

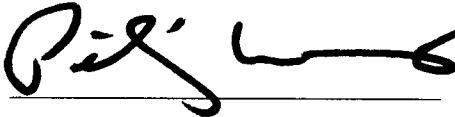
To the Graduate Council:

I am submitting herewith a dissertation written by Lisa A. Ennis entitled "Technostress in the Reference Environment: A Survey of U.S. Association of Research Libraries Academic Reference Librarians." I have examined the final copy of this dissertation for form and content and recommended that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Information Sciences.



Carol Tenopir, Major Professor

We have read this dissertation  
and recommend its acceptance:



Accepted for the Council:



Associate Vice Chancellor and  
Dean of The Graduate School

**TECHNOSTRESS IN THE REFERENCE ENVIRONMENT:  
A SURVEY OF U.S. ASSOCIATION OF RESEARCH LIBRARIES  
ACADEMIC REFERENCE LIBRARIANS**

A Thesis  
Presented for the  
Master of Science  
Degree  
The University of Tennessee, Knoxville

Lisa A. Ennis  
December 1997

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## **DEDICATION**

This thesis is dedicated in the loving memory of

Emily Edmonson Champion Wike

and

Anne Louise Harman.

## **ACKNOWLEDGMENTS**

Special thanks to Dr. Carol Tenopir for her guidance, time, and concern.; and for allowing me to participate in her research on electronic reference sources. I also would like to thanks the rest of the committee, Dr. David Penniman and Dr. Peiling Wang for their help and time. I am particularly thankful for the committee's positive and encouraging attitude during the whole thesis process.

## **ABSTRACT**

This study uses a Likert type scale to examine Technostress and the attitudes of academic ARL reference librarians. A Likert survey with twenty items allowing the participants to respond, strongly agree, agree, neutral, disagree, or strongly disagree was sent to 97 ARL academic libraries in the United States. The librarians could either return the survey through the postal service or via e-mail. The total population consisted of all academic ARL reference librarians in the United States, about 2,000 librarians total. Of the 2,000 librarians 158 responded. The results demonstrate that even though technology creates a large amount of stress, librarians are excited and enthusiastic about the resources technology have made available.

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# CHAPTER 1

## Introduction:

The academic reference librarians of today face a deluge of new technologies and information caused in part by the implementation of automated systems and Internet access in colleges and universities. Often computer software companies issue product upgrades just as an old version is becoming comfortable to the librarians and staff. Moreover, World Wide Web database interfaces have the potential to change daily and without any prior notice. Because of the proliferation of new technologies, the roles, expectations, and responsibilities of reference librarians have changed dramatically in the last few years. Further, because of these changes in librarianship many librarians are experiencing a form of stress called Technostress.

Since any kind of change can cause stress, providing a definition of stress and its symptoms may prove useful at this point. *Taber's Cyclopedic Medical Dictionary* provides a medical definition of stress. Stress is defined in *Taber's* as "the result produced when a structure, system, or organism is acted on by forces that disrupt equilibrium or produce strain . . . when stress occurs in quantities that the system cannot handle, it produces pathological changes."<sup>1</sup> *Taber's* also point to medical studies which demonstrate people can become "nonfunctional" as a result of stress.<sup>2</sup> Thus, stress can

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<sup>1</sup>Clayton L. Thomas, ed., *Taber's Cyclopedic Medical Dictionary*, (18th Illustrated Edition. Philadelphia: F.A. Davis, Co., 1997): 1845.

<sup>2</sup>Ibid.

have both mental and physical consequences on an individual.

Psychologists have also worked to define stress. One source states stress “refers to the emotional, physiological, and behavioral reactions of the individual when confronted by the threat of physical or psychic harm.”<sup>3</sup> Hans Selye, author of *The Stress of Life*, the classic text on stress, was the first to identify the pattern people go through when confronted with a harmful stimulus or stressor.<sup>4</sup> Selye named the response pattern, which has three stages, the “General Adaptation Syndrome” (GAS). The first stage is an “alarm reaction,” or flight or fight reaction, which causes the body’s defenses to mobilize. Second, is a stage of resistance. The final stage of GAS is exhaustion. This last stage is marked by a breakdown in the body’s ability to fight diseases, and therefore causing people to be more susceptible to common colds and viruses.<sup>5</sup>

Specific research has also been conducted on the area of occupational related stress. Psychologists have developed three theoretical models which pertain to work related stress: *Person-Environment Fit*, *Job-Demands Control*, and *Learned Helplessness*. All three models can be observed in reference librarians attempting to cope with new technologies. The *Person-Environment Fit* model “assumes the stress arises from a perceived discrepancy between the person’s desires or abilities and the constraints and demands” of the person’s job.<sup>6</sup> This model could work in two directions. A librarian

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<sup>3</sup>Reuben M. Baron and William G. Grazian, *Social Psychology*, (Fort Worth, TX: Holt, Rhinehart and Winston, Inc., 1991): 619.

<sup>4</sup>Ibid., 649, 621.

<sup>5</sup>Ibid., 621.

<sup>6</sup>Ibid., 623.

could want to learn the new technologies, but the employer may not or be unable to provide adequate training and/or time for the librarian to train enough to feel comfortable. On the other side of this example, a reference librarian may not see any benefit in learning about new technologies while the employer is pushing or requiring the librarian to attend training sessions. Any sort of discrepancy between the person's view of their job and the reality of that job can cause stress.

The *Job-Demands Control* model focuses on the job's requirements, "such as the degree to which the work is difficult and pressured," and the degree to which the person believes they have control over the situation.<sup>7</sup> As the pace of technology quickens and the number of different available technologies increase the demands placed on reference librarians grow proportionately. Allowing workers to set their own pace and learn new computer applications in their own way in order to accommodate personal learning styles can be important in determining their willingness to learn new applications. To thrust new technologies on any group without the proper preparation can be detrimental.

The third model is *Learned Helplessness*. Learned helplessness refers to a "state of the organism following prolonged exposure to uncontrollable events in which the person perceives that his or her behavior does not influence his or her outcomes."<sup>8</sup> *Social Psychology* provides the example of the student who comes to believe they will never be able to pass an exam after repeated failures, and therefore the student no longer studies for exams because they believe nothing can help them pass. Consider this model

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<sup>7</sup>Ibid., 625.

<sup>8</sup>Ibid.

in relation to the librarian whose library's equipment is so old it often fails. No matter how good they become at using electronic sources they are hindered by hardware limitations.<sup>9</sup> Any of these models or combinations of models may apply to an individual in any number of ways.

The effects of stress are as much physical as psychological. An increased secretion of adrenaline and increased heart rate and blood pressure are some of the physical symptoms of stress. Further, an increase in "skin conductance level," an indication of increased sympathetic nervous reaction, and "increased jaw muscle electromyograph," or clenching teeth, have both been found in subjects engaged in performing computer tasks.<sup>10</sup> Stress causes measurable changes in humans whether the "threat" is real or perceived as real by the individual.

While the above-mentioned examples and theories are relatively old, the study of Technostress is reasonably new, and the study of Technostress in librarianship is even newer. Craig Brod is credited with coining the term "Technostress." Brod defines Technostress as "a condition resulting from the inability of an individual or organization to adapt to the introduction and operation of new technology."<sup>11</sup> Many of the symptoms prevalent throughout the history of the study of stress are found to hold true in cases of

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<sup>9</sup>Ibid.

<sup>10</sup>Richard A. Hudiburg, "Assessing and Managing Technostress," Sponsored by the Association of College and Research Libraries Instructional Section at the 115th Annual Meeting of the ALA, July 8, 1996, New York: NY. Accessible at <http://www2.una.edu/psychology/alatalk.htm>, Internet. Last accessed April 30, 1997.

<sup>11</sup>Craig Brod, "Managing Technostress: Optimizing the Use of Computer Technology," *Personnel Journal* 61, no. 10 (October 1982): 754.

Technostress. Brod's definition was applied to librarians in the late 1970s to early '80s by Sara Fine.<sup>12</sup> With the mass marketing of the Internet as a tool for libraries and librarians, the literature on librarianship and Technostress has increased. Very few of the articles, however, are based on research. For instance, some very useful papers based on an individual librarian's observations or experiences exist, as well as a number of editorial type items.

Almost all of the items examined for this study have two things in common: they cite Brod's work, and they all list similar symptoms. For instance, librarians report the following symptoms of Technostress: lack of energy, short temper, decline in performance, withdrawal from society, negative attitude, aggressiveness, absenteeism, tardiness, fright, anxiety, disgust, and envy among others.<sup>13</sup> Ironically, the effects of Technostress can be significantly lessened by relatively simple measures. For example, individuals should find a "rest spot" where they can relax, perform easy jobs when feeling stressed, get eight hours of sleep, eat healthy regular meals, and exercise, all of which will help them cope with stress at work.<sup>14</sup>

The library administration should also be aware of technology as a potential stressor and should strive to make any transition to a new system or other technology as

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<sup>12</sup>Sara Fine. "Technological Innovation, Diffusion, and Resistance: An Historical Perspective." *Journal of Library Administration* 7 (Spring 1986): 83-108, and "Terminal Paralysis or Showdown at the Interface." *Human Aspects of Library Automation: Helping Staff and Patrons*. Urbana, IL: Graduate School of Library and Information Science, University of Illinois, 1986, 3-15.

<sup>13</sup>Carol Smallwood, "Technostress: What is It? How Can You Learn to Live with It?" *Technology Connection*, (June 1996): 13; and Sara Fine, "Terminal Paralysis or Showdown at the Interface," in *Human Aspects of Library Automation: Helping Staff and Patrons*, (Urbana, IL: Graduate School of Library and Information Science, University of Illinois, 1986): 10; and Hudiburg.

<sup>14</sup>Smallwood, 13.

smooth as possible. One of the most important things an administrator can do is provide everyone with the time and opportunity to train on new systems *before* the new technology is made available to the general public.<sup>15</sup> Other possible solutions include involving the library staff in the decision making process, proceeding slowly, including time for feedback, and promoting the new system.<sup>16</sup>

The purpose of this study is to examine librarians' attitudes toward new technologies, what aspects of the technologies librarians view as stressful, and if changes in job descriptions and duties related to technology are seen as beneficial or detrimental. For instance, a common complaint among reference librarians is that instead of answering reference questions, they are asked to be technicians for all the new electronic equipment.<sup>17</sup> Thus, instead of being asked for help in locating research information, users ask librarians to clear paper jams and "unfreeze" their terminal monitors.

Given the pace of technological change in today's libraries, understanding the effects of technological change on employees of any kind would be beneficial. For academic libraries, whose budgets are generally cut more often than expanded, saving money is paramount, and new technologies, along with the new hardware and software they will require, are not cheap. Administrators should strive to ensure the technologies are accepted and embraced, otherwise the technologies will not achieve the intended

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<sup>15</sup>Rita M. Hanna, et al., "The Wired Administrator--Technology Training and Lifelong Learning," *School Business Affairs* 61, no. 2 (February 1994): 5.

<sup>16</sup>Julie Bichteler, "Technostress in Libraries: Causes, Effects and Solutions," *Electronic Library* 5, no. 5 (October 1987): 282-287.

<sup>17</sup>Carol Tenopir and Ralf Neufang, "Electronic Reference Option: Tracking the Changes," *Online* 19 (July/ August 1995): 73.

effects but rather the opposite.

Ideally, this study will help prioritize the factors contributing to Technostress, which in turn will help administrators focus their energy on the aspects of technology which tend to cause the most problems. Problems may include, the quick pace of change of today's technology, lack of proper training, an increase in work load, lack of standardization in software and hardware components, the reliability of the hardware and software, and the changing role of librarians. The literature suggests that many of the things an administrator can do to prevent Technostress are relatively inexpensive and easy to implement when viewed in respect to the psychological and physical costs of stress.

The saying "an ounce of prevention is worth a pound of cure" is appropriate here. Technostress research has potential of holding off a plague. Whatever measures are taken to stop Technostress before it starts will cost less in terms of employee performance, absenteeism, attitude problems, illness, as well as the effectiveness of the new technology itself, than trying to "cure" the problems after they have already occurred. It simply does no good to have the latest and best technology, if it is not used, or if employees are out sick or expose others to their negative attitude about the new technology.

This study will first examine the works of the two scholars primarily credited with beginning the research on Technostress, Craig Brod and Sara Fine. A more recent researcher, John Kupersmith, is also included in this area because of his new work in the study of Technostress. Once an introduction to Technostress is provided, a discussion of the most cited causes of Technostress: pace of change, lack of proper training, increased workload, lack of standardization, the librarians' changing role, and the reliability of

technologies. A section on related research is also included.

Chapter three discusses the methodology used to evaluate the cause of Technostress and reference librarians' views and attitudes. An overview of the Likert Scale is given, as well as a detailed look at the survey which was distributed to the study's sample population. Examples of other researchers who have used the Likert Scale are also provided.

The results of the survey are discussed in chapter four. Charts are provided as well as an analysis of the questions as they pertain to the various causes of Technostress. Finally, chapter five will outline some general conclusions derived from the research, a forecast of the perceived future of reference services from the literature and survey results, suggestions for dealing with Technostress, and suggestions for further study.

## CHAPTER 2

### Literature Review:

#### Introduction to Technostress-- Brod, Fine, & Kupersmith

One of the first people to identify the possible stresses of technology was Craig Brod, a psychotherapist and consultant on integrating new technologies in the workplace. Brod's work, *TechnoStress: The Human Cost of the Computer Revolution*, explores computer phobia and its effects on people at home, work, and play. Brod emphasizes the importance of examining the role of technology in daily life throughout his work and warns everyone to "take heed of its perils as well as its merits."<sup>1</sup> While this thesis is much narrower than Brod's comprehensive work, *TechnoStress* is a good starting point because Brod's definition of Technostress has been virtually universally adopted.

Brod states, "Technostress is 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."<sup>2</sup> For reference librarians, Technostress may result in librarians who are deathly afraid of the new technologies and who refuses to learn and use the technologies, or librarians who become so involved with the technology that they over identify with the machines and

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<sup>1</sup>Craig Brod, *TechnoStress: The Human Cost of the Computer Revolution*, (Reading, MA: Addison-Wesley): 16.

<sup>2</sup>Ibid., 3.

lose their interpersonal skills. Brod calls the latter a "loss of social norms" in which people become so involved in the technology they "forget" how to interact with others.<sup>3</sup>

The technocentered person becomes frustrated with the ambling and ambiguity of human conversation. The computer does what it is told to do without asking questions, and it does the task quickly and efficiently. When a technocentered person is at the computer, they can very easily lose all track of time.<sup>4</sup> The reference librarians who like learning the new technology and concentrate on it must remain aware of their social skills, insuring they do not lose their ability to interact with other people. This thesis, however, will focus on those librarians who are struggling with new technologies.

Using the term "resistance," Brod examined the cost of Technostress in a 1982 article.<sup>5</sup> Brod states:

Technostress has a negative impact on human performance by shifting attention from work-congruent stress to internal states of distress; reducing the ability to process information accurately; slowing the response time to computer generated demands; and breaking up natural work-rest pauses that characterize normal work patterns.<sup>6</sup>

Workers are thrown from the stress of doing their assigned daily tasks to the stress of learning a new operation for doing the same tasks. Further, not only are workers learning to use new and complicated tools, but they are also adjusting to the new rhythms and patterns these new technologies bring with them. In some cases, workers lose the ability

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<sup>3</sup>Ibid., 105.

<sup>4</sup>Ibid, 93-94.

<sup>5</sup>Craig Brod, "Managing Technostress: Optimizing the Use of Computer Technology," *Personnel Journal* 61, no. 10 (October 1982): 753.

<sup>6</sup>Ibid., 754.

to stop performing a task when they want to do so, but must wait on the machine to stop.

These aspects of Technostress apply to librarians in very specific ways. For reference librarians, the switch from one database vendor to another, or the purchase of an upgraded version of a database, causes the same kind of switch from “work-congruent stress to internal states of distress.”<sup>7</sup> Before the librarians can do their job of searching the database, they must first learn, or relearn, how to operate the new interface and use any new commands. If the system is an online commercial database, the stress can be amplified by the knowledge that the longer the search takes, the more it will cost the library or patron.

Sara Fine, librarian and psychologist, was one of the first librarians to examine technological stresses on other librarians, also using the term “resistance.” Fine focused on resistance patterns of librarians who avoided technology. Between 1978 and 1981, Fine conducted a series of research studies on “resistance to technological innovation in public libraries and library schools.”<sup>8</sup> The findings of this study dismissed many popularly held beliefs about resistance and librarians.

Fine explains that when she started her study in 1978, the research was seen as “quaint,” but as time progressed, Fine noted her research moved up in status to “significant.”<sup>9</sup> In 1986, Fine was asked to write an article for a series on mental

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<sup>7</sup>Ibid.

<sup>8</sup> Sara Fine, “Technological Innovation, Diffusion, and Resistance: An Historical Perspective.” *Journal of Library Administration* 7 (Spring 1986): 88.

<sup>9</sup>Sara Fine, “Terminal Paralysis or Showdown at the Interface.” *Human Aspects of Library Automation: Helping Staff and Patrons*. Urbana, IL: Graduate School of Library and Information Science, University of Illinois, 1986, 4.

disorders. Her article on Technostress was to appear above the articles on alcoholism and depression. By the mid-1980's, Technostress was a recognized mental disorder worthy of medical recognition and treatment.<sup>10</sup>

Throughout her work, Fine emphasizes many of the same themes as Brod. However, since Fine's work concentrates specifically on librarians, her conclusions are an important part of this work. Fine attempted to ascertain if resistance was a part of a "librarian personality" type.<sup>11</sup> Not only was the answer a resounding "no," but Fine was unable to find a clear librarian personality profile. It would seem librarians are a very diverse group. Resistance was found in "flexible, adaptive, progressive people" just as often in "rigid, difficult, and traditional people."<sup>12</sup>

While Fine did not find a clear librarian personality profile in her research, other researchers have discovered a skewness to librarians' personality types using the Myers-Briggs Personality Inventory. For example, Mary Jane Scherdin and Anne Beaubien conducted a comprehensive occupational survey using the Myers-Briggs Type Indicator, the Strong Interest Inventory, and a demographic questionnaire.<sup>13</sup> The personality types of librarians were found to differ based on the type of library as well as the area, technical services, adult public services, children's public services, administration, and automation,

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<sup>10</sup>Ibid.

<sup>11</sup>Ibid., 5.

<sup>12</sup>Ibid.

<sup>13</sup>Mary Jane Scherdin and Anne K. Beaubien, "Shattering Our Stereotype: Librarians' New Image," *Library Journal* (July 1995): 35.

within the library.<sup>14</sup>

Scherdin and Beaubien found that extroverts are rare in the library profession, 63% are Introverted. The other preferences prevalent among librarians are, 60% Intuitive, 61% Thinking, and 66% Judging.<sup>15</sup> While this research demonstrates a skewness in personality profiles of the majority of people who are drawn to the library profession, it still fails to define a single profile for all librarians.

Fine also draws a corollary between resistance and “whether or not people perceive themselves as part of the decision making process.”<sup>16</sup> The warning here is not to confuse conformity with acceptance. Fine explains when people *believe* they have a free choice, they are much more apt to accept new things and thus experience a change in attitudes. Fine states that under certain conditions, “*less* social pressure can produce *more* attitude change.”<sup>17</sup>

More recently, John Kupersmith, also a librarian, has been involved in researching Technostress. Kupersmith identifies “performance anxiety, information overload, role conflicts, and organizational factors” as the primary aspects of technology which produce Technostress in reference librarians.<sup>18</sup> Drawing heavily on Brod’s work, Kupersmith concentrates on computer anxiety which generally affects those who feel

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<sup>14</sup>Ibid., 37.

<sup>15</sup>Ibid., 36.

<sup>16</sup>Fine, “Terminal Paralysis,” 6.

<sup>17</sup>Ibid.

<sup>18</sup>John Kupersmith, “Technostress and the Reference Librarian,” *Reference Services Review* 20 (Summer 1992): 1.

pressured to accept and use computers.<sup>19</sup> Kupersmith also points out a number of common symptoms found in reference librarians, such as “feelings of isolation and frustration,” negative attitudes toward new technologies, indifference to users’ “computer related needs,” and “an apologetic attitude toward users.”<sup>20</sup> Kupersmith goes on to examine the factors he lists as perpetuating Technostress in reference librarians and offers some strategies for coping with technology related stress. Kupersmith also maintains a World Wide Web site on Technostress.<sup>21</sup>

Other than the work of Kupersmith and Fine, not many other sources specifically dealing with Technostress and librarians have been produced. Many of the articles found are not research works but opinion articles. However, a close examination of the research, editorials, and other articles on related topics can provide a clear picture of the factors which induce Technostress in reference librarians. The primary aspects of technology which are most cited as a cause of Technostress are: the pace of change of today’s technology, lack of proper training, an increase in work load, lack of standardization in software and hardware components, the reliability of the hardware and software, and the changing role of librarians. The same articles further demonstrate that the effects of Technostress can be lessened through a number of different simple solutions.

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<sup>19</sup>Ibid., 3.

<sup>20</sup>Ibid.

<sup>21</sup>John Kupersmith’s “Technostress Page” is accessible at <<http://www/greatbasin.net/~jkup/tstress.html>>. Last accessed April 30, 1997.

## **Pace of Change**

In "Technostress and Librarians," Virginia Bartlett explains "dramatic changes" have occurred in libraries over the past few years including the introduction of a number of new technologies such as the telecommunications functions of E-mail, telefaxing, teleconferencing, and many others.<sup>22</sup> As new technologies are introduced and old systems are upgraded, librarians are faced with learning new applications as well as relearning old systems. Further, reference librarians are required to use and teach users to use the new technologies often before they are comfortable with new applications or systems.

Time is the focus of another current article, "Technostressed Out? How to Cope in the Digital Age." This well written and highly readable article also declares that technology is not at fault. A common complaint among librarians is feeling overwhelmed by the amount of work expected from them.<sup>23</sup> People in general have let machines establish the pace of work. The faster computers get, the faster employers and employees expect the work to flow. Another computer function people attempt to emulate is multitasking. No person can effectively manage six operations at once, yet because the computer can perform multiple tasks simultaneously people attempt to do just that.<sup>24</sup>

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<sup>22</sup>Virginia Bartlett, "Technostress and Librarians," *Library Administration and Management* 9, no. 4 (Fall 1995): 226.

<sup>23</sup>Katie Clark and Sally Kalin, "Technostressed Out? How to Cope in the Digital Age," *Library Journal* 121 (August 1996): 30.

<sup>24</sup>Ibid.

According to Clark and Kalin, the term Technostress is a misnomer. Computers and other technologies are “merely tools that are inherently neither good nor bad. We are the ones who manipulate these tools, using them to rewrite the rules of our workplaces and homes . . . it is the pace of technological change and its ramifications that has us reeling.”<sup>25</sup> Thus, employers should not focus on managing technology, but managing change. The importance of providing employees with the time to train properly cannot be emphasized enough.<sup>26</sup> Employees are not afraid of the new technologies, but they may be afraid they will not be able to master these technologies and fear embarrassment in front of co-workers and the people they are trying to help.

### **Proper Training**

Much of the current research, however, does not blame the technology itself as the demon, but other factors in the library setting. Throughout Brod’s *Technostress*, providing the employees with the time to properly learn and practice any new technology before it is implemented on a widespread basis is paramount. This theme of proper training is echoed in a number of more current research articles as well.

Using the Myers-Briggs personality inventory, Virginia Moreland states personality and learning type can play an important role in how different people learn and cope with new things. Moreland states, “different aspects of technology produce greater

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<sup>25</sup>Ibid., 31.

<sup>26</sup>Ibid.

stress for different kinds of people.”<sup>27</sup> Allowing workers to familiarize themselves with new technology on their own terms can stop a number of problems before they begin.

Another important aspect of Moreland’s research demonstrates that different people have different learning styles. Administrators and managers need to realize that everyone learns at different rates and in different ways. Thus, holding a lecture-type seminar on the uses of a new technology is not appealing to everyone. Some people will want to test out the technology on their own using a tutorial, specialized exercises, or even a real person for guidance. Moreland suggests providing librarians and staff with time and space to learn the technology at their own pace and in their own way will do much to prevent Technostress.<sup>28</sup>

Rita Hanna’s article, “The Wired Administrator--Technology Training and Lifelong Learning,” stresses the importance a library administration can make in introducing new technologies. Hanna asserts that when an administrator is aware of the issues and trends involved in implementing new technologies, the migration can go much smoother. An aware administrator will recognize the importance of clear lines of communications and training time for professional and support staff, as well as a well-trained administrator.<sup>29</sup> Stresses can often be eliminated from the top down if the administration is knowledgeable about their staff and the new technology.

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<sup>27</sup>Virginia F Moreland, “Technostress and Personality Type,” *Online* 17 (July 1993): 59.

<sup>28</sup>Ibid.

<sup>29</sup>Rita M. Hanna, et al, “The Wired Administrator--Technology Training and Lifelong Learning,” *School Business Affairs* 61, no. 2 (February 1994): 5-6.

Another suggestion for preventing Technostress offered by Craig Brod is to train employees about the causes and effects of Technostress. Designed to foster a better relationship between employees and technologies, Brod's Technostress training has three phases: education, rehearsal, and networking training.<sup>30</sup>

During the education phase, employees are taught about Technostress and the effects stress can have both mentally and physically. The rehearsal phase is designed to provide a variety of "action and cognitive coping models."<sup>31</sup> The action models include identifying specific stressors, remembering to take breaks or pauses in work, and relaxation techniques. The cognitive models deal primarily with making people aware of negative statements and thoughts. The network phase helps employees help each other. Knowing there are others in the work place with similar feelings about technology can help individuals in their own coping efforts.

### **Increased Workload**

Two documents on CD-ROM related stress, "CD-ROM Stress," by Charles Bunge, and "Staff Resistance to Library CD-ROM Services," by Walter Giesbrecht and Roberta McCarthy, reiterate the themes of previous research by focusing on a single aspect of library service. While CD-ROM databases are not new, they can still be the source of stress and frustration for librarians. Bunge explains "helping a patron get into a database, select terms, and use Boolean operators takes longer than" using a typical print

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<sup>30</sup>Brod, "Managing Technostress," 756.

<sup>31</sup>Ibid.

source.<sup>32</sup> Both authors indicate differing databases with different commands and interfaces as a source of increased teaching loads for librarians and thus a source of stress.<sup>33</sup> Whether in a formal instruction session or one-on-one, librarians are required to instruct users on how to effectively search a variety of differing databases. Further, the various CD-ROM manufacturers use many different formats and layout designs for their systems. Librarians must learn how to use and instruct others to use each system and interfaces. The diversity of databases mattered less when a library might have two or three different vendors. In today's market, however, a single library may have more than fifteen different vendors.<sup>34</sup>

Along the same lines is Carol Tenopir's research on electronic reference options.<sup>35</sup> Every three years throughout the 1990s, Tenopir and Ralf Neufang survey academic research libraries to track the changes in electronic reference services. A portion of the survey relates to changes in workload and tasks. The responses received often include comments on the increased work load that new duties such as maintaining and using various computer software and hardware brings to their job. Further, these new duties are often expected to be performed in addition to the old duties. A frequent theme is the

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<sup>32</sup>Charles A Bunge, "CD-ROM Stress," *Library Journal* 116 (April 15, 1991): 63.

<sup>33</sup>Ibid.; and Walter Giesbrecht and Roberta McCarthy, "Staff Resistance to Library CD-ROM Services," *CD-ROM Professional* 4 (May 1991): 35.

<sup>34</sup>Kupersmith, 4.

<sup>35</sup>Carol Tenopir and Ralf Neufang, "Electronic Reference Options: How they Stack Up in Research Libraries," *Online* 16 (March 1992) 22-28; "Electronic Reference Options: Tracking the Changes," *Online* 19 (July/August 1995): 67-73; "Impact of Electronic Reference on Reference Librarians," *Online* 16 (May 1992): 54-60, "Internet Use and Training in University Libraries," *National Online Meeting Proceedings*, (Medford, NJ: Learned Information, Inc., Mar 1995).

“growing complexity of the reference librarian’s job.”<sup>36</sup>

Another of Tenopir’s articles, “The Impact of Electronic Reference on Reference Librarians,” examines how the career of librarianship has changed as the number of electronic sources expands. Further, Tenopir and Neufang stress the importance of training and time to learn before the librarian has to use these resources for a demanding public.<sup>37</sup> Finally, in “Internet Use and Training in University Libraries,” the authors examine if Internet access has replaced existing CD-ROM services. The authors found Internet access did not replace CD-ROM databases, but was added to the CD-ROM databases as an extra resource.<sup>38</sup> Thus, the librarians were expected to know more and train users to search the Internet as well as the many varying CD-ROM databases. Librarians are further expected to “mediate between these systems and a public that may include novice, intermediate, and near-expert users.”<sup>39</sup>

Another source of stress exacerbated by the growth of new technologies is information overload, or as Jennifer Tanaka calls it in her article “Drowning in Data,” “info-stress.”<sup>40</sup> Tanaka’s short article points to cell phones, beepers, fax machines, E-mail, and even post-it-notes as contributing to info-stress. Tanaka explains a person can be reached anywhere at anytime, so that even when a person is on vacation they are still at

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<sup>36</sup>Tenopir, “Electronic Reference Options,” 1995, 72.

<sup>37</sup>Tenopir, “The Impact of,” 56-57.

<sup>38</sup>Tenopir, “Internet Use and Training,” 387.

<sup>39</sup>Kupersmith, 5.

<sup>40</sup>Jennifer Tanaka, “Drowning in Data,” *Newsweek* (April 28, 1997): 85.

work.<sup>41</sup> For reference librarians, information overload can have far reaching effects. Two books address the information overload question, Richard Wurman's classic text, *Information Anxiety: What to do When Information Doesn't Tell You What You Need to Know*, and David Shenk's new work, *Data Smog: Surviving the Information Glut*.

Wurman's work is a "how to" manage information handbook. Throughout the work, Wurman explains strategies for finding the information needed and avoiding the pitfalls of the "Information Age." Wurman also points to a common theme running through the previous research, time and pace. The author explains a fundamental aspect of information anxiety is the speed at which information is dispersed.<sup>42</sup> *Information Anxiety* provides an excellent overview of information overload as well as possible solutions for the flood of information librarians must wade through every day.

The World Wide Web search engines often amplify this problem of information overload, since each search engine has its own way of weighing terms and ranking results. David Shenk's new work, *Data Smog*, echoes many of Wurman's thoughts, but takes information overload to the next level, the Internet. A very clear and easy to read book, *Data Smog* explores the unintended consequences of the new information technologies.<sup>43</sup> Shenk's premise is that the existence of so much information has created a smog no one can see through. Further, Shenk demonstrates this smog is made worse by a dependence on computers, the mass commercialization of the Internet and World Wide Web, and a

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<sup>41</sup>Ibid.

<sup>42</sup>Richard Saul Wurman, *Information Anxiety*, (New York: Bantam Books, Inc., 1991): 35.

<sup>43</sup>David Shenk, *Data Smog: Surviving the Information Glut*, ( San Francisco: HarperCollins, 1997): 51.

need to have things fast and easy.<sup>44</sup> Today's reference librarians must deal with users who demand electronic sources and are unwilling to even consider a print source. While Shenk's work does not specifically deal with reference librarians, many of the themes presented in his book apply to the reference dilemma of helping people find what they need.

Brod also foresaw the increase in workload. As Brod explains, many people believe computers make tasks and jobs much easier and faster, so workers can have more free time to work on other projects. However, the more a worker can get done, the more is expected of them.<sup>45</sup> Further, consider the worker who has not had the proper training and must deal with learning the new technology as well as the increased workload, with the added stipulation that the work which is produced is expected to be flawless. Brod states, "we are adopting as our own the computer's standards- expecting from people the perfection, accuracy, and speed of a computer."<sup>46</sup>

### **Lack of Standardization**

One aspect of technology poorly represented in the literature is language. Along with new technologies comes a new language to be learned and mastered. *Technobabble*, by John Barry, discusses the "high tech tower of Babel."<sup>47</sup> This interesting aspect of

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<sup>44</sup>Tanaka, 85.

<sup>45</sup>Brod, *Technostress*, 6-7.

<sup>46</sup>Ibid., 15.

<sup>47</sup>John A. Barry, *Technobabble*, (Cambridge, MA: The MIT Press, 1991): 47.

Technostress works in two directions. First, librarians have been thrust into the world of networking, Windows software, the Internet, and various other applications. As information professionals, librarians are expected not only to search various databases using these tools, but to access and navigate a seemingly endless supply of potential sources employing such tools as gopher, Archie, FTP, telnet, WAIS, LANs, and others. Learning just the terms is an undertaking in itself. Once these functions become familiar and easy to librarians, explaining them to users becomes tedious and irritating.

Another aspect of language is the terms used by the computer to inform the operator of different things. Consider these terms: execute, load, terminate, kill, escape, crunch, catastrophic error, abort, fatal error, crash, fail, illegal operation, all data will be erased, and irreversible error. These terms have a militaristic and authoritative tone to them. Further, the many different platforms and operations often do not use the same terms for the same function.<sup>48</sup>

Added to the language problem are other standardization problems such as those mentioned in regard to CD-ROM and commercial online vendors, differing keyboards, mice, trackballs, touch pads, icons, protocols, WWW browsers, and many others. In essence, language just adds to stress of learning new technologies. As more and more manufacturers attempt to produce systems which look and behave like the Microsoft Windows environment, it is likely that standardization will become less of an interface operational problem. However, those individuals working with hardware issues and problems will continue to grapple with standardization difficulties.

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<sup>48</sup>Barlett, 227.

## **The Librarian's Changing Role**

John Kupersmith states librarians today “feel friction between different, and sometimes contradictory, functions and self-definitions.”<sup>49</sup> Much of the change in libraries and librarians has evolved from the early 1980s while many of the current reference librarians entered the field when the primary source was print. The library, traditionally viewed as a materials storehouse, is now seen as an “information clearinghouse” where librarians are considered “CD-ROM attendants” and printer technicians.<sup>50</sup> In such an atmosphere, “deprofessionalization” has become an important issue and concern among librarians.<sup>51</sup>

In Laverna Saunders-McMaster's brief article, “Internet Librarian: The ‘Coolest’ Job in the Library,” the change in library operations brought about by technology is viewed as exciting. The author points out libraries are developing new positions or redefining old positions to assist in the effort to keep pace with technology.<sup>52</sup> Saunders-McMaster gives the example of “Webmaster” as a new function for librarians. However, consider the skills Saunders-McMaster states are needed in order to be a Webmaster: “knowledge of HTML, tables, browsers, graphic placement, CGI programming, UNIX,

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<sup>49</sup>Kupersmith, 6.

<sup>50</sup>Ibid.

<sup>51</sup>Ibid.

<sup>52</sup>Laverna Saunders-McMaster, “Internet Librarian: The Coolest Job in the Library,” *Computers in the Library* 17 (February 1997) 37.

and JAVA.”<sup>53</sup> Finding someone in-house willing to take on this huge task may prove difficult, and appointing someone who does not want the job could prove disastrous.

Saunders-McMaster’s article touches on a very important part of the changing role that all the new technology means for librarians. Two short but very good articles on the changing roles of librarians are “The Librarian as Change Agent in the Diffusion of Technological Innovation,” by Diane R. Callahan, and Evan St. Lifer’s “Net Work: New Roles, Same Mission.” Callahan’s article concentrates on the new responsibilities technology has thrust upon librarians while St. Lifer’s article provides statistics on the increase in work load and the distribution of new tasks and duties among the staffs of different kinds of libraries.

Callahan first differentiates between data and information, stating “the technology of data acquisition has outstripped our ability to convert data into information.”<sup>54</sup> In other words, the new technologies provide people with so much data they can not process it into useable information. Further, Callahan declares librarians have become “change agents” who are responsible for turning data into information.<sup>55</sup> As a result of this awesome responsibility, Callahan says librarians find themselves in the “unenviable position of having to: (1) learn how to use recent technological innovations; (2) instruct potential users, either in the capabilities of the technology, so that they can perform their own data searches, or more usually, having to teach them how to formulate informational

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<sup>53</sup>Ibid.

<sup>54</sup> Diane R. Callahan, “The Librarian as Change Agent in the Diffusion of Technological Innovation,” *The Electronic Library* 9 (February 1991): 13.

<sup>55</sup>Ibid.

questions which will access relevant data sources; (3) assess new technological developments in light of user needs"; and finally and possibly most frustrating "(4) repeat these steps each time a 'new' database is made available either online or by direct CD-ROM access."<sup>56</sup> Moreover, librarians must overcome any resistance they may have toward the new technology to assume these new roles, which they are often asked to do with little or no preparation.<sup>57</sup>

In "Net Work: New Roles, Same Mission," Evan St. Lifer takes note of the dramatic changes in the roles librarians play, and how these changes will affect the librarianship. As well as examining these evolving roles, St. Lifer looks at the changing job hierarchy among the ranks of librarians and the support staff. First, many believe some sort of certification should exist for people working in a library but not holding an M.S. in library/information science.<sup>58</sup> Further, St. Lifer considers what sort of degree will be required for the jobs created by new technologies. Should people without a degree be allowed to hold the post of librarian because of their adeptness at coping with technological changes? Reorganization of libraries, departments, job titles, and duties all add to the stress felt by many librarians today.

A number of articles included in the bibliography make reference to many of the same themes touched on by other authors. Kitty Smith's "Toward the New Millennium: The Human Side of Library Automation (Revisited)" reexamine some of the human

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<sup>56</sup>Ibid., 14.

<sup>57</sup>Ibid.

<sup>58</sup>Evan St. Lifer, "Net Work: New Roles, Same Mission," *Library Journal* 121 (November 15, 1996): 27-29.

factors in automation. A portion of Smith's article focuses on attitudes. For instance, Smith indicates current attitudes about libraries are changing due to new technologies.<sup>59</sup> Along with this change, the title of "librarian" has been transformed into the title of "information professional," indicating a broader view of opportunities and responsibilities as the electronic realm grows.<sup>60</sup>

Another aspect of the changing role of the librarian is not viewed in a positive light. As more and more computer workstations, printers, and other hardware and software components are introduced into the library, the reference librarian often assumes the role of technician. Many librarians fear they are becoming machine attendants and will thus suffer a loss of prestige as they are asked to clear paper jams and replace ink cartridges.<sup>61</sup> Included among computer mishaps reported are frozen terminals, unplugged components, floppy disks stuck in disk drives, accidental or purposeful deletion of files by users or librarians, and a number of other "small" things. The librarian could easily spend all day trying to fix computer problems while never once answering a reference question.

### **Technological Reliability**

The hardware itself can be a source of stress for library personnel, as Philip Turner and others demonstrate in "The Effects of Baud Rate, Performance Anxiety, and

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<sup>59</sup> Kitty Smith, "Toward the New Millennium: The Human Side of Library Automation (Revisited)," *Information Technology and Libraries* 12 (June 1993): 211.

<sup>60</sup>Ibid.

<sup>61</sup>Bartlett, "Technostress and Librarians," 227.

Experience on Online Bibliographic Searches.” This article provides a good example of how librarians can experience stress over things they can not control.<sup>62</sup> All computer hardware is not created equal. Librarians can experience extreme stress when unable to connect to an online site, especially when the person they are trying to help is looking over their shoulder. While this article does not deal specifically with librarians or the library environment, many of the issues raised apply to the librarian’s situation in today’s library.

A second article along the same lines is Susan Cady’s “At Ease in Liberspace.” Cady discusses the pros and cons of the virtual library as well as the library’s dependence on technology. Networking technologies have allowed people to have much more access to libraries than they have in previous years. Dependence on this technology, however, means hardware or software problems can shut down remote access to the library all together. Cady notes that when hardware or software failures occur, “patrons are locked out of liberspace as completely as if we closed the physical buildings at random during the day.”<sup>63</sup> The librarians who must field complaints and phone calls of users frustrated with the failure of the remote access can suffer from high levels of stress.

An excellent example of the type of system crash mentioned above is found in Linda Dobb’s “Technostress: Surviving a Database Crash.” During the time of the database crash, Dobb was head of the cataloging department at the Kennedy Library of

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<sup>62</sup>Philip M Turner, Neal K. Kaske, and Gayle S. Baker, “The Effects of Baud Rate, Performance Anxiety, and Experience on Online Bibliographic Searches,” *Information Technology and Libraries* 9 (March 1990): 34-35.

<sup>63</sup>S. A. Cady, “At Ease In Liberspace,” *Serials Librarian* 25 (1995): 206-207.

California Polytechnic State University, San Luis Obispo. The library lost all title entries from "A" through "M."<sup>64</sup> During the next six months, as their system was pieced back together, a number of things occurred. First, Dobb explains some of the library's staff experienced technofear. Many lost confidence in the technology which they had previously relied on for more than eight years.<sup>65</sup>

Second, Dobb notes that personal relationships among all groups were strained. Those who felt the strain most acutely were those who worked with the public, "such as the reference and circulation personnel."<sup>66</sup> Trying to explain to a frustrated patron why the online catalog was not working and then being unable to provide any kind of an alternative is extremely frustrating.

### **Other Related Research**

Ergonomics can also affect stress levels, as shown in Tina Roose's "Ergonomics in the Library." While Roose concentrates on the users' comfort, many of the same aspects affect the librarian, who must spend at least eight hours a day in the library. Lighting, for instance, can play a crucial role in the comfort of people in the library. Roose explains "glare and reflection are terrible problems" and "human eyes are comfortable in dim light."<sup>67</sup> Roose also stresses the importance of "adjustability" in

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<sup>64</sup>Linda Dobb, "Technostress: Surviving a Database Crash," *Reference Services Review* 18 (1990): 66.

<sup>65</sup>Ibid.

<sup>66</sup>Ibid.

<sup>67</sup>Tina Roose, "Ergonomics in the Library," *Library Journal* 111, no. 17 (October 15, 1986): 55.

chairs, computer monitors, and keyboards.<sup>68</sup> For the librarian having trouble using a new technology, comfort can ease the physical pain if not the stress.

Larry Rosen, psychologist and researcher, has published many works on computerphobia, including "Myths and Realities of Computerphobia: A Meta-analysis" which is an analysis of analyses. In this meta-analysis, Rosen dispels many of the myths associated with computerphobia. Two of the beliefs Rosen attacks are the myths that "women are more computerphobic than men," and "older people are more computerphobic than younger people."<sup>69</sup> Since librarians are disproportionally older females, Rosen's findings have a unique place in this paper.<sup>70</sup> The meta-analysis indicates women are only slightly more computerphobic than men and he found no correlation between age and computerphobia.<sup>71</sup>

Another myth examined by Rosen is that "computer experience 'cures' computerphobia." Rosen found this belief also to be false. Simple exposure to computers will not turn a person into an advocate for computer use.<sup>72</sup> While Rosen's work best falls into the realm of psychology, many of the findings are applicable to Technostress and librarians. His work deals heavily in statistics and psychological theory, but his findings can be effectively applied to the library environment.

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<sup>68</sup>Ibid.

<sup>69</sup>Larry R. Rosen and Patricia Maguire, "Myths and Realities of Computerphobia: a Meta-Analysis," *Anxiety Research* 3 (1990): 176.

<sup>70</sup>Ibid.

<sup>71</sup>Ibid., 180-181.

<sup>72</sup>Ibid., 183.

Some research, such as Victoria Elder, Ella P. Gardner, and Stephen R. Ruth's "Gender and Age in Technostress," provides a contradictory view of Rosen's research. This article was developed from a survey of government finance offices, and demonstrates that some groups feel the effects of technology related stress more than others. This survey found age and gender to have a significant effect on computerphobia.<sup>73</sup> An important aspect of this survey, however, is its finding on how technology affects different groups. For instance, groups with higher levels of computer use experienced more stress than other groups.<sup>74</sup> Thus, reference librarians and electronic resources librarians may be more stressed than other library workers.

Another interesting point in "Gender and Age in Technostress" is the response received when the participants were asked about the sources of Technostress. Among the answers tallied were "the lack of standardization of hardware and software; insufficient knowledge, training, and practice; and poorly written, confusing, user manuals."<sup>75</sup> These are the same themes seen throughout the previous research cited. Time and training seem to be the key for coping with new technologies.

The literature for this topic frequently crosses discipline lines, but precious few articles exist which concentrate specifically on the technological stresses of reference librarians. Further, the principles found in other research are equally applicable. It is this

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<sup>73</sup>Victoria Elder, Ella P. Gardner, and Stephen R. Ruth, "Gender and Age in Technostress," *Government Finance Review* 3 (December 1987): 19.

<sup>74</sup>Ibid.

<sup>75</sup>Ibid., 20.

researcher's intention to add to the knowledge base which already exists and draw together the vast sources on technology and stress.

## **CHAPTER 3**

### **Methodology:**

#### **Introduction**

The methodology for this project consisted of a question survey and a Likert-type index. The Technostress survey was conducted in conjunction with Dr. Tenopir's research on tracking the changes in electronic reference services, including the use of online databases, CD-ROMs, OPACs, and the Internet. Dr. Tenopir's survey will provide a summary of the types of services offered by academic research libraries for later inclusion.

A questionnaire on Technostress, using a Likert index, was included with Dr. Tenopir's survey. The Likert index measured how librarians perceive new technologies and the impact of these new technologies on reference services. It should be noted that the intent of this research was not to measure whether new technologies actually help or hinder reference librarians, but rather to discover if librarians believe the new technologies to be a benefit or detriment to the services their library offers.

#### **Respondents**

The survey was sent to the academic members of the Association of Research Libraries (ARL). The ARL members "share a common mission to serve faculty, students and researchers and provide access to the information required by the research

community.”<sup>1</sup> ARL libraries also strive to “shape and influence” the direction and role of research libraries in “the process of scholarly communication.”<sup>2</sup> The ARL members are large research organizations which actively participate to promote equitable access to, “and use of recorded knowledge in support of teaching, research, scholarship, and community service.”<sup>3</sup> This year’s survey was distributed to 110 academic research libraries in the United States and Canada. The Technostress survey was included in the packets for the 97 academic research libraries in the United States.

Dr. Tenopir’s research drew a clear picture of what types of technologies as well as how many different technologies are being used in ARL libraries. The survey for Dr. Tenopir’s research is factual in nature, describing the types of resources and services available in each library. These facts will provide a clear picture of the work environment of ARL reference librarians. Since, ARL libraries tend to have larger budgets than other libraries, they offer a greater range of technologies than smaller academic libraries.<sup>4</sup>

While Dr. Tenopir’s survey is directed toward the head of reference services, the Technostress survey was distributed to all reference librarians within a particular library, so the population for this research project is made up of all ARL reference librarians, about 2,000 librarians total. By using a survey, the population for this study will be much

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<sup>1</sup>Carol Tenopir and Ralf Neufang, “Electronic Reference Options: Tracking the Change,” *Online* 19 (July/August 1995): 67.

<sup>2</sup>Association of Research Libraries, Washington, D.C., “About ARL,” accessible at <<http://www.arl.org>>, Internet. Last accessed November 9, 1997.

<sup>3</sup>Ibid.

<sup>4</sup>Ibid.

more diverse than attempting to observe reference librarians in a single library, and will provide a larger image of the causes and effects of Technostress.

Five copies of the Likert survey were included in each packet for the head of reference to distribute to the other reference librarians, and instructions were given to copy more if needed. This procedure produced several responses from multiple schools. The Likert survey is also made available via the World Wide Web. The respondents were given the option to return their answers through the postal service or via E-mail.

### **The Likert Method**

The *Survey Research Handbook* defines a Likert scale as “a type of scaling where the respondents are presented with a series of statements, rather than questions, and asked to indicate the degree to which they agree or disagree, usually on a five-point scale.”<sup>5</sup> Developed in 1932, the Likert method of summated ratings has remained one of the most popular attitude-assessment methods.<sup>6</sup> The Likert scale is popular primarily because of its power and simple format.<sup>7</sup> Each question must be phrased in a clearly favorable or unfavorable direction.

The Likert technique “indirectly measures attitudes by assessing the extent to which someone holds positive or negative beliefs about an attitude object.”<sup>8</sup> The subject

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<sup>5</sup>Pamela Alreck and Robert Settle, *The Survey Research Handbook*, (Illinois: Irwin, 1985): 412.

<sup>6</sup>Reuben Baron, *Social Psychology*, (Chicago: Holt, Rhinehart and Winston, Inc, 1991): 216-217.

<sup>7</sup>Alreck, *The Survey Research Handbook*, 134.

<sup>8</sup>Baron, 216.

marks each question on the following scale "Strongly Disagree (represented by 1) -- Disagree (2) --- Undecided (3) --- Agree (4) --- Strongly Agree (5)."<sup>9</sup> Total scores are then calculated by adding up the scores. Thus a high score indicates an overall positive attitude about the issue measured. Likert also allows for "item analysis," which allows the researcher to identify poorly phrased or ambiguous questions and then throw them out.<sup>10</sup>

A modified Likert scale has been used in prior librarianship research. For example, Shelley Heaton and Jeanne M. Brown employed a modified Likert scale in their research of the perception of incentives and hurdles to using technology.<sup>11</sup> The authors' use of a modified Likert survey still allowed them to throw out ambiguous and poorly worded questions, which is one of the Likert method's strongest features. The Technostress survey was supplemented by opened ended questions to elicit responses about how reference librarians view changes in their careers and other comments they would like to include.

The Likert scale was chosen over other types of scales for a number of reasons. The Likert scale allows participants to indicate the degree to which they agree or disagree with an item, or they can choose a neutral option. A Verbal Frequency scale is similar to the Likert scale, but the verbal frequency scale "contains five words that indicate *how*

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<sup>9</sup>Ibid.

<sup>10</sup>Ibid., 216-217.

<sup>11</sup>Shelley Heaton and Jeanne M. Brown, "Staff Perceptions of Incentives and Hurdles to the use of Technology," *Computers in Libraries* 15 (February 1995): 28.

*often* an action has been taken.”<sup>12</sup> Since the Technostress survey needed an indication of attitude, the Likert scale proved more reasonable. Also, the Likert scale allows each item to be taken into consideration individually. For instance, a Semantic Differential scale could provide some interesting data about the causes of Technostress. However, the semantic differential scale is used to measure the “*image*” of a single entity.<sup>13</sup> The Technostress survey, however, needed to examine six different causes of Technostress. Another important consideration was the ability to provide the users with a neutral option. For the purposes of this study, forcing the respondents to choose either disagree or agree, like in a Forced Ranking scale, would skew the results.<sup>14</sup>

### **The Items**

The Technostress survey consisted of twenty statements covering the various topics presented in the literature review. Six statements cover the changing role of librarians:

- a) I enjoy teaching users about electronic sources,
- d) Electronic sources are more convenient than print sources,
- e) Technology makes the reference task easier,
- f) I enjoy learning about new electronic sources,
- h) I feel comfortable using computers, and

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<sup>12</sup>Alreck, 136.

<sup>13</sup>Ibid., 148.

<sup>14</sup>Ibid., 140.

n) Users expect me to be fluent in using technologies.

Two statements deal with the changing pace of technology:

b) The technology changes too fast for me to keep up and

m) Every time I get comfortable with a computer program it is changed or upgraded.

There are three statements for technological reliability

c) Print sources are more accurate than electronic sources,

g) I feel helpless when electronic sources are unavailable (i.e., the LAN is down),  
and

q) I keep paper backup copies as well as floppy disk backups.

The issue of proper training has four statements:

I) My employer provides adequate training for new technologies,

l) The reference staff is provided access to new technologies before the general public,

o) I spend more time learning how to use new technologies than I spend on other work, and

s) I find manufacturer user manuals helpful.

The issue of standardization also has four statements:

j) I get angry at my PC,

k) I get frustrated with different versions of similar programs,

p) I like learning new computer programs, and

r) It is frustrating to learn different commands for different vendors of similar

programs.

Lastly, a final statement about the whole of reference services is included to obtain an overall idea of how reference librarians see the future of reference services:

t) Overall, I feel positive about the future of reference services.

An average was calculated for each statement, which makes discrepancies in individual items apparent as well as provides clear parallels between similar items and differing items. By closely analyzing each item individual items which are poorly constructed will be excluded without harming the overall results.

Respondents were also asked to make comments on the survey if they wished. The comments provided within the body of the Technostress survey helped identify problem items as well as provide valuable thoughts and insights from various librarians. Respondents of Dr. Tenopir's survey were also asked to make comments "on whether new technologies help or hinder reference services."<sup>15</sup> These responses, provided by the heads of reference services, will also add to the depth of the Technostress survey.

### **Examples of Likert Research in Library Science**

The Likert Scale has been used in Library Science research in past projects. One example is Shelley Heaton and Jeanne Brown's "Staff Perceptions of Incentives and Hurdles to the Use of Technology."<sup>16</sup> A questionnaire was designed to assess "hurdles to

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<sup>15</sup>"Use of Electronic Reference Sources," Appendix .

<sup>16</sup>Shelley Heaton and Jeanne Brown, "Staff Perceptions of Incentives and Hurdles to the Use of Technology," *Computers in Libraries* 15 (February 1995) : 28.

the use of technology such as lack of training, and equipment and software inadequacies.”<sup>17</sup> The survey was distributed to the eighty-four staff members of the University of Nevada, Las Vegas, Library. Forty-two of the staff members responded, giving the researchers a 50 percent return rate.

The response categories were: “a significant incentive, something of an incentive, neither incentive nor hurdle, somewhat of a hurdle, and significant hurdle.”<sup>18</sup> The researchers developed seventeen items covering the general areas of “supervisor impact, training, time, communication, equipment and software, and personal reasons,” as well as a place for additional comments and suggestions.<sup>19</sup> Unfortunately the article does not include a copy of the questionnaire, but the authors indicate that because of their survey, at least some of the stressors associated with staff perceptions of technology have diminished.

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<sup>17</sup>Ibid.

<sup>18</sup>Ibid.

<sup>19</sup>Ibid.

## **CHAPTER 4**

### **Survey Results:**

#### **Survey Demographics**

The Technostress survey was distributed to 97 ARL (Association of Research Libraries) academic libraries in the United States. Of the 97 libraries contacted with a total population of approximately 2,000 reference librarians, 37 schools responded, for a return rate of 38%. From the 37 schools which replied, 158 individual surveys were received, and 29 of the 158 respondents included comments on their response sheet. While this return rate is statistically low, the primary concern of this research is to examine general trends in reference librarians' attitudes and beliefs concerning technologies in reference services.

The sample of reference librarians was large enough to provide a level of statistical significance. Given the sample size of  $N=158$  and the array of results for the twenty items, most of the responses could be assumed to be  $\pm 5\%$  at the 95% confidence level. For example, item "t" where almost 83% agreed and approximately 8% disagreed, could have results of 78% and 12% if a second sample were drawn.

Where the responses were closer to being even, the proportion agreeing were close to the proportion disagreeing, the confidence level is lower. These items tended to have a confidence level of  $90\% \pm 5\%$ . In brief, the results, for the most part, are good estimates of how the entire population of ARL academic reference librarians may have responded if the Technostress survey was readministered to a second sample.

## **Analysis of Results**

### ***Introduction***

The Likert scaling method can allow the researcher to assign values to responses and/or items; however, no values were assigned to designated responses or items for this study, since the purpose of the project was not to determine to what degree reference librarians were experiencing Technostress, or even if they were experiencing Technostress at all. Prior research has demonstrated the existence and causes of Technostress in librarians of all types. What this study intended to do was to take what the other researchers have said causes Technostress and ask reference librarians if those aspects of Technology are still a concern to them today.

Ideally, by determining what aspects of Technostress most concern librarians, library administrators will be better able to ease the causes of Technostress they can control, and the librarians themselves will be more prepared to watch for symptoms of Technostress in themselves and co-workers. However, there are some facets of Technostress over which individual librarians and individual libraries have little control. Interface design, pace of change, changes in job description and responsibilities, and hardware and software engineering will remain problems for a while to come, but at least if librarians know what they are feeling and why they are feeling it, they will be much better armed to cope with new technologies.

One of the strengths of the Likert method is that it allows for the survey items to be analyzed independently of each other. Thus, each item is presented below in its own chart, showing the number of responses for each category as well as the percentage of

respondents' replies. Tables providing the results in a more condensed manner are provided in the appendix.<sup>1</sup>

The items have been categorized into the six aspects of technology the literature cites as causing Technostress: pace of change, lack of training, lack of standardization, reliability of new technology, and the changing role of librarians. While a number of the items crossed category lines, the sixth aspect, increased workload, is especially flexible. So, the increase in workload will be addressed in the summary. The items have been assigned a category based on where they best fit.

### *Pace of Change*

Two items were constructed to deal with the topic of the pace of technological change. The first, b) *The technology changes too fast for me to keep up*, prompted the results shown in figure 1.1. The responses indicate reference librarians perceive the rate of technological change as too fast for them to keep current. Overall 51% agreed with the statement, while only 25% disagreed, and 24% remained neutral.

| <b>1=strongly agree</b> | <b>2=agree</b> | <b>3=neutral</b> | <b>4=disagree</b> | <b>5=strongly disagree</b> |
|-------------------------|----------------|------------------|-------------------|----------------------------|
| 15%                     | 36%            | 24%              | 20%               | 5%                         |
| 24                      | 56             | 38               | 32                | 8                          |

Figure 1.1: b) *The technology changes too fast for me to keep up.*

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<sup>1</sup>See Appendix for Tables.

The second item, m) *Every time I get comfortable with a computer program it is changed or upgraded*, received similar results to those shown in figure 1.2. For this item, 43% agreed with the statement, 29% disagreed, and 28% were neutral. One respondent indicated there was no longer “time to get comfortable anymore,” and another librarian went as far to call the effort to keep up with technological change a “crisis for professional and staff development.”

| 1=strongly agree | 2=agree | 3=neutral | 4=disagree | 5=strongly disagree |
|------------------|---------|-----------|------------|---------------------|
| 9%               | 34%     | 28%       | 27%        | 2%                  |
| 14               | 54      | 44        | 43         | 3                   |

Figure 1.2: m) *Every time I get comfortable with a computer program it is changed or upgraded*.

Further, as librarians struggle to keep abreast of the technologies and develop the necessary skills to use these technologies, their other duties and tasks continue to build in a seemingly endless backlog. A number of respondents indicated they did not mind learning new programs, but that there was just no time to practice or read manuals and still do all the other tasks and duties required of them. The rate at which technologies are introduced and changed through upgrades is a strong source of stress for librarians, even if they like learning about new technologies.

## ***Training***

Proper training has the potential to alleviate some of the stresses associated with new technologies and their implementation. Four items were designed to provide clues to the degree of training offered to librarians by their employer. The first item, I) *My employer provides adequate training for new technologies*, seeks to discover if librarians believe their employers provide them adequate training opportunities. While everyone's idea of what may or may not be "adequate" will vary, what is important is how the librarians view what is offered in terms of training. As figure 2.1 shows 49% of the respondents believed their employers did provide adequate training, 26% reported their employers did not, and 25% were neutral.

| <b>1=strongly agree</b> | <b>2=agree</b> | <b>3=neutral</b> | <b>4=disagree</b> | <b>5=strongly disagree</b> |
|-------------------------|----------------|------------------|-------------------|----------------------------|
| 11%                     | 38%            | 25%              | 20%               | 6%                         |
| 17                      | 60             | 40               | 32                | 9                          |

*Figure 2.1: I) My employer provides adequate training for new technologies.*

One important aspect of training is to allow librarians to practice on new systems before they are introduced to the general public. The second item in this category, I) *The reference staff is provided access to new technologies before the general public*, examines this aspect of training. The results in figure 2.2 are similar to those found in item "I." Overall 53% agreed, 29% disagreed, and 18% were neutral on whether their library enabled reference librarians to practice privately on new systems before the

systems were made available to the public. Some of the respondents indicated they were usually provided access to new system, but not always. Another librarian stated the library staff was given access in private areas for training and practice at the same time the system was made available to the public.

| <b>1=strongly agree</b> | <b>2=agree</b> | <b>3=neutral</b> | <b>4=disagree</b> | <b>5=strongly disagree</b> |
|-------------------------|----------------|------------------|-------------------|----------------------------|
| 9%                      | 44%            | 18%              | 23%               | 6%                         |
| 15                      | 69             | 28               | 36                | 10                         |

Figure 2.2: 1) *The reference staff is provided access to new technologies before the general public.*

Technostress literature also points to frustration over spending more and more time learning how to effectively operate new technologies than on other daily duties and tasks. The third item in this category addresses this issue, o) *I spend more time learning how to use new technologies than I spend on other work*, the results of which are shown in figure 2.3. For this item, only 20% agreed with the statement, while 53% disagreed and 27% were neutral. However, one respondent stated they should spend more time, “but there is no more time.” Thus, the indication for this particular item is librarians perhaps could spend all their time learning about new technologies if they neglected their other responsibilities.

| 1=strongly agree | 2=agree | 3=neutral | 4=disagree | 5=strongly disagree |
|------------------|---------|-----------|------------|---------------------|
| 5%               | 15%     | 27%       | 49%        | 4%                  |
| 8                | 24      | 42        | 77         | 7                   |

Figure 2.3: o) *I spend more time learning how to use new technologies than I spend on other work.*

The final item for this section involves the instruction manual which is included with hardware and software packages. The item, s) *I find manufacturer user manuals helpful*, seeks to discover if the manuals produced by the manufacturer are useful to librarians in conducting reference services. As figure 2.4 shows, 29% stated they agreed manuals were helpful, 44% disagreed, and 27% were neutral. One librarian pointed out the manuals were useful when they could find them. For a single software package loaded on a network, the lack of multiple copies of product documentation would prove to be a problem. Clearly, however, manuals are not the answer for everyone.

| 1=strongly agree | 2=agree | 3=neutral | 4=disagree | 5=strongly disagree |
|------------------|---------|-----------|------------|---------------------|
| 3%               | 27%     | 27%       | 32%        | 11%                 |
| 4                | 42      | 43        | 51         | 18                  |

Figure 2.4: s) *I find manufacturer user manuals helpful.*

### **Standardization**

The issue of standardization in technology can be related to a number of different aspects, such as: differing commands for the same type of program, hardware and

software incompatibilities, differing versions of the same program, different terms, different commands, and different icons. This section of four items attempts to deal with the standardization issue. For item "j," *I get angry at my PC*, 34% agreed, 50% disagreed, and 16% remained neutral (see figure 3.1). One respondent reported they only got angry at the IBMs, not the Macs.

| 1=strongly agree | 2=agree | 3=neutral | 4=disagree | 5=strongly disagree |
|------------------|---------|-----------|------------|---------------------|
| 8%               | 26%     | 16%       | 34%        | 16%                 |
| 12               | 41      | 26        | 54         | 25                  |

Figure 3.1: j) *I get angry at my PC*.

A second aspect of standardization deals with different commands and interfaces for similar programs produced by the same or competing companies. For instance, Word Perfect and Microsoft Word are both word processors, but they have very different commands, icons, and interfaces. Item "k," *I get frustrated with different versions of similar programs*, covers this issue. Forty-two percent of the respondents agreed with the statement, 34% disagreed, and 24% remained neutral, as shown in figure 3.2. The differences in versions of programs were reported as very stressful for one librarian, and another librarian found it stressful when the same program was not downward compatible with its previous versions.

| 1=strongly agree | 2=agree | 3=neutral | 4=disagree | 5=strongly disagree |
|------------------|---------|-----------|------------|---------------------|
| 9%               | 33%     | 24%       | 28%        | 6%                  |
| 14               | 52      | 38        | 44         | 10                  |

Figure 3.2: k) *I get frustrated with different versions of similar programs.*

The third item focusing on standardization is, p) *I like learning new computer programs.* Since it is unlikely a person who likes to learn new programs would feel stress by having to learn new applications and programs, this item seemed appropriate. Of the respondents, 60% agreed they like learning new programs, as figure 3.3 illustrates while 17% disagreed with the statement, and 23% were neutral.

| 1=strongly agree | 2=agree | 3=neutral | 4=disagree | 5=strongly disagree |
|------------------|---------|-----------|------------|---------------------|
| 18%              | 42%     | 23%       | 14%        | 3%                  |
| 29               | 66      | 36        | 22         | 5                   |

Figure 3.3: p) *I like learning new computer programs.*

Along the same lines as item "k" is item "r," *It is frustrating to learn different commands for different vendors of similar programs,* which also looks at the differences in similar programs. The numbers for item "r" varied somewhat from those of item "k." For instance, 54% reported they agreed with the statement, 21% disagreed, and 25% remained neutral. One librarian commented they did not mind learning new commands for similar programs, but teaching different commands for similar programs was difficult,

especially in short classes. Taken together, items "k" and "r" demonstrate some level of standardization in new technologies would lessen Technostress for some librarians.

However, since more and more manufacturers are moving toward a Web and Windows environment or interface, it is likely standardization, at least for software, will lessen as a significant problem.

| 1=strongly agree | 2=agree | 3=neutral | 4=disagree | 5=strongly disagree |
|------------------|---------|-----------|------------|---------------------|
| 17%              | 37%     | 25%       | 15%        | 6%                  |
| 27               | 59      | 39        | 23         | 10                  |

Figure 3.4: r) It is frustrating to learn different commands for different vendors of similar programs.

### ***Changing Role***

Six of the items relate to the librarians' changing role. Much of the literature stresses the importance of the changing role of librarians and the librarians' perception of their evolving role in today's high tech library. Some expressed positive outlook, while others feel negative about the dynamic nature of reference services and its future. The items for this section were designed to elicit responses on how librarians perceive new electronic resources and technologies. For instance, the first item is a) *I enjoy teaching users about electronic sources*. The librarians overwhelmingly responded they did indeed enjoy teaching users about new electronic resources: 85% agreed with the item, only 4% disagreed, and 10% were neutral (see figure 4.1).

| 1=strongly agree | 2=agree | 3=neutral | 4=disagree | 5=strongly disagree |
|------------------|---------|-----------|------------|---------------------|
| 44%              | 42%     | 10%       | 3%         | 1%                  |
| 69               | 66      | 16        | 5          | 2                   |

Figure 4.1: a) *I enjoy teaching users about electronic sources.*

The responses for item, f) *I enjoy learning about new electronic sources*, restated the same idea, and the results were practically the same: 84% agreed, 4% disagreed, and 12% remained neutral. Thus, an overwhelming majority of the librarians who responded to the survey enjoyed both teaching and learning about new electronic resources. A number of respondents expressed excitement over the "huge array" of resources available today.

| 1=strongly agree | 2=agree | 3=neutral | 4=disagree | 5=strongly disagree |
|------------------|---------|-----------|------------|---------------------|
| 36%              | 47%     | 12%       | 3%         | 1%                  |
| 57               | 75      | 19        | 5          | 2                   |

Figure 4.2: f) *I enjoy learning about new electronic sources.*

While librarians may enjoy new technologies, the pressure to learn how to use them efficiently and quickly can be great. Item "n," *Users expect me to be fluent in using technologies*, sought to ascertain the degree to which librarians feel pressured by users to understand and operate technologies fluently. The results show that librarians do feel pressure to be fluent in the various technologies within their libraries: 89% agreed users expect them to be fluent, 5% disagreed, and 5% were neutral (see figure 4.3).

This item also provoked a number of comments. One librarian reported that not only do users expect expertise from the reference librarians, but become “obnoxious” when the librarians are not fluent. Another librarian, however, stated they just explained to the user that fluency was not a realistic expectation, but assured the user that together they could explore the system and find what information was needed. The same librarian also commented that many of the users understood this situation, because they were “experiencing the same thing.”

| 1=strongly agree | 2=agree | 3=neutral | 4=disagree | 5=strongly disagree |
|------------------|---------|-----------|------------|---------------------|
| 28%              | 61%     | 5%        | 5%         | 1%                  |
| 45               | 96      | 8         | 8          | 1                   |

Figure 4.3: n) Users expect me to be fluent in using technologies.

Item "d," *Electronic sources are more convenient than print sources*, was intended to determine if reference librarians, in general, found electronic sources more convenient than other types of sources. Figure 4.4 shows that 51% agreed with the statement, 18% disagreed, 31% were neutral. A number of respondents commented they could not generalize the variety of electronic resources into one large group. A number of librarians also stated convenience depended on the type of electronic source.

| <b>1=strongly agree</b> | <b>2=agree</b> | <b>3=neutral</b> | <b>4=disagree</b> | <b>5=strongly disagree</b> |
|-------------------------|----------------|------------------|-------------------|----------------------------|
| 16%                     | 35%            | 31%              | 16%               | 2%                         |
| 25                      | 55             | 49               | 25                | 4                          |

Figure 4.4: d) *Electronic sources are more convenient than print sources.*

The fifth item in this section, e) *Technology makes the reference task easier*, asks librarians if they believe technology makes their job easier. Of the librarians who replied, 56% agreed, 27% disagreed, and 16% of the respondents replied neutral (see figure 4.5). Many of the comments librarians provided expressed the view that technology was a double-edged sword. One comment expressed how technologies allow librarians to do more, but “also increases expectations about what” librarians are able to do. Another librarian stated everyone, including librarians, are too eager to use new electronic sources, ignoring other more traditional but still very useful resources. Librarians also commented that “technology has made it efficient to find certain kinds of information but it has also made it more complicated to find other kinds.”

| <b>1=strongly agree</b> | <b>2=agree</b> | <b>3=neutral</b> | <b>4=disagree</b> | <b>5=strongly disagree</b> |
|-------------------------|----------------|------------------|-------------------|----------------------------|
| 19%                     | 37%            | 16%              | 20%               | 7%                         |
| 30                      | 59             | 26               | 32                | 11                         |

Figure 4.5: e) *Technology makes the reference task easier*

Since all ARL libraries are highly automated, the final item in this section, h) *I feel comfortable using computers*, was designed to determine if librarians are comfortable

using personal computers. Of the librarians which responded 88% reported feeling comfortable with computers, only 3% disagreed, and 9% were neutral (figure 4.6). With the prevalence of computers in libraries today, these numbers come as no real surprise.

| <b>1=strongly agree</b> | <b>2=agree</b> | <b>3=neutral</b> | <b>4=disagree</b> | <b>5=strongly disagree</b> |
|-------------------------|----------------|------------------|-------------------|----------------------------|
| 44%                     | 44%            | 9%               | 2%                | 1%                         |
| 69                      | 70             | 15               | 3                 | 1                          |

Figure 4.6: h) *I feel comfortable using computers.*

### **Reliability**

The issue of technological reliability in libraries involve both the technology working properly and the content the technology contains. The first item in this section, c) *Print sources are more accurate than electronic sources*, deals with the aspect of content. This item produced comments of “it depends” and “sometimes,” varying on the kind and type of information required. Only 9% of the librarians agreed with the statement while 46% disagreed and 46% were neutral (figure 5.1). Clearly, librarians have faith in the integrity of most electronic resources, especially when the sources are manufactured by companies with which they are already familiar.

| <b>1=strongly agree</b> | <b>2=agree</b> | <b>3=neutral</b> | <b>4=disagree</b> | <b>5=strongly disagree</b> |
|-------------------------|----------------|------------------|-------------------|----------------------------|
| 1%                      | 8%             | 46%              | 39%               | 6%                         |
| 2                       | 12             | 72               | 62                | 10                         |

Figure 5.1: c) *Print sources are more accurate than electronic sources.*

The second item deals with the technology working properly. A more balanced response was elicited from g) *I feel helpless when electronic sources are unavailable (i.e., the LAN is down)*. Thirty-five percent agreed, 51% disagreed, and 13% reported neutral (figure 5.1). One respondent, however, stated “helpless” was too strong, but “frustrated” was a better descriptor. Others reported only feeling helpless if an adequate alternative was unavailable.

| <b>1=strongly agree</b> | <b>2=agree</b> | <b>3=neutral</b> | <b>4=disagree</b> | <b>5=strongly disagree</b> |
|-------------------------|----------------|------------------|-------------------|----------------------------|
| 6%                      | 29%            | 13%              | 41%               | 11%                        |
| 10                      | 46             | 21               | 64                | 17                         |

Figure 5.2: g) *I feel helpless when electronic sources are unavailable (i.e., the LAN is down)*.

The third item, q) *I keep paper backup copies as well as floppy disk backups*, was designed to elicit responses about how well librarians “trust” the technology to keep their data safe. The survey results indicate librarians do trust the technology, since 27% agreed with the statement, while 54% disagreed, and the neutral group made up only 19% of the responses.

| 1=strongly agree | 2=agree | 3=neutral | 4=disagree | 5=strongly disagree |
|------------------|---------|-----------|------------|---------------------|
| 3%               | 24%     | 19%       | 44%        | 10%                 |
| 5                | 38      | 30        | 69         | 16                  |

Figure 5.3: q) *I keep paper backup copies as well as floppy disk backups.*

### ***Future Outlook***

Item "t," *Overall, I feel positive about the future of reference services*, was designed to gauge how librarians view the overall future of reference services. An overwhelming majority of 88% reported they felt positive about the future of reference librarianship, only 8% did not feel positive, and 10% selected neutral. Even in the light of great changes and challenges, the majority of reference librarians appear to look toward the positive aspects of technology.

| 1=strongly agree | 2=agree | 3=neutral | 4=disagree | 5=strongly disagree |
|------------------|---------|-----------|------------|---------------------|
| 37%              | 46%     | 9%        | 5%         | 3%                  |
| 59               | 72      | 15        | 8          | 4                   |

Figure 6.1: t) *Overall, I feel positive about the future of reference services*

### **Discussion and Findings**

The responses gathered from ARL librarians through the Technostress Survey and the Electronic Reference Sources Survey indicated in academic libraries some trends related to Technostress can be observed. First, almost half of the respondents reported trouble keeping up with the pace of technology. Whether from the implementation of

entirely new systems or smaller, subtler changes from upgrades, the rate of change is a source of stress for reference librarians. Comments made throughout the surveys indicate a willingness to learn, but also a lack of time to learn. One librarian stated;

The rapid proliferation and changing nature of electronic resources is creating an enormous amount of stress for reference librarians and a crisis for professional and staff development. Librarians are really struggling to keep up with developments and stay ahead of users in knowledge of resources and the skills to use them.

The struggle to remain current on new and emerging information technologies is a constant challenge for librarians and users.

Unfortunately, it is unlikely there is anything anyone can do to slow the advance of technology. Librarians should remember that at least within the library's walls, technology is not changing as fast as it is for network specialists and others in the private sector. Due to budgetary concerns, libraries are unable to buy every new technology or upgrade that comes around the corner. Perhaps slowing the advance of technology within the library and thus lessening stress is the single positive aspect to come out of budget cuts.

Further, as librarians become more experienced in and accustomed to older technologies, new technologies will become less frightening and easier to learn. Indeed, most librarians reported they enjoyed learning and teaching users about new resources. However, some librarians responded technology today has so many options that it no longer makes reference easier, but rather more difficult.

One way to alleviate Technostress is through proper training. The majority of the subjects did believe their employer provided adequate training for new technologies. A

number of librarians also indicated they were allowed to practice on new systems privately. Allowing employees to learn a new system away from the judging eye of users, as well as co-workers, is a good way to prevent the frustration of librarians and users, as well as keep the reference librarian from any embarrassing situations. Even if a private station can not be operational until the public terminals are ready, providing a private area is still a good idea. Secluded work stations would give the librarian a place to go and make mistakes where no else can see them.

Another source of stress the prior research on Technostress found was librarians spending more time learning new technologies than on their other tasks, thus creating a backlog of work. However, over half of this survey's participants reported they disagreed that they spent more time learning new technologies than on other things, while 60% reported they enjoyed learning new computer programs. A possible reason for this response could be that librarians prioritize their work in such a way that taking time to learn a new system or database is lower on the list than completing their other tasks. One librarian expressed the desire to spend more time learning about new resources, but just did not have the time.

Standardization of technologies would also lessen the amount of time required to train employees on systems and interfaces. For instance, 42% said they get frustrated with different versions of similar programs, and 54% reported learning different commands for different vendors of similar programs was frustrating. An example of this is the command to quit a program. Does the user press the "escape key," "Q," "F10," or a combination of keys to exit a program? Standardization can have a bigger impact on

people who use a different operating system at home than the system they are required to use at work. One librarian reported they only got “mad” at IBM computers, not at Macs. Sadly for librarians, this problem is an area for software designers. There are small and relatively inexpensive actions which can help prevent some of the stressful aspects of software variances. If the commands are not clear, something as simple as a template can help immensely.

A second important aspect of training is the manufacturers’ manuals that come with a new product. Only 29% of those who responded reported that they felt the manufacturers’ manuals were helpful. One of those 29% added that they thought the manuals were useful, but often had a hard time locating them. If manufacturers are unable or unwilling to provide extra copies of manuals for software packages licensed for a network environment, perhaps making a simple “cheat sheet” for the most common commands and keys and taping it to the desktop would be helpful for at least some things.

Another librarian did not like the manuals, but did find online help screens useful, which could form an interesting follow-up question.

Adequate training is no doubt important, but whether the employer holds workshops, makes manuals available, creates templates or “cheat sheets,” or provides private access to new systems, it is the employee’s responsibility to take advantage of these opportunities as well as to practice what they are taught. Training is a two-way street, and both parties, employers and employees, must make the effort to ensure the training provided is effective.

The theme that runs through the literature the most is the changing role of librarians, and the changes in job description and duties. According to Clark Hallman, Head of Reference and Interlibrary Loan at South Dakota State,

Reference librarians at academic libraries are especially affected by this changing environment. They have a responsibility to acquire the knowledge and skills necessary to use and teach the most efficient information techniques that current technology makes possible.<sup>2</sup>

Respondents echo this thought in a number of ways, both from a positive and negative view. Overall the study illustrates librarians enjoy the new opportunities and resources technology has brought forth. The overwhelming majority, 85% and 84% respectively, reported both enjoying teaching and learning about new electronic sources.

Many of the participants commented that electronic resources helped them find more information for users. Further, the sheer number of available resources encourages librarians to be much more reluctant to give up on a particular reference problem. The complaints voiced most often involved non-technical aspects, such as time constraints in and out of the classroom, and increased user expectations of what is possible and available.

Although a high number of respondents enjoy new electronic resources, a high number, 89%, stated that users expect them to be fluent in using technologies. This aspect combined with the pace of technological change can be a strong source of Technostress in reference librarians. Respondents also expressed concern that reference librarians are now required to be much more technically "savvy." A particular librarian

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<sup>2</sup>Clark N. Hallman, "Technology: Trigger for Change in Reference Librarianship," *The Journal of Academic Librarianship* 16, no. 4 (September 1990): 204.

states "Reference is less a skill as it has become a trade. The ref[erence] librarian more and more is tech support rather than resource."

This aspect of the librarian's changing role fits into the *Person-Environment Fit* model discussed in the Introduction of this work.<sup>3</sup> Librarians are experiencing angst over what they are required to do at work because of new technologies and what they believe they should be doing at work. For instance, librarians complain of time spent instructing users on the mechanics of how to properly operate a World Wide Web browser and other software packages instead of answering reference questions or providing instruction on searching techniques. Elizabeth Thomsen explains, in her article "Negative Capability," librarians have had "to learn too much too fast," and most librarians did not enter the field "because it was techy and fast-paced, but because of a love of literature and learning and a desire to help others."<sup>4</sup>

Librarians also found electronic resources more convenient than other types of sources, according to 51% of the respondents. However, a number of them commented they could not generalize the vast array of "electronic resources" into one general category. Electronic indexes were considered more convenient than some other electronic sources. For the most part, librarians stated convenience depended on the source, the information needed, and whether the technology was working properly at the time it was needed. The results were similar for opinions about technology making the

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<sup>3</sup>Introduction, 2.

<sup>4</sup>Elizabeth B. Thomsen, "Viewpoint: Negative Capability," *Wilson Library Bulletin* (January 1995): 29.

reference task easier.

One particular frustration for librarians is users who expect to find things easily and in full-text. As one librarian explains;

The biggest change is increased user expectations. More and more users expect to be able to find everything on-line, full-text. Technology lets us do more, but it also increases expectations about what we can do.

As a result librarians are being forced to direct users to full-text databases and spend less time instructing users in the use of other types of resources. Users are less willing to spend the time learning search strategies or searching for what they really need and settle for what they can get easily and quickly. One librarian stated the current popularity of Web and full-text databases reminded them of "the reluctance to use hard copy indexes and abstracts, once electronic files were available." Now users do not even want to look up items in a bound copy of a journal, for example. Another stated that it is difficult to even get users close to their print index section.

If the technology is working properly, many respondents believe it helps the reference task. However, a number of librarians express concern that everyone is too enamored with the look and feel of electronic sources, and not concerned enough with the content of the resources. Others are concerned older more traditional sources are being forgotten, even though the older sources may be quicker and provide clearer and more reliable information.

Electronic sources are only more convenient and easier when all things are working as they should. When the technology is not working, however, the reference task can come to a complete halt. For many libraries, when the automated catalog is down,

there is no alternative but to wait for the system to be repaired. Another problem is often hardware can not keep up with software and access improvement, thus old systems are asked to do more than they are intended to do.

A high speed fiber network can not make a 14.4 modem operate any faster, or a printer print faster. The results of hardware inadequacies are frozen terminals, printer jams, hard drive crashes, corrupt files, and a host of other errors, all of which users expect the reference librarian to fix. Many librarians expressed that when no alternatives to the electronic sources are available when technology problems occur they do feel helpless, or at the least, frustrated. This problem is compounded, as one librarian explained, by competition for money. As libraries attempt to keep their software and hardware current, money for alternative sources is reallocated for technology, thus lessening the reference resource alternatives.

Overall, librarians generally appear to have become comfortable with the role technology plays in their work life. Eighty-eight percent of the librarians who responded reported they were comfortable using computers. Even with the concerns and frustrations brought by technology librarians still made comments like, "It's more fun to go out to the [reference] desk now," and indicated they would have become bored a long time ago without the changing technological environment.

The overall trend in reference services is one of anticipation and excitement. Of the librarians 88% said they felt positive about the outlook of reference services. While all the difficulties cited can and certainly do cause Technostress in some librarians, most seem to believe the positive outweigh the negative. There are aspects of technology

which cause a certain amount of stress. After all, the card catalog never goes down, but on the other hand, cards do get lost, only one user can look at one drawer at a time, and searching strategies are not as flexible as with automated catalogs.

### **Limitations of Methodology**

The method used for this research had two primary problems associated with the interpretation of results. First, is the problem of terminology and wording of the individual items. Some of the items included vague or confusing wording, which can foster misinterpretation of particular items. Further, since much of the technology is new, much of the terminology of that technology is also new, and in some cases terms have more than one meaning. A dynamic and changing terminology will lead to some degree of confusion of the statements in the survey. Hopefully some of this confusion will be alleviated by allowing and encouraging respondents to make comments within the body of the survey.

A second problem involves the mood of the respondent at the time they filled out the survey. For instance, someone having a particularly bad day, for whatever reason, is much more likely to answer items in the extreme positive or negative, depending on the nature of the item. This principle also applies to people who are having a particularly good day. Both types of moods can cause the participant to report results which can skew the results of a survey.

The respondents can also skew results by failing to reply honestly to the survey items. Although anonymity is insured, some people will still be hesitant to criticize their

employer. Along the same lines some of the respondents may have completed the survey because their boss required them to do so. Secondly, there may be difference in those who responded and those who chose not to respond. For example, people who are more outgoing and positive may be more apt to take the time to fill out a survey.

Overall, the Likert method works very well for outlining trends and attitudes within a specific group. Since this study is not concerned with specific ratios and numbers, the Likert scale and open-ended questions on the Technostress survey do provide a good indication of the attitudes of reference librarians toward new technologies in the workplace. For the types generalizations focused on in this study the chosen methodology has allowed a reasonably clear picture to surface. For determining information of a more specific nature, another research method would be more appropriate.

### **Summary**

This research sought to prioritize what prior research labeled the main causes of Technostress in reference librarians, but it can not. The environment is simply too dynamic to nail down one cause as more important or stressful than another. Further, the majority of the librarians who responded to this survey are enjoying the changing and challenging environment. They feel empowered by the wide selection of electronic tools at their fingertips. The pace of technological change is fast, the role of the librarian is changing, machines do fail, and different programs have different interfaces and commands, but the alternative of choosing not to take advantage of computers and

electronics to increase productivity and selection of alternative information resources does not appear to be an option for reference librarians.

From this study, however, the indication is the increase in workload and user expectations due to technology is the primary source of stress for librarians in the reference environment. Every time an upgrade or new program is installed, the librarian has to relearn how to operate it and then reteach the users. When a new database is added, either on a local network or on the Internet, the librarian must learn how to search it, and teach others to effectively search the new resource. While librarians are excited about the variety of resources available for their use, each time a new one is added their workload has increased.

As the number of resources grows, the expectations of the users also grow. The librarians who participated in this survey indicate the users expect them to know the details of every resource available. The reluctance of users to employ more traditional resources because of a belief that everything can be found on the Internet adds to the librarians' level of stress. Few library users understand how little is actually on the Internet, or how poorly organized the things available online are.

## CHAPTER 5

### Conclusion:

#### The Future of Reference Services

The literature on the future outlook of reference librarianship warns librarians must embrace change and take charge of it, or be prepared to be left behind as the rest of the world leaps into the future.<sup>1</sup> Malinconico further states new technologies “have both the power to displace traditional librarians and information specialists and/or magnify their importance and the contributions they can make to scholarship.”<sup>2</sup> Michael

Gorman echos the same thought:

All the changes we face are worth addressing. Change should be welcomed and recognized as a sign of health. The academic libraries that we serve are of great importance to culture and education. They are worth striving for, and from that striving comes creativity and innovation. In the process of changing and growing we must be prepared, on occasion, to fail and to not become downhearted by failure.<sup>3</sup>

Many of the respondents to both surveys expressed the same ideas. As one librarian stated, “we are in a revolution in technology, information retrieval and generation, and higher education . . . It is always changing. This is given.” Librarians realize technology is changing the nature of their job, but they also realize many of the

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<sup>1</sup>Michael Malinconico, “Information’s Brave New World,” *Library Journal* 117, no. 8 (January/June 1992): 36.

<sup>2</sup>Ibid.

<sup>3</sup>Michael Gorman, “The Academic Library in the Year 2001: Dream or Nightmare or Something In Between?” *The Journal of Academic Librarianship* 17, no. 1 (1991): 9.

changes are allowing them to do their job better. While the changes are indeed stressful, librarians appear to be rising to the challenges of new technologies and resources, and are eager to participate in and contribute to the changes. With librarians involved in the rising technologies, the outlook for reference services can not help but be positive and bright.

### **Suggestions for Coping**

Some work-related stress is inevitable, no matter what kind of job a person performs. A number of researchers have developed suggestions for librarians who experience technological stress. John Kupersmith provides individual strategies for coping in his article, "Technostress and the Reference Librarian." Kupersmith is quick to point out coping with stress is "a highly individual matter; different people react to a situation in different ways."<sup>4</sup> The first suggestion offered by Kupersmith is simply to relax, breathe, and stretch when beginning to feel stressed. Staying healthy, developing a positive attitude, building time management skills, and setting realistic goals, Kupersmith explains, are all things individual librarians can do to prevent and cope with stress and its effects.<sup>5</sup>

Kupersmith also provides suggestions for the "organizational" level. For instance, fostering cooperation between co-workers, providing training time, and setting

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<sup>4</sup>Kupersmith, 9.

<sup>5</sup>Ibid., 9-10.

clear and reasonable priorities will all help employees cope with changes and challenges.<sup>6</sup>

A particularly creative suggestion offered by Kupersmith is to "distribute the expertise."<sup>7</sup> While all reference librarians need to have a basic "level of competence" on systems available at their institution, no one can master them all.<sup>8</sup> By dividing "up the territory" and allowing employees to concentrate on one area or one kind of system, responsibility is distributed.<sup>9</sup>

Other suggestions are offered by Virginia Bartlett and Carol Smallwood. Bartlett suggests librarians write and talk to vendors about how to make products easier to use.<sup>10</sup> The vendors may or may not listen, but just the act of writing a letter or informing a company representative of specific complaints can help a librarian release stress. Bartlett also points to adequate staffing to prevent stress and overload, as well as involving the staff in decision making.<sup>11</sup> Smallwood's suggestions are more practical for the day-to-day operation of a library. For instance, insuring "paper, cartridges, ribbon[s], and other supplies" are ordered in advance, and "guarding against perfectionism," are two suggestions that can help individual librarians take control over their work day.<sup>12</sup>

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<sup>6</sup>Ibid., 14.

<sup>7</sup>Ibid.

<sup>8</sup>Ibid.

<sup>9</sup>Ibid.

<sup>10</sup>Bartlett, "Technostress and Librarians," 228.

<sup>11</sup>Ibid.

<sup>12</sup>Carol Smallwood, "Technostress: What Is It? How Can You Learn to Live with It?," *Technology Connection* (June 1996): 14.

“There is no ‘magic bullet’ that will banish technostress from libraries,” states Kupersmith.<sup>13</sup> There are clearly things which can be done to lessen technostress, however. By keeping track of the things which cause their technostress, individual librarians can work toward preventing as much stress as they can in their daily routine. Also, by recognizing warning signs and taking the proper actions such as taking a break, librarians can control the stress, instead of the stress controlling them.

### **Suggestions for Further Study**

In a real sense, this research created more questions than it answered. Any one of the causes of Technostress mentioned in this paper could be examined individually much more closely. For instance, the section on the convenience of electronic resources could be molded into a study of its own with specific question about specific vendors and resources. Also, examining any difference in responses due to gender and/or age would add to the richness of Technostress research.

Another suggestion is to examine how library schools have changed their curriculums to accommodate the new technologies in libraries. Within the past few years the term “library” has been removed from the title of a number of schools, as well as the name of the degree itself. For instance, hardly anyone earns a Masters in Library Science anymore, but instead a Masters of Science in Information Science, Masters of Information Science, or some other variation. The names of individual courses have changed to accommodate new technologies.

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<sup>13</sup>Kupersmith, 18.

A final suggestion is to examine a statewide system, such as GALILEO (Georgia Libraries Learning Online) in Georgia or the similar system in Virginia. In these states, the universities and colleges have a single interface for the majority of the databases offered, as well as access to every schools' online catalog. Does the standardization of interface make reference easier, or does the lack of an individual library's control over the interface make reference more difficult?

The area of Technostress and changes in library resources offers a rich field for research of all kinds. The field can be as broad or as narrow as the researcher wants it to be, and the field lends itself to a number of different methodologies. The only limitation is the researcher's imagination and creativity.

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## The Survey

### Technology & Reference Services

Please pick a number from the scale to show how much you agree or disagree with how each statement relates to you and your job. You may reply via e-mail using "a=? b=? etc." to <lennis@utkux.utcc.utk.edu>.

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|                         |                |                  |                   |                            |
|-------------------------|----------------|------------------|-------------------|----------------------------|
| <b>1=strongly agree</b> | <b>2=agree</b> | <b>3=neutral</b> | <b>4=disagree</b> | <b>5=strongly disagree</b> |
|-------------------------|----------------|------------------|-------------------|----------------------------|

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- \_\_\_a) I enjoy teaching users about electronic sources.
- \_\_\_b) The technology changes too fast for me to keep up.
- \_\_\_c) Print sources are more accurate than electronic sources.
- \_\_\_d) Electronic sources are more convenient than print sources.
- \_\_\_e) Technology makes the reference task easier.
- \_\_\_f) I enjoy learning about new electronic sources.
- \_\_\_g) I feel helpless when electronic sources are unavailable (i.e the LAN is down).
- \_\_\_h) I feel comfortable using computers.
- \_\_\_I) My employer provides adequate training for new technologies.
- \_\_\_j) I get angry at my PC.
- \_\_\_k) I get frustrated with different versions of similar programs.
- \_\_\_l) The reference staff is provided access to new technologies before the general public.
- \_\_\_m) Every time I get comfortable with a computer program it is changed or upgraded.
- \_\_\_n) Users expect me to be fluent in using technologies.
- \_\_\_o) I spend more time learning how to use new technologies than I spend on other work.
- \_\_\_p) I like learning new computer programs.
- \_\_\_q) I keep paper backup copies as well as floppy disk backups.
- \_\_\_r) It is frustrating to learn different commands for different vendors of similar programs.
- \_\_\_s) I find manufacturer user manuals helpful.
- \_\_\_t) Overall, I feel positive about the future of reference services.

From "Tracking Electronic Resources" survey sent to the head of reference services.

**13. Please comment on how your library's use of electronic reference services has changed over the past 2-3 years and how the job of the reference staff has changed.**

We would be especially interested in your views on whether new technologies help or hinder reference services.

## Survey Results

Table 2. Condensed Summary of Results.

| Item                                                                                               | Agree | Disagree |
|----------------------------------------------------------------------------------------------------|-------|----------|
| <i>a) I enjoy teaching users about electronic sources.</i>                                         | 85%   | 4%       |
| <i>b) The technology changes too fast for me to keep up.</i>                                       | 51%   | 25%      |
| <i>c) Print sources are more accurate than electronic sources.</i>                                 | 9%    | 46%      |
| <i>d) Electronic sources are more convenient than print sources.</i>                               | 51%   | 18%      |
| <i>e) Technology makes the reference task easier.</i>                                              | 56%   | 27%      |
| <i>f) I enjoy learning about new electronic sources.</i>                                           | 84%   | 4%       |
| <i>g) I feel helpless when electronic sources are unavailable (i.e the LAN is down).</i>           | 35%   | 51%      |
| <i>h) I feel comfortable using computers.</i>                                                      | 88%   | 3%       |
| <i>I) My employer provides adequate training for new technologies.</i>                             | 49%   | 26%      |
| <i>j) I get angry at my PC.</i>                                                                    | 34%   | 50%      |
| <i>k) I get frustrated with different versions of similar programs.</i>                            | 42%   | 34%      |
| <i>l) The reference staff is provided access to new technologies before the general public.</i>    | 53%   | 29%      |
| <i>m) Every time I get comfortable with a computer program it is changed or upgraded.</i>          | 43%   | 29%      |
| <i>n) Users expect me to be fluent in using technologies.</i>                                      | 89%   | 5%       |
| <i>o) I spend more time learning how to use new technologies than I spend on other work.</i>       | 20%   | 53%      |
| <i>p) I like learning new computer programs.</i>                                                   | 60%   | 17%      |
| <i>q) I keep paper backup copies as well as floppy disk backups.</i>                               | 27%   | 54%      |
| <i>r) It is frustrating to learn different commands for different vendors of similar programs.</i> | 54%   | 21%      |
| <i>s) I find manufacturer user manuals helpful.</i>                                                | 29%   | 44%      |
| <i>t) Overall, I feel positive about the future of reference services.</i>                         | 83%   | 8%       |

1=Strongly Agree    2=Agree    3=Neutral    4=Disagree    5=Strongly Disagree

| Item                                                                                        | 1   | 2   | 3   | 4   | 5   |
|---------------------------------------------------------------------------------------------|-----|-----|-----|-----|-----|
| a) I enjoy teaching users about electronic sources.                                         | 44% | 42% | 10% | 3%  | 1%  |
| b) The technology changes too fast for me to keep up.                                       | 15% | 36% | 24% | 20% | 5%  |
| c) Print sources are more accurate than electronic sources.                                 | 1%  | 8%  | 46% | 39% | 6%  |
| d) Electronic sources are more convenient than print sources.                               | 16% | 35% | 31% | 16% | 2%  |
| e) Technology makes the reference task easier.                                              | 19% | 37% | 16% | 20% | 7%  |
| f) I enjoy learning about new electronic sources.                                           | 36% | 47% | 12% | 3%  | 1%  |
| g) I feel helpless when electronic sources are unavailable(i.e the LAN is down).            | 6%  | 29% | 13% | 41% | 11% |
| h) I feel comfortable using computers.                                                      | 44% | 44% | 9%  | 2%  | 1%  |
| I) My employer provides adequate training for new technologies.                             | 11% | 38% | 25% | 20% | 6%  |
| j) I get angry at my PC.                                                                    | 8%  | 26% | 16% | 34% | 16% |
| k) I get frustrated with different versions of similar programs.                            | 9%  | 33% | 24% | 28% | 6%  |
| l) The reference staff is provided access to new technologies before the general public.    | 9%  | 44% | 18% | 23% | 6%  |
| m) Every time I get comfortable with a computer program it is changed or upgraded.          | 9%  | 34% | 28% | 27% | 2%  |
| n) Users expect me to be fluent in using technologies.                                      | 28% | 61% | 5%  | 5%  | 1%  |
| o) I spend more time learning how to use new technologies than I spend on other work.       | 5%  | 15% | 27% | 49% | 4%  |
| p) I like learning new computer programs.                                                   | 18% | 42% | 23% | 14% | 3%  |
| q) I keep paper backup copies as well as floppy disk backups.                               | 3%  | 24% | 19% | 44% | 10% |
| r) It is frustrating to learn different commands for different vendors of similar programs. | 17% | 37% | 25% | 15% | 6%  |
| s) I find manufacturer user manuals helpful.                                                | 3%  | 27% | 27% | 32% | 11% |
| t) Overall, I feel positive about the future of reference services.                         | 37% | 46% | 9%  | 5%  | 3%  |

## **VITA**

## VITA

Lisa A. Ennis was born in Macon, Georgia on November 3, 1969. She attended Mount De Sales Academy and graduated in 1988. She was granted a Bachelor of Arts in History from Mercer University in 1992, and then pursued Master's of Arts in History from Georgia College in Milledgeville. Her M.A. was completed in 1994. Beginning in September 1994, she began teaching Western Civilization I and II at Georgia College. In June of 1995 Lisa started work as the Interlibrary Loan Assistant in the Ina Dillard Russell Library of Georgia College. After two years of teaching and a year in the ILL department she decided to pursue a Master's of Science in Information Sciences at the University of Tennessee, Knoxville. While at the University of Tennessee Lisa worked in the University of Tennessee's Law Library's Acquisitions Department and in the Map Library. Her M.S. in Information Sciences will be complete December 1997. After graduation Lisa will begin her appointment as Interlibrary Loan/Reference Librarian at Mercer University.