.
- Take a break from the computer and return.
- I acknowledge to myself that I am doing my best and that I will eventually integrate more technology into my personal and professional life.
- Slow down and relax. Breathe normally. Take a break.
- do other kind of work
- for most part of it is non existent w/one since I appreciate it so much!
- avoid using computers at times - e.g., for instruction or recording grades
- try to learn from grad students who know much more than I, or from my adult daughters & son in law.
- it is very - more so than many other job-related stresses.

- I don't cope well at all when really stressed about it. I seek help from technical support people at the University in which I work, but they are typically not very responsive and, often, not very skilled. The best thing I did was order the "gold" service through DELL the last time I ordered a computer. They have been really central in helping to solve any problem my hardware has posed. Software problems seem pretty easy to overcome or else I simply don't purchase the product.
- Turn it off and start over.
- Read the manual and/or call on the support staff or systems administrator or web master.
- I swear a lot!
- Loss of sleep. Make adjustments in goals.
- I just deal with it. I'm too busy to do otherwise.
- Quit; leave it.
- complain, yell- make jokes about software engineers.
- Restart, get help, get a new computer. Delete.
- I'm not usually stressed- but if problem can't be solved- call for human help.
- Shut off the computer. Ignore e-mail messages. File e-mail folders. Delete lots of messages at once. If it was really important, it will be sent again.
- Seek help from colleagues first, then from college-level tech support, then university level tech support- but I usually seek help only after I have become very frustrated. I tell my students not to do what I do. I tell them if they get frustrated, shut down and walk away, come back later, then get help if you still need it.
- Complain a lot, or just deal with it only at work.
- Ask assistance from more expert users in department. Call on library systems support staff. Yell obscenities at Bill Gates (I was fully trained in WordPerfect, and our administration adopted MS Word for Systems Network Support).
- I usually end up moving on to another project and leave unanswered questions for another time.
- 1. Switch to another task, preferably not involving a computer(2 or 3 times/week). 2. Play a game on PC for a few minutes, almost daily. 3. Check e-mail (almost daily). 4. Take a coffee or lunch break, and eat and go for a walk or read (daily). 5. Chat with a co-worker (twice a week) or visit a friend in another dept. of the library (about once a month).
- I ask for help or report problems to our systems librarian or department computer expert.



- I seek help from others with more expertise and make an effort to increase my computer technology literacy.
- I don't have any special coping mechanisms.
- Eat.
- Other than basic web browsing and word processing, I avoid them because I consider most technology and software faddish.
- Call the technical support.
- Chocolate!
- Poorly. Learn to dislike and distrust providers. Makes it easy to be amazed when someone/something actually does what it's supposed to.
- Call the computer support people for help.
- I don't find it stressful.
- Beat on my keyboard. Run away. Fantasize other acts of violence to the machine. When I calm down, I try to get help- on-line, in the manuals, and from more expert users.
- I cope by listening to music.
- Take a break.
- Pretty much tell the computer that it is an idiot!
- Ignore it.
- By taking a break.
- Ask for assistance.
- Take a deep breath or two sometimes. Do not have a particular strategy, but do not consider it a serious problem.
- Try to stick to my task.
- I complain a bit and then either turn off the computer and start over or seek technical support.
- I don't feel a lot of stress. I think computers have made my life much less stressful.
- This is not usually a problem.
- Persistence, finding helpful people to support me, and a little bit of self-directed learning. I have not yet bothered to learn html, but otherwise I am quite self-sufficient. I have never tried to be a computer geek, but I have used the PC for over 20 years, which gives some benefit of experience. Cursing and going for a coffee break also helps. Some on-line resources are also useful, although I am not expert enough to use most of the suggestions. Misery loves company.
- I call the help desks and I quit with the computer until I can calm down. Or, I get somebody else to do the work.
- Curse.
- By turning the problem over to others more competent than I am!

- Walk away. Clean my office.
- Drink heavily, after abusing the machinery.
- Take a deep breath and remind myself of the value of computer technology.
- I occasionally divert to entertainment sites(sports, news, Amazon).
- Call for help.
- I try to find some down time to respond to messages or limit the time spent answering e-mail messages. Constantly, some messages go unanswered if not recognized as needing immediate response.
- Take a break from trying to fix problems if it becomes too frustrating.
- Curse.
- I don't really look at it as stress... for me it is more of a challenge.
- Ask someone for help.
- I feel little stress when using computer technology.
- I call the local help desk.
- On specific problems, take a break and then come back to it later. Request help from a colleague.
- I don't try to solve problems that are better solved by tech personnel - especially network-related problems. I usually have them do tasks such as system installs, hard disk reformat, etc. These tasks are not a good use of my time, and they can do them without fumbling through the process. I like to ask questions of real human beings - "How do you ...?" etc. I've identified people in my environment who are experts about specific programs. I never do something major to my computer set up when under pressure. For example, I don't download or install new software when a major deadline is looming. I stay off the "bleeding edge." New software inevitably has bugs. I let other people find them and fix them before I spend my time doing that. I avoid upgrading to the next new thing (Windows XP, for example) until it makes sense to do so - like when I buy a new computer or something becomes seriously wrong with the current one. I backup religiously: my data exist on multiple computers in multiple locations and in multiple formats at all times. I carry all current files around with me on a little removable drive. I think this is the most important strategy of all. I teach and present with technology almost 100% of the time. Nevertheless, I'm always prepared with some kind of alternative plan in case the projector won't work, the server is down ... etc. Usually, all I need is a printout and a CD backup

- these cover most situations with a little added flexibility.
- walk away, ask for assistance.
  - With a sense of humor. Not everything will work all the time. We just don't know what will malfunction in advance. That is technology. Keep trying.
  - take a break, do not take it too seriously, know good support people I can contact for support.
  - call my help desk.
  - do something else.
  - seek out our departmental computer technician, avoid the problem if necessary which results in additional stress.
  - take a nap.
  - walk away occasionally, switch projects.
  - I go for a walk and hope that the problem will have resolved itself when I return. Or I find a non-computer related task to perform like reading reviews.
  - get help.
  - I try to remember to get away from the computer and do stretches-and watch that I'm not tensing a part of my body that will later hurt if I don't stop; I take classes when possible to learn new software; I might talk to someone in the library who has used the software, or printout messages on one of my list-servs if people have listed hints about the software; I might first try it with the idea that I'll only spend so much time on it today and then try again the next day; I know that I figure things out sometimes early in the morning - so maybe the next day I'll have thought of something helpful in how it works.
  - try to keep in mind that something will go wrong at some point.
  - ask for help (colleagues & support people); take frequent breaks - go for a walk; joke a lot!
  - I do what I know how to do.
  - I have two computer staff members in my department who fix my problems! And I don't try to do much other than e-mail, word processing, and some web surfing. I need to learn more but just don't have (or take) the time.
  - I get help. I ask someone else to do things for me.
  - Quit whatever is the problem & go on to something else
  - drum my fingers on my desk; leave for a while to get a drink of water; come back; go again.
  - do other things-multi task.
  - shut down, walk away, try again.
  - try to breathe deeply; call on the library systems folks; take the problem home to have my husband help-

- with an MS Access problem; put the problem aside; or do it the old fashioned way.
- take lots of breaks; do yoga to keep back and shoulders from being stiff.
  - quit immediately then back; call a techie friend
  - organize my course material to reduce queries from students; message blocking.
  - systematically organizing and triaging my tasks. Those with highest priority get my attention. Those with lower priority usually get done-but often very late!
  - leave it & come back to it later.
  - I rarely have stress with computers. When and if I do, I take a break and come back to it. I always find a way to solve it.
  - get up; walk; talk to others to try to solve the problem; make back-ups of my work.
  - troubleshoot; call tech support.
  - I get mad and frustrated. I feel inadequate. I talk to the computer. I swear at the computer. I hit my desk with my fist. I ask for help from my colleagues. I try to trouble shoot the problem. If I have time, I explore my computer's functions to try to make it work for me. I also think about taking more workshops to improve my computer skills but usually do not follow through on this.
  - Seek help from anyone I know who is familiar with the technology. Try to stay on top of things so that last minute expectations don't happen.
  - learning more.
  - scream, whine, bitch.
  - ask for assistance; take a break; back up information; contact the internet service provider.
  - Ask for help from an expert. I don't want to know HOW it works; I just want it to work!
  - I'm a MAC user. I believe this choice (MAC vs PC) has eliminated the kind of stress you are addressing in this questionnaire. Computer technology is not stressful- it's fun and a great enhancement to my teaching, research & service efforts.
  - call experts.
  - keep busy.
  - I'm pretty low stress in general and don't really notice technology related stress.