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Perceptions of Personnel at Selected Texas Community Colleges Regarding the Impact of Technology on Their Libraries

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PERCEPTIONS OF PERSONNEL AT SELECTED TEXAS COMMUNITY COLLEGES REGARDING THE IMPACT OF TECHNOLOGY ON THEIR LIBRARIES

by

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Technological innovations have transformed all areas of community college libraries. Automated library systems, office software, and Internet access have altered work processes for library personnel and have changed research methodologies for students and faculty. The purpose of this bounded multiple case study was to explore how the adoption of technology has changed important areas of four community college libraries in Texas. Using purposeful sampling to select community colleges with high technology libraries, the study explored how the adoption of technology by the case college libraries changed the libraries and the roles of people employed within the libraries by examining the impact of the adoption of technology on the following areas of the libraries: (a) physical structure; (b) organizational structure; (c) services; (d) ability to help meet the institution's educational mission; (e) capital and operational budgets; (f) personnel; (g) allocation of human resources; and (h) collections.

The researcher addressed this qualitative study from a constructivist paradigm that included multiple source data collection from (a) semi-structured one-on-one interviews; (b) non-participant observations, and (c) a review of public documents. Lean coding that corresponded to the eight categories being studied and in vivo coding that reflected the words of the participants were used to analyze interview transcripts.

According to participants in the study (a) academic libraries are still vitally important for faculty and students; (b) transitioning to online resources has transformed library collections; (c) library employees have adapted to and been supportive of technology; (d) technology funds derive from multiple sources, and locating funds requires creativity; (e) libraries are optimizing space and ensuring it is retained for library purposes; (f) work relations have evolved within libraries and between libraries and information technology; (g) organizational structures have remained flat; and (h) employees with higher levels of education and technology competencies are being hired.

Based on the findings of this study, implications for practice were formulated that might benefit libraries, library directors, and community colleges. Areas suggested for future study included online reference communications, attitudes toward library resources/services, relations within libraries, reporting structure and allocations, leading and following in different settings, and hiring the ideal candidate.

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Chapter 1

Introduction to the Study

In 1982, John Naisbitt referred to contemporary culture as a "Baskin-Robbins society" in which "everything comes in at least 31 flavors" (p. 260). Community colleges appear to have adopted that construct, for in recent years they have become the Baskin-Robbins of higher education. There is something for everyone, and their popularity reflects it. An American Association of Community Colleges publication estimates that enrollment in U.S. community colleges increased 21.8% from fall 2007 to fall 2011 (Mullin & Phillippe, 2011, p. 1). In Texas, the focus of this study, enrollment at two-year public institutions during fall 2010 accounted for 51%, or 743,252, of the state's entire enrollment of 1,445,157 students who were attending higher education institutions (Texas Higher Education Coordinating Board, 2011e). Although some students attend community colleges because enrollment caps at four-year institutions limit their opportunities (Mullin & Phillippe, 2009, p. 7), most students are drawn to community colleges for their workforce training opportunities, cost savings, institutional outreach to the community, flexible course scheduling and delivery, and course offerings that meet local needs (pp. 6-7).

Traditionally, community colleges have been known for their ability to adapt to change, and this is part of their attraction. Inculcated in their structure is a flexibility that allows for rapid response as conditions dictate. That ability has been tested in recent years by technological innovations that have transformed all areas of the college, especially the library. Maloy (2004) states that "technology has been the major driver for change in libraries for more than 30 years, and it has accelerated in recent years"

(p. 444). Technology has been so transforming that a study designated "Transforming Texas Libraries" examined technological "phenomena affecting libraries and patrons" in 2007 and 2008. Sponsored by the Texas Library Association and the Texas State Library and Archives Commission, the study's findings are now being applied in individual libraries (Schlosser, 2011, pp. 155-156).

Automated library systems, office related software, and convenient Internet access have altered work processes for library personnel and have changed research methodologies for students and faculty. Academic libraries vary in the typology of their library personnel, but noticeable shifts have occurred in support staff that are migrating toward technician positions and in faculty librarians that are moving toward non-faculty status due to a focus on technology rather than scholarly research. Indicative of the conversation on the evolving role of librarians is an editorial in the *Chronicle of Higher Education* that suggests tenure should be discouraged since "librarians with tenure do not have the same incentives to adapt to change" and may even be hampered in their flexibility (Carver, 2005, p. B11).

Integral to all of the transformation that academic libraries have experienced is the change in required professional qualities and competencies of personnel. Thompson (2009) states that "technology is changing the work we do in libraries as well as the services we offer," and she contends that "technology competency is not an option, it is critical for all librarians and staff" (p. 24).

In light of continuing technological innovations in libraries, this qualitative research study seeks to answer questions regarding the impact of technology on the physical structure, organizational structure, services, educational mission, budget,

personnel, allocation of human resources, and collections of community college libraries. A multi-site, multi-case study approach was used in which participant libraries were selected based upon the level of technology at their libraries. Personnel at the colleges and at the colleges' libraries were interviewed; selected activities and personnel were observed at the libraries; and public documents were examined.

A brief vignette that focuses on the researcher's workplace, McLennan Community College (MCC), in Waco, Texas, provides some context for the study and illustrates the technological transformation of one community college library. Creswell (2007) suggests this approach as a means for helping readers relate to the study (p. 195), and Miles and Huberman (1994) encourage inclusion of a vignette to provide "a focused description of a series of events taken to be representative, typical, or emblematic" (p. 81) of the case(s) being studied.

The story, or vignette, begins in the mid-1980s at the MCC Library when changes in technology were occurring on a small scale before the explosive changes that took place a decade later. Simple Commodore PET computers, which were basically rudimentary word processing machines with cassettes for data storage, started being used by students in the library for a few course assignments. The PET, or Personal Electronic Transactor, computers were replaced by larger and faster Commodore 64 computers in the late 80s. Finally in the early 90s, the library began investing heavily in technology. The first step involved converting a substantial card catalog into digital form. The conversion process was labor intensive and required outsourcing to a company that converted thousands of book records into machine readable format. Records were

downloaded to a public access catalog that students used for several years—or at least until the Internet developed to the point that migration to an online catalog was possible.

When Internet access became available, searching for information was a challenge until 1995 when Netscape's Internet browser facilitated the search process. Access to information was so improved that the library started adding student computers in large numbers. Student needs drove the effort to improve technological offerings. They wanted and needed convenient access to computers in order to find resources for papers, to type assignments, and as time went on, to incorporate various forms of media into their schoolwork. Microsoft Office software programs, especially word processing and PowerPoint, were in high demand. Instructors who had not used the library extensively in the past began to show an interest in new technologies that were being introduced. Databases accessed via large CD-ROM towers in the early nineties, and via online access later in the nineties, were particularly popular with faculty searching for research materials. Faculty also encouraged their classes to learn about the new technologies. It was a time when traditional library instruction sessions were transformed into discussions of the newest technological tools and how to use them.

MCC's library rapidly became a leader in innovation in the Waco area, so community members, former students, and students from other institutions gravitated to the library. Himmelfarb (1999) contends that academic libraries were in "the throes of revolution" at that time, and she states that "something momentous" was happening that was "far more consequential than a mere technological innovation" (p. 613). Himmelfarb's assessment of technology's impact on academic libraries was accurate. What began as technological innovation rapidly turned into transformative change.

MCC Library's open access computer lab currently has around 142 computer work stations, and the library is once again planning a conversion project. Plans include moving bound volumes of periodicals to a remote storage facility, while continuing to purchase databases that alleviate the need for hard copy periodical subscriptions. A study area that was repurposed to accommodate recently added computers will be moved into space vacated by bound volumes as funding becomes available. Since professional movers are required, the cost of the project will be significant.

Understandably, changes resulting from technology have also affected staffing at McLennan Community College Library. By 1999, library technicians were available to assist students with technology needs; in 2002, a faculty librarian position was reclassified to non-faculty status when needs shifted from instruction to collection development and acquisitions technology; in 2003, an online librarian was hired to maintain the library's web pages and electronic resources; in 2007, the library started reporting to a vice president in charge of research, planning, and information technology; and in 2008, the college's first library director without a master's degree in library or information science was hired. The unconventional hiring resulted from the library's inability to find a suitable applicant with a master's degree in library or information science. The college decided to hire a director with an industrial background due to his management experience and a mindset that valued technological innovation.

Recently, the library has considered implementing a plan that would allow support staff in traditional roles to move into information specialist types of positions. The plan would transition traditional positions into areas requiring more technological skills and would provide support for the library's research services function. The library

has also considered requiring cross training for support staff to enhance the library's flexibility in meeting user needs.

Changing organizational patterns and structures have become a necessity for libraries. Bernfeld (2004) asserts that this is understandable for an organization "that traffics in information" technology—and that libraries should "expect to change more than most organizations" (p. 127). Phipps (2004) advocates reorganizing current systems that have traditionally been hierarchical and creating "new, postmodern organizational structures where collaborative learning, participative decision-making, and shared accountability can ensure adaptability, flexibility, and the potential for future success" (p. 68).

MCC Library has restructured, primarily for technological reasons, several times over the past few years. In the current structure, the director is in charge of the library and educational information services, and he is a member of the college's "administrative and professional staff" (McLennan Community College, 2011b). Three supervisors, representative of various position typologies at the library, report to the director. One supervisor, who supervises technicians and circulation desk personnel working in the public service area, is a member of the college's support staff, also designated "classified staff" (McLennan Community College, 2011c). Another supervisor is an administrative and professional staff librarian/specialist in charge of collection development, acquisitions, and periodicals. The third supervisor is a faculty librarian (McLennan Community College 2011a) charged with supervising the library's faculty librarians, both full-time and part-time—plus a reference and technology librarian/specialist, which is an administrative and professional staff position. All

librarians at MCC are required to have a master's degree in library science from an A.L.A. (American Library Association) accredited institution or a master's degree in another discipline and 18 graduate hours in library science.

So in addition to changing the role and qualifications of MCC's library director, innovations related to technology have also changed the role of MCC's librarians; the way the library is staffed; and the reclassification of one member of its library faculty. Other changes are needed to increase effectiveness and functionality, but as always, buy-in by employees is needed and human resource requirements must be addressed before additional changes can be implemented. Experiences similar to those at McLennan Community College have been replicated throughout the library world and in all sorts of libraries—academic, public, specialized, and school (Jeng, 2008, p. 134; Redefining LIS Jobs, 2007, p. 40; Thompson, 2009, pp. 8-16). As indicated by the vignette, however, this study will focus solely on libraries at community colleges.

Community colleges are unique institutions in higher education. Their open door policy, flexible course offerings, and overall responsiveness to community needs (Dougherty & Townsend, 2006, p. 8) demonstrate a willingness to embrace new ideas and to help local communities. Mitchell (2009) cites community colleges' ready adoption of online education as an example of "their ability to change quickly" (p. 81), and in the same vein, Cejda (2007) refers to "their reputation for responsiveness, adaptability, and flexibility" (p. 87).

These characteristics have enabled community colleges to embrace technology, resulting not only in new modes of course delivery, but also in restructured student services (Petrides, 2003) and in "the integration of information literacy" throughout the

curriculum (Warnken, 2004, p. 323). Campus libraries have contributed by adding resources and services that improve access to information in a variety of formats and settings. For instance, an "information commons" model used in some academic libraries has combined technology, traditional library resources, and service areas such as cafes, art galleries, and copy centers—all under one roof (Tucker, 2007, p. 1).

Warnken (2004) is concerned, however, that in academic libraries "technological advances have been occurring at unprecedented rates without commensurate organizational changes" (p. 323). The need for resource, facility, and personnel realignments due to technological advances has relevancy for this study. Branin (2009), editor of *College & Research Libraries*, describes changes in the jobs of a chief information officer (CIO) and a library director, as those in which "the CIOs role is clearly expanding. The library director's role is not so clearly being redefined in an era where content, media, and technology services merge" (p. 513). Rummler (2005) appears to agree, for he suggests that librarianship is in the process of being subsumed by information services. Increasingly, libraries are seen as an arm of IT, and this perception has implications for directors who must balance the needs of the library with the needs of the information technology area.

In this evolving environment, knowledge of the impact of technology will assist community college libraries planning for the future as they strive to meet the educational missions of their colleges. The purpose of this qualitative research study, defined by Creswell (2007) as "an inquiry process that explores a social or human problem" (p. 249), was to explore how the adoption of technology has changed important areas of community college libraries.

The chronological aspect of evolving technologies that have impacted libraries over time is in synch with Stake's (1995) position that "to the qualitative scholar, the understanding of human experience is a matter of chronologies more than of causes and effects" (p. 39). Guiding the process for this study is a pragmatic worldview that focuses "on the practical implications of the research" (Creswell, 2007, p. 23).

Research Questions

Creswell (2007) recommends reducing a study to "a single, overarching question and several subquestions," (p. 108) with the overarching question, which is sometimes designated the "central question" (pp. 107-108), being the broadest question the researcher can ask about the problem being studied. The following central question guided this study: "How has the adoption of technology by community college libraries changed the library and the roles of people employed within the library?" Subquestions that provided supporting information for answering the central question were as follows:

- How has the adoption of technology impacted the physical structure of the library? Research Question (RQ1)
- How has the adoption of technology impacted the organizational structure of the library? (RQ2)
- How has the adoption of technology impacted the services offered by the library? (RQ3)
- How has the adoption of technology impacted the ability of the library to help meet the institution's educational mission? (RQ4)
- How has the adoption of technology impacted the capital and operational budgets of the library? (RQ5)

- How has the adoption of technology impacted personnel employed in the library? (RQ6)
- How has the adoption of technology impacted the human resources allocated to the library? (RQ7)
- How has the adoption of technology impacted the collections in the library? (RQ8)

Framework for the Study

Creswell (2007) describes the process of qualitative research "as flowing from philosophical assumptions, to world views and through a theoretical lens" (p. 37), with the lens being the manner in which the study is viewed from different contexts, including social, political, and historical contexts (p. 38). The framework for this study derives in part from the concept that librarianship is a profession. Over 30 years ago, Asheim's (1978) seminal article on "librarianship as a profession" cited historical works, such as Flexner's text on medical education (p. 227), as he analyzed the traditional attributes and characteristics of a profession. According to Asheim, professions usually establish an association, have a formal code of ethics, create programs of preparation, remain objective/neutral, have a service orientation, participate in scholarly research and publication, and are experts in the field. Several of these attributes, including being an expert in the field and attending a program of preparation, have traditionally been requirements for admission to librarianship and are relevant to this study. It is not clear which educational pathway or what level and type of expertise are needed in libraries focused on new technologies; however, positions have clearly been influenced by the traditional concept of librarianship as a profession.

Also contributing to the study's framework is the work of Rogers (2003), a researcher who has been involved with the Diffusion of Innovations Theory since the 1960s. This theory encompasses innovations in all types of organizations, including academic libraries, from an individual perspective and an institutional perspective. The theory describes patterns for adopting innovations and the roles people perform in the adoption process. Rogers defines innovation as "an idea, practice, or object that is perceived as new by an individual or other unit of adoption" (p. 475) and diffusion as "the process by which an innovation is communicated through certain channels over time, among the members of a social system" (p. 11).

Rogers (2003) uses a continuum of adopter categories to indicate the degree to which individuals embrace technology. His categories—innovators, early adopters, early majority, late majority, and laggards—consist of individuals that vary in their level of, or their acceptance of, innovation based upon factors such as education, socioeconomic status, communication patterns, and personality (pp. 298-299). Innovators, described as "venturesome," and laggards, described as "traditional," are the extremes of the continuum. In between are early adopters, who usually have more formal education, higher socioeconomic status, and "a greater ability to deal with abstractions" and change than late adopters; early majority, who are described as "deliberate" in their approach to innovation; and late majority, who are primarily "skeptical" of all innovation and change (pp. 298-299). The intent in formulating these categories was to create a strategy for utilizing various communication channels that could reach every worker in an organization, regardless of the worker's level of innovation (p. 299).

In his discussion of innovation from an institutional perspective, Rogers (2003) identifies five stages in the "innovation process" of an organization: (a) agenda-setting, which involves recognizing a problem that requires innovation; (b) matching, which entails "fitting a problem . . . with an innovation"; (c) redefining/restructuring, which means modifying the innovation to fit organizational needs and altering the organization's structure; (d) clarifying, which involves defining the relationship between the innovation and the organization; and (e) routinizing, which is the stage that is needed to move the innovation into "ongoing activity" status (p. 421). The first two stages in this five stage model are "initiation" activities that lead up to the adoption of an innovation, and the last three stages are "implementation" activities that ensure the innovation is going to be used (pp. 420-429).

Rogers (2003) emphasizes the need for organizations to restructure so they can accommodate innovation (p. 424) because, as Van de Ven states, "innovations not only adapt to existing organizational and industrial arrangements, but they also transform the structure" (as cited in Rogers, 2003, pp. 424-425). Rogers found that innovation is positively related to "larger-sized organizations"; positively related to open systems that are linked with individuals external to the system; and negatively related to formalized, rule following organizations (p, 408). An indication of the importance of Rogers' work in various fields is evident in the literature. For instance, the business world has adopted aspects of his theory by applying it to the marketing of pharmaceuticals to physicians (Alkhateeb, Khanfar, & Loudon, 2010) and to attempts to entice "consumer innovativeness" by identifying consumer groups who are early adopters (Hirunyawipada & Zolfagharian, 2005). In the military, Lt. D.W. Berger (2011) has applied the concepts

to his work in the "Naval Computer and Telecommunications Area" (p. 44), and government entities have utilized Rogers' theory in studying "policy diffusion" in the criminal justice system (Makse & Volden, 2011, p. 109).

As academic libraries are being transformed, innovations are creating structural changes in the organization; influencing the skills and qualities needed in workers; and impacting the library's ability to meet the college's educational mission. This study on the impact of technology at community college libraries looks at four libraries that have embraced innovation from an institutional and an individual perspective. By using the Diffusion of Innovations Theory as a framework, the study contributes to the literature and adds to the theory as it relates to innovation in a library setting and to changes in the roles of people employed within the library. By using the concept of librarianship as a profession as a framework, the study contributes to the literature on professional qualities that constitute expertness in directors and in librarians staffing the libraries.

Overview of Research Methodology

Creswell (2007) states that qualitative research is used when needing "a complex, detailed understanding" of an issue and "the contexts or settings in which participants" address the issue (p. 40). He explains that the characteristics of qualitative research include: collecting data in the natural setting of the issue being studied; using a researcher to collect data rather than other types of instruments; collecting and organizing data from multiple sources; using an inductive "bottom-up" process for analyzing data; deriving meaning about the issue from participants; using an "emergent design" that is open to change after research commences; viewing the study from a

specific approach or theoretical lens; allowing multiple interpretations to emerge; and providing multiple perspectives, including participants' views (pp. 37-39).

The current study fits the characteristics of qualitative research as described by Creswell (2007). Data were collected on site, i.e., in a "natural setting," at four community college libraries via interviews with library personnel, academic officers, and faculty members; non-participant observations at the libraries; and retrieval of public documents. The researcher was responsible for collecting, organizing, and analyzing data that were gathered from multiple sources, and the analysis process was inductive, i.e., moving from the specific to the general. The participants in the study provided meaning about the impact of the adoption of technology at their community college libraries. The study's design was open to change as needed, for as Creswell (2007) states, "the key idea behind qualitative research is to learn about the problem or issue from participants and to address the research to obtain that information" (p. 39). Lastly, a traditional constructivist approach for viewing the study is evident throughout the report, and multiple interpretations and perspectives have been presented that identify the "complex interactions of factors" (p. 39) surrounding the issue being studied.

Creswell (2007) advocates using one of the following five approaches for qualitative research studies: narrative, phenomenology, grounded theory, ethnography, or case study (pp. 78-79). This study follows a case study approach, which Creswell (2007) describes as an approach that examines an issue that is bounded by time, setting, and/or context; explores a case, or multiple cases, over time; uses one or more representative cases to illustrate an "issue or concern"; utilizes comprehensive data collection from multiple sources; and reports "case description[s] and case-based

themes" (pp. 73-74). Creswell (2007) explains that narratives study people; phenomenological studies examine a phenomenon or concept; grounded theory focuses on developing a theory; and ethnography studies the culture—while a case study seeks "to understand an issue or problem using the case as a specific illustration" (Creswell, 2007, pp. 73 & 93). This multiple case study seeks to understand the changes that have occurred at community college libraries that are highly ranked technologically. Given the case study parameters described by Creswell (2007), a multiple case study approach was deemed the best method for collecting the data that were needed to answer the research questions posed.

Procedures that have been suggested by Creswell (2007) for case study research guided the organization, research design, and methodology for this study. Creswell outlines specific steps for conducting multiple case studies, but he also states that he relies "primarily on Stake's (1995) approach for conducting a case study" (p. 74). Consequently, this study relied on Creswell's (2007) process for case study research, and to some extent on Stake's (1995, 2006) process. Most researchers, including Creswell (2007) and Stake (2006), suggest fully examining each case as a separate entity before determining what is "similar or different about the cases" (Stake, 2006, p. 6), and that is the approach used in this study.

Significance of the Study

As evidenced by continuing transformations in libraries, change and the ability to change will only become more important. Roberts (2009) states that "we need leaders who understand that even though we have experienced a decade or more of rapid and persistent change, the pace is about to speed up" (p. 5). According to Walton (2009),

"the key challenge for academic library leaders is not to get stuck in the tar pit of debating whether libraries will exist but to begin sculpting and then articulating a vision of what they will look like in the future" (p. 89). Walton advocates embracing technology and figuring out ways to convert space that has traditionally been reserved for books and periodicals into "new user interaction programming spaces" (p. 89).

Academic libraries embrace technology and the need for user interaction in a variety of forums and for a wide range of constituencies. For example, community college libraries may serve as the primary source of technology, including Internet connectivity, in their communities. Rural communities, in particular, often have broadband access issues that force them to depend upon local community college libraries. Access that is taken for granted in populated areas that are adequately served by Internet providers is not always available in rural areas. Cejda (2007) suggests allowing "community members who do not have broadband connections at home or work to bring laptops" to public areas on community college campuses, such as libraries, as a means for colleges to "develop coalitions and document needs for the long term" (p. 95). Cejda describes the dilemma facing rural community colleges that are trying to increase access to computers and to improve the "technological competence of faculty and students" (p. 92) as a struggle for parity with their counterpart urban and suburban communities that do not have to contend with a "digital divide" hampering progress in their communities (p. 95). Libraries at rural institutions play a significant role in addressing those technological issues.

Communities in lower socio economic areas also depend upon their local community college libraries for access to technology. Reliable Internet service that is

fast, dependable, and available when needed is desired by all students and communities. In a discussion of findings from the Public Library Funding and Technology Access Study, Barber and Wallace (2008) state that "people living in less-affluent communities and seniors were least likely to report having computers at home" (p. 55).

Public libraries are able to fill the void to some extent and they are assuming an advocacy role as they attempt to do so (Storey, 2010), but recent cuts in state, county, and municipal funding have diminished their ability to serve all constituencies. Along with other public services, public libraries are "facing increased financial strain," according to a study funded by the Bill and Melinda Gates Foundation (Research Report, 2008). Therefore to ensure access to technology is available, particularly access to databases and Internet resources, communities frequently are forced to rely on their local community college libraries. Community colleges have separate taxing capabilities, receive state funding, are eligible for federal grants such as Title III, and enroll large numbers of students who are eligible for financial aid. Access to local appropriations is particularly helpful for assisting the colleges in filling the educational needs of their communities (Askin, 2007, p. 979).

Technological innovations at community college libraries are also essential for meeting the needs of a diverse student population. Public two-year institutions awarded 596,098 associate degrees in 2009—and they enrolled 40% of all U.S. undergraduates, including 38% of White students; 40% of Black students; and 52% of Hispanic students in fall 2009 (National Center for Education Statistics, 2011b).

In Texas, "public two-year colleges have generally grown more rapidly than universities since the mid-1960s and are expected to continue to outpace universities in

the number of students" (Texas Higher Education Coordinating Board, 2011d, p. 2). Demographically, the racial/ethnic composition in the 18 to 35 age group in Texas is projected to change substantially during the next 8 years, and this shift will influence higher education. Whites are projected to "decrease from 39.9 % in 2007 to 34.9 % in 2015; African Americans will remain stable at 11.6 % and 11.5 %; and Hispanics will expand from 44.2 % to 49.1 %" (Texas Higher Education Coordinating Board, 2008, p. 1). In 2010, the African American participation rate in higher education in Texas "grew to 6.6%, exceeding the rates for Whites and Hispanics" (Texas Higher Education Coordinating Board, 2011a, p. 9). Community college libraries fill a technological void for these diverse student populations.

In addition to enrolling large numbers of minority students, community colleges also enroll significant numbers of part-time students and non-traditional students. Grubb (1999) describes community colleges as "second-chance institutions" due to "their importance for older students" who may have failed at previous attempts to obtain a degree; who may have been displaced in the workplace; or who may be new to the workplace (p. 3). Increasingly, community colleges are also serving students who historically have gone to baccalaureate granting institutions, but who now find themselves enrolling at local community colleges due to changes in the economy and/or pressure from state officials seeking ways to control enrollment at public four-year institutions. Illustrative of popular sentiment, *USA Today* points to community colleges as a bargain and attributes their "soaring" enrollment to an "economic downturn [that] is affecting the choices that students and their parents make" (Block, 2009).

The impact of this broad range of constituencies on community college libraries is significant, since the libraries must respond to a variety of technology experiences, skill levels, and needs. In a review of the literature on technology and community colleges, Harrington (2010) describes the struggle developmental and first-year writing students often have with technology "due to poor typing skills" and other technology issues, such as "not knowing how to change fonts or double-space in a word processing program" (p. 15). The deficiencies are not surprising given Pew Research Center results in an Internet and American Life Project survey that found only 52% of Black adults, 47% of Hispanic adults, 42% of households making less than $30,000 a year, and 24% of individuals with less than a high school diploma have home broadband Internet access (Rainie, 2010, p. 4). Harrington (2010) emphasizes the need for libraries at "commuter" community colleges to extend hours so students struggling with technology can use their computer labs (p. 14). Providing technological resources and meeting constituency needs requires hiring personnel knowledgeable enough about technology issues that they can provide the skills needed for planning, funding, and implementing required technology initiatives that will meet a variety of needs.

Communities and students are depending upon colleges to make sound decisions during these economically challenging times. This study sought to determine if high technology libraries in Texas are adopting technology that is contributing to the educational mission of the institutions, i.e., if they are expanding access to information, services, and resources that support the curriculum. It also explored personnel and the organizational structure to see if human resources are being optimized effectively for meeting the needs of the institution. Hardesty, Kirk, and Adams (2007) state that it can

be expensive for institutions to hire the wrong person—"not only in out-of-pocket costs and staff time, but more importantly, in the interruption of the momentum of the library's program and contribution to the institution" (p. 1).

Obviously, momentum is essential. Technology continues to impact community colleges, society, and the global culture (Romano & Dellow, 2009, p. 16). Community college libraries strive to advance and to stay at the forefront in using technology, so they can adequately provide for the technical needs of their diverse students and communities. This multi-site, multi-case study looked at each library's ability to assist in meeting the institution's educational mission as it provides essential services and resources. The study is significant for its usefulness in enlightening other libraries about the pitfalls, benefits, and processes related to various technological innovations; in assisting libraries as they plan for change; and in providing libraries with reliable data and information on which to base decisions. Change is happening so fast that current, in-depth research on the impact of technology on community college libraries is needed.

Assumptions

The following assumptions guided this study:

- In an academic setting, library technology enhances services/resources and improves education outcomes.
- It is possible to identify high technology libraries using Texas Academic Library Survey data.
- It is possible to verify high technology status by observing case college libraries.

- Participants in the study answered the interview questions accurately and completely.
- The study's design and methodologies were appropriate for studying the impact of the adoption of technology on four community college libraries in Texas.

Definition of Terms

The following section provides definitions of the terms and concepts that have significant meaning in this study:

Academic Library—is defined by the National Center for Education Statistics (2011d*)* as a "library associated with a degree granting institution of higher education." The center describes the components of an academic library as an organized collection of materials; with a staff to provide and interpret the materials as needed to meet "the informational, cultural, recreational, or educational needs of clientele;" with established services that are provided to the library's clientele; and with physical facilities that support the library's collections, staff, and services.

Academic Officer—refers to the individual to whom the library directors report at the community colleges in this study. Three community college library directors report to the chief academic officer (CAO) at their institution, and the fourth director reports to a senior academic officer who reports to the college's CAO.

Community College—is defined by Cohen and Brawer (2003) as "any institution regionally accredited to award the associate in arts or the associate in science as its highest degree" (p. 5). The authors include "the comprehensive two-year college as well as many technical institutes, both public and private" in their definition (p. 5).

Library Director—refers to the administrative head of the libraries being studied. Traditional names for directors include chief executive officer, library director, director of libraries, and director of library services (Young, 1983, p. 175); however, contemporary titles tend to vary. Therefore, a broad range of titles were acceptable for this study.

Library Technology—in the context of this study encompasses online subscription databases, integrated library systems, library web pages, library copy centers, overhead projector/computer systems in smart classrooms, computer work stations, and all library hardware and software. Resources such as DVDs; VCRs; microforms and microform machines; and CD-ROMs and CD-ROM towers are also forms of library technology.

Professional Qualities—are the required or desired education/credentials, experience, personal characteristics, and knowledge/skills/abilities needed to perform the duties and to fulfill the responsibilities of a community college library director position or a librarian position.

Support Staff—is a term that refers to a library's clerical staff, classified staff, or paraprofessional staff. Applegate (2010) explains that there is a "wide range of roles" in a library's workforce, and the master's degree in library or information science is usually the line that divides professional librarians from the library's support staff (p. 289).

Technology Competency—may be defined as the "knowledge and ability that enables effective use of digital technology to accomplish tasks and to support and develop computerized systems" (Thompson, 2009, p. 3). For this study, technology

competence also refers to (a) a mindset that is open to innovation, and (b) a broad set of skills that is needed for implementing change related to technology.

Delimitations

Wolcott (2009) cautions researchers about the need to focus their research (p. 41) and to proclaim "all the things that [the] study [is] not going to deal with" (p. 6). They are the things the researcher can control in making decisions about the study. Bryant (2004) states that "delimitations are the factors that prevent you from claiming that your findings are true for all people in all times and places" (p. 57). Accordingly, the following delimitations applied to this study:

- The cases examined are not representative of all community college libraries in Texas or in the United States. High technology libraries are included in the study because they are the libraries that are most impacted by technology.
- Conclusions resulting from the study are limited to the community college libraries that were selected for this bounded, multi-site, multi-case study according to a technology ranking system that was created by the researcher using Texas Academic Library Survey data. Generalizations are not the aim of the study; rather, contextual understanding of the "particularity" of the cases is the focus (Stake, 1995, p. 39).
- Rather than using an overall comprehensive approach that looks at all areas of the educational mission, the study encompasses areas emphasized by interviewees at each institution as they explained how the library's adoption of technology has made a difference in those areas.

- Studying the impact of technology on eight areas in a community college library enabled the researcher to look at each case in the study as "a complex entity located in its own situation" (Stake, 2006, p. 12). Future studies may want to focus on one or more of the eight areas.
- Each library director in the study identified potential participants at his/her institution so the researcher could interview individuals familiar with the library, but the researcher realized those individuals might have a bias.

Limitations

Limitations are relevant to the methods used in a study. They are the things the researcher cannot control. Specifically, Bryant (2004) states that limitations "have to do with the means you have chosen for gathering and analyzing data" (p. 58). In this study, the following limitations applied:

- Using a multiple case study approach rather than a single case study approach may have diluted the "overall analysis" (Creswell, 2007, p. 76), but for the purposes of this study a multiple case study approach was needed to make cross-case comparisons.
- Since levels of technology will never be exactly the same for two libraries, the four high tech community college libraries selected for the study varied in their level of technology.
- Studying only high technology community college libraries in Texas resulted in findings that may have worked out differently if another approach had been used. However, in looking at the impact of technology, it was necessary to study libraries that were identified as being high tech.

- Selecting cases based upon their high technology ranking using an established state survey may have excluded libraries that would have been selected if another method had been used.
- Looking at technology at the high tech libraries was at times hard to grasp due to the "moving target" nature of technological change.
- Conducting only one face-to-face interview with participants at each college, with follow-up questions and clarifications being conducted via email or telephone due to time and cost constraints, may have limited the quality of information collected from participants in the study.
- Bias in case study research is a possibility when the researcher is the sole investigator (Merriam, 1998, p. 42).
- The inexperience of the primary investigator may have resulted in data collection opportunities being lost due to that inexperience (Yin, 2009, p. 68).

Organization of the Document

This chapter has introduced the topic of the study, provided an overview of the methodology that was used for the research, established the parameters of the study, and elucidated the study's importance. Chapter 2 provides a comprehensive review of literature relevant to the community college mission and libraries and to the impact of technology on community college libraries. It also discusses dissertations that are relevant to the study. Chapter 3 contains details about the study's methodology, including its research design, data collection sources, data analysis procedures, and the methods that were used to validate the study. Chapter 4 presents the study's findings,

and Chapter 5 discusses the findings, the implications of those findings for practitioners, and makes recommendations for future research.

Chapter 2

Review of the Literature

Introduction

According to Merriam (1998), a literature review "integrates, synthesizes, and critiques the important thinking and research on a particular topic" in order to situate it "in the knowledge base of the field" (p. 55). Merriam recommends organizing the review according to themes that are relevant to the study. For the purposes of this study, topics are arranged in the chapter according to themes, and the themes are subdivided into categories that relate to the study's research topics.

The first section in this chapter provides information on community college libraries within the context of the five missions of a community college. Literature on the topic is relevant to one of the study's research questions that examines how the adoption of technology has impacted the ability of the library to help meet the institution's educational mission. The second section in this chapter is relevant to additional research questions in the study, for that section reviews the literature on areas in which technological innovation has impacted the library, i.e., physical structure, organizational structure, services, budgets, personnel, allocation of human resources, and collections. The last section in this chapter presents studies with topics that are related in various ways to this study on the impact of technology on community college libraries.

Creswell (2009) advocates creating "a visual picture of existing research about a topic" (p. 34) to facilitate organizing and developing a literature review of the topic. Figure 1 illustrates Creswell's concept for it provides a literature map of the research for

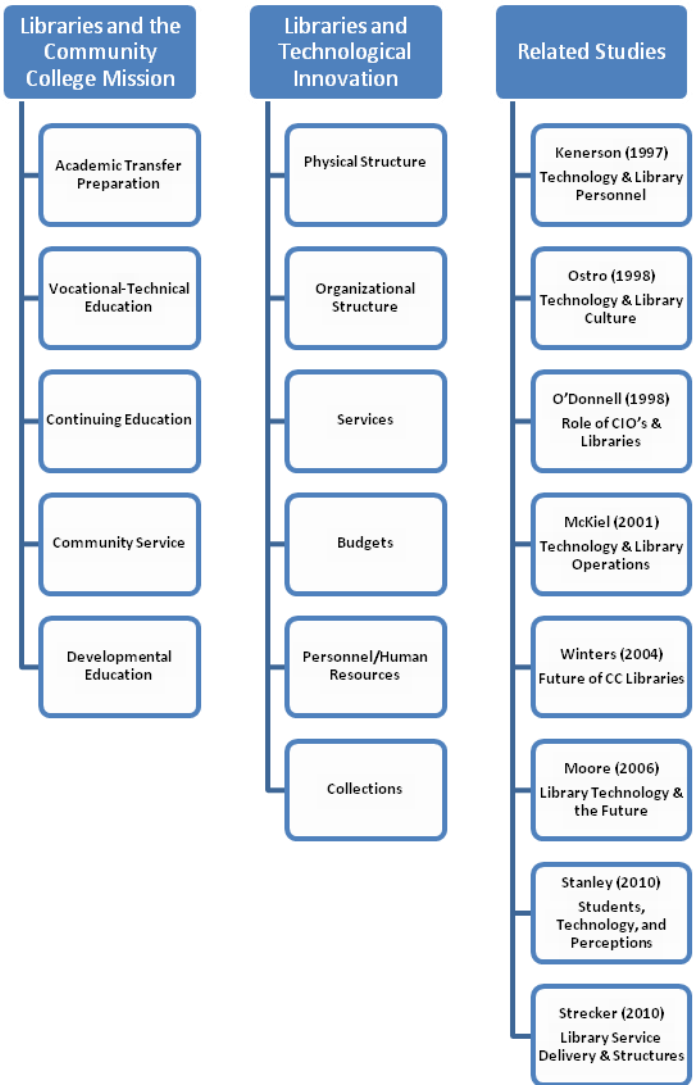

Figure 1. Literature map of the research.

this study. It is a visual picture of the themes and the order of the topics that are presented in this chapter.

Libraries and the Community College Mission

Cohen and Brawer (2003) define a community college as "any institution regionally accredited to award the associate in arts or the associate in science as its highest degree," including "comprehensive two-year colleges as well as many technical

institutes, both public and private" (p. 5). In terms of organizational functioning, Birnbaum's (1988) bureaucratic model is the environment in which community colleges have traditionally functioned. This meshes with Bergquist's (1992) contention that American community colleges have a managerial culture that grew out of the public school system in their communities, since they are "managed like other educational institutions in the local school system" that employ teachers rather than scholars and administrators who lack degrees in academic disciplines (pp. 57-58).

Pedersen (1997) explains that the "first great wave of junior colleges," established between 1900 and 1940, were aligned with high schools after small and mid-sized communities, mostly in the mid-west and western part of the United States, were unsuccessful in attracting four-year institutions (pp. 501-502). Junior colleges became more collegiate and less an extension of area high schools when four-year institutions started encouraging standards, which later evolved into an accreditation process, that would ensure transfer students could do the work expected of them at universities and baccalaureate granting institutions (Pedersen, 1997, pp. 504-506).

Although struggling for recognition in their early years, junior colleges eventually gained in popularity because, as Veit (1975) explains, "admission was either free or at low cost and the junior college was usually nearer the students' homes than the state college or university" (p. 4). Veit states that the junior college expanded in scope to fulfill demands placed on it and that led to their "phenomenal growth" during the 1960s and early 70s—to the point that by 1970 this new American type of institution was enrolling around 2 million students (p. 5).

Demands from diverse local constituencies included not only a need for preparation for advanced study beyond the first two years of college, but also a need for functions such as career education and an expansion of the colleges' participation in community service. Veit states that the junior college, which evolved into a community college as its role broadened, "is the center for community life. Lectures, concerts, and art exhibits are open to the community at large. Each college gears its offerings to the cultural and educational preferences of the community" (p. 8).

Ayers (2010) is concerned that the current emphasis on "vocational education and job training" in the community college will lead to corporate influence, rather than community influence, on the curriculum. He references the 1947 Truman Commission Report, entitled *Higher Education for American Democracy*, as the source for wide usage of the term "community college" and, also, as the source for envisioning higher education as "a primary means of creating a more democratic society" (p. 10). In line with the Truman Commission Report, Ayers desires continuation of community colleges that "produce local leaders who can help communities take charge of their own destinies" (p. 11). He supports job training as a mission because it helps Americans "achieve their productive potential," but he wants balance in community college missions as they work to retain a focus on their communities (p. 11).

Curricular missions of contemporary community colleges, according to Cohen and Brawer (2003), consist of "the various curricular functions noted in each state's legislation," with functions that "usually include academic transfer preparation, vocational-technical education, continuing education, developmental education, and community service" (p. 20). Emphasizing the importance of the missions, the authors

state that these five curricular missions of community colleges have been articulated in "every book written about the institution" (p. 20).

As missions have expanded and became more comprehensive, the role of the community college library has changed as well. In 1973, K.W. Allen and L. Allen wrote that the library, or the learning resources center, "is no longer a passive agent within the institution; it is dynamic and changing" (p. 15). They were referring to the integration of media with traditional library resources. Change continues today, but "media" has been expanded to technological innovations that were unimaginable in the 1970s.

In the midst of change, however, libraries have remained focused on meeting the curricular missions of their institutions. They provide services, resources, and personnel that support the academic transfer preparation mission, the vocational-technical education mission, the continuing education mission, the community service mission, and the developmental education mission. These missions provide direction for library planning and development as institutional goals are accomplished in a technologically transformed environment. Following is a description of each of the five missions and an explanation of the manner in which community college libraries have been responding to those missions.

Academic transfer preparation mission. The academic transfer preparation mission is a collegiate function that focuses on "preparing students to enter junior-level programs leading to the bachelor's degree" (Cohen & Brawer, 2003, p. 424). According to Levinson (2005), transfer programs usually require "a relatively high number of general education requirements [and] are designed to enable a student to transfer easily to a four-year institution" (p. 120). In Texas, general education courses are part of the

core curriculum, and all students, regardless of their academic discipline, must "complete the state's general education core curriculum as part of their degree requirements" (Texas Higher Education Coordinating Board, 2012). The core curriculum includes courses in the liberal arts, humanities, sciences, and political/social/cultural history.

Traditionally, community college libraries have supported the transfer mission by offering classes that instruct students in research methodologies for general education topics; by developing collections that are strong in subject areas taught at the institution, including making textbooks available (Meyer, 1996); by encouraging external partnerships for sharing the cost of database resources (Texas State Library, 2010); and by providing reference and technical support to assist students with assignments and research needs. The library's primary objective is to teach skills, especially information literacy skills, that students may carry with them to the next level of their education. Information literacy has focused on developing the ability to "recognize when information is needed and [to] 'locate, evaluate, and use effectively the needed information'" (American Library Association, as cited in O'Connor, 2009, p. 79). O'Connor (2009) suggests going a step further with "knowledge acquisition" by supporting active learning that would encourage students to ask and answer "questions that matter to them and to the world around them" (p. 87). Teaching these skills has been a library responsibility, and increasingly, a technological mindset has been important.

Vocational-technical education mission. Levinson (2005) states that career programs at community colleges "have traditionally been viewed as providing direct

entry into a specific occupation and typically offer only a modicum of general education courses" (p. 120). Cohen and Brawer (2003) explain that vocational education, also called workforce training, was "originally conceived as an essential component of terminal study—education for students who would not go on to further studies." They state that "vocational education in the two-year colleges was designed to teach skills more complicated than those taught in high schools" (p. 22). A "tech prep" program in Texas facilitates the process of enrolling in workforce training in high school and provides a seamless way to advance from high school, to community college, to the workforce (*Tech Prep Module*, n.d.). The Carl Perkins Vocational and Applied Technology Act and its amendments supply federal funding to assist with vocational-technical costs (Ashburn, 2006).

Davis (2008) agrees that community colleges are the primary providers of workforce education. He quotes a 2001 National Education Association study in which sixty-four legislators state that community colleges are able to respond to community "needs and emerging trends" faster than other types of institutions (p. 569). One of the emerging trends, according to Davis, is the creation of skill standards that are the "driving force" in career and technology education. He describes skill standards in Texas that are incorporated into courses and programs via a manual called WECM, or the Workforce Education Course Manual, which provides a "state inventory of workforce education courses for public two-year colleges" (Davis, 2008, p. 571). One of several justifications for adding a new course to WECM is "new technology" (*Chapter Four: The Workforce Education*, 2003, p. 15)

Community college libraries support students enrolled in vocational-technical courses in the same manner in which they support transfer students; although resources and services are targeted toward a two-year program, rather than a transfer program. In the area of collection development, libraries must meet the requirements of a workforce education curriculum that conforms to established skill standards (Davis, 2008). Program directors in vocational-technical areas may appoint special committees or task forces to work with library personnel in selecting periodicals, adding appropriate books to the collection, suggesting software and online databases that support the subject areas, and teaching "information-gathering skills" that meet professional, as well as regional, accreditation/reaccreditation requirements (Thompson, 2002, p. 224).

Continuing education mission. Continuing education is a form of community education. Fletcher, Rue, and Young (as cited in Cohen & Brawer, 2003) state that a college's continuing education program encompasses the courses or activities that can be taken for credit or noncredit; that can be taught in a classroom or in a nontraditional setting; and that focus on meeting the needs of the "surrounding community" (p. 288). The courses or activities may be recreational; cultural; basic/developmental; health related; or oriented toward professional/occupational development. Levinson (2005) notes that instructional credit classes and continuing education noncredit classes are clearly different, stating that they "are offered by separate and distinct entities" (p. 168).

Library resources and services for students enrolled in noncredit continuing education courses are minimal when compared to the resources and services available for students in credit courses. Reasons are not entirely clear; however, research conducted by Van Noy and Jacobs (2009) provides some insight. The authors studied

noncredit workforce education courses in relation to credit courses, including their funding and their organizational approach, in order to explore the outlook for noncredit education. After studying several states, the authors found that funding for noncredit instruction "is often small relative to the amount of funding that the state provides for credit programs and is prone to fluctuations based on the state's overall yearly budget" (p. 88). The difference, they state, "provides an important signal about the state's vision for community colleges and short-term training" (p. 88).

In addition to funding, Van Noy and Jacobs (2009) questioned the organizational practices of colleges regarding noncredit workforce instruction programs. Specifically, they wanted to know "how programs operate in relationship to other programs in the college" (p. 89). Their research found that campuses with noncredit workforce instruction courses "interspersed across the college's academic units by content area" (p. 90) are innovative and have an integrated approach that fosters collaboration with other areas on campus. Separate organizational structures, on the other hand, require faculty to schedule meetings and communicate in forums that are not as conducive to collaboration. This study provides insight into possible reasons for variations in library services and resources that are available for credit and noncredit students. For instance, library funds for undervalued areas on campus may be reduced. If collaboration is a concern on campus, it is most likely a concern for the library as well.

Community service mission. Community service builds on the concept of continuing education. In its broadest sense, according to Cohen and Brawer (2003), it refers to "whatever services an institution provides that are acceptable to the people in its service area" (p. 288). Zeiss (1995) states that community colleges are charged with

making their communities "better places in which to live," since they are created locally with the intent to educate people in the community. He emphasizes the fact that community colleges "exist of, by, and for the communities they serve. Communities do not exist to serve colleges" (p. 57). In recent years, a concept of service learning in which community engagement in volunteer programs is part of the curriculum has been gaining attention on community college campuses (Zlotkowski et al., 2004, p. 16).

Libraries emphasize volunteerism and other forms of community service. Heiselt and Wolverton (2009) state that "literature on the relationship between service-learning and libraries has proliferated in recent years"; although, they suggest "that academic libraries [need to] play a more central role in providing service-learning opportunities in their communities" (p. 85). Examples of activities discussed by the authors include establishing volunteer programs in the community; recruiting volunteers to work in the library; and coordinating efforts with public libraries to provide educational and recreational reading material for incarcerated individuals (p. 85).

In addition, some community college libraries offer open access computer labs; courtesy check out cards; programs, displays, and events; local history collections; information on community services; subscription databases that can be used on campus; and print periodicals. When Andrew Carnegie was establishing public libraries in the late 1800s and early 1900s, he envisioned creating "community catalysts" (Storey, 2009, p. 4), and that is a concept community college libraries have embraced.

Developmental education mission. Developmental education, or remedial education, consists of "basic skills instruction" in reading, writing, and mathematics that is offered or required for underprepared students as a means for "bridging the gap

between the competencies students bring with them and those they need to do well in the classroom and in society" (Grubb & Worthen, 1999, p. 173). Viewpoints on this mission vary, especially among faculty who question the need for offering non-credit, non-collegiate courses. However, others see developmental education as a necessity for an institution that has an open door policy. Grubb and Worthen state that some community college administrators and faculty view "the task of remediation as the heart of what they are there to do" (p. 172).

Shannon and Smith (2006) defend the open access mission of community colleges, stating that it is "critical to our understanding of the community college" (p. 16). However, they are concerned that rising enrollment, budget reductions, expensive technology, decreases in financial aid, and increasing remediation needs pose threats to the open access mission (p. 17). Remedies to those threats, in their opinion, derive from "strengthening the open door policy" and from being committed to providing reading, writing, math, and computer remedial education (p. 19).

Community college libraries are generally sympathetic to the developmental education mission of their institutions. The service orientation of personnel makes the library an ideal place for developmental students to request and receive assistance. Basic, introductory types of materials are available, and guides/handouts/tutorials are written to be understood at the beginner level. In a study on academic library practices in developmental education, Roselle (2009) found that "90 percent of librarians interviewed provide specialized library instruction to developmental reading and/or writing courses" (p. 145).

Juchniewicz, Dagostino, and Carifio (2007) address the literacy needs of community college students who have different "goals, abilities, beliefs, and life situation[s]" (p. 206) They recommend offering the following services and facilities for students enrolled in developmental education classes: individualized literacy instruction; diagnostic tests; special classes; one-on-one tutoring; study areas or centers that offer reading and writing assistance; library workshops that offer study strategies, library skills, research methodology, and technology information; resource centers that provide assistance for individual classes and specific subjects; campus resources such as a student health center and a day care center; community activities; and book clubs for the study of literature (pp. 207-212).

Libraries and Technological Innovation

The previous section reviewed literature on community college libraries within the context of the five missions of a community college. The information is relevant since this study looks at the adoption of technology in community college libraries and how it has impacted the ability of libraries to help meet their institutions' educational mission. The study also examines the impact of technology on the physical structure, organizational structure, services, budgets, personnel, allocation of human resources, and collections of the libraries. A review of the literature on these areas adds to the "picture of existing research," as advocated by Creswell (2009, p. 34).

The literature indicates that Kurzweil (as cited in Ramage, 2011) is accurate in contending that "change, progress, and advancement are occurring at an increasing rate" and that it is misguided to assume there is a "static rate of change" (p. 107). Libraries have witnessed this increasingly rapid change firsthand, for they have been in a state of

flux since the mid-1990s due to technological innovations that have transformed the library profession (McElrath, 2002; Stevens, 2006). An article in a 2009 issue of *Texas Library Journal* states that libraries "must do—become, change, leave behind, adapt—whatever is necessary to move ahead" (Meraz, 2009, p. 47).

An article written over a decade ago provides background on the rapidity of technological change in academic libraries. The article, by Chodorow (2001), looks at the impact of technology on the lives of college students and how changes in technology affect the library. He advised colleges to consider purchasing an online library that could be available 24/7, since approximately 98% of surveyed college students were using the Internet for research (p. 4). His suggestion is now a reality. Academic libraries routinely advertise the 24/7 availability of services and resources on library websites.

Chodorow (2001) also quotes a University of Dubuque professor who compared the power of information technology to Gutenberg's invention of the printing press. Chodorow asks readers to "imagine a world where you can go online and have every book ever published available at your fingertips" (p. 4). In 2001, when the article was written, Chodorow's vision was somewhat radical, but today digitization initiatives at universities and in other venues are being implemented to move this concept closer to reality.

Physical structure. Harloe and Williams (2009) state that one of the challenges for college libraries in the 21st century is ensuring print collections can exist in space that has been reconfigured to accommodate group study spaces and "active learning" areas that address all forms of literacy, including reading and writing. They suggest

approaching changes in physical space as a process rather than a one-time event, and they advocate maintaining flexibility since "user needs, collections, and technologies" will continue evolving. To ensure success, the authors urge librarians to adopt a collaborative attitude that encourages student, faculty, and IT department input and feedback when reallocating space (pp. 514-515). Stuart (2009) surveyed research libraries and found that librarians agree there should be collaborations on campus, flexible spaces, and tutoring and support areas. Added to the list of desired "innovative space initiatives" are such things as multimedia and digital centers, faculty spaces, classrooms, cafes, and facilities for preparing presentations (pp. 8-9).

Franks (2008) and Woodward (2009, p. 88) describe an information/learning commons concept that includes a coffee shop along with a "common" shared space for collaboration, computers, wireless access, and all sorts of support and assistance. Inherent in the idea is an open area rather than the confined space of a computer lab. Barr and Tagg (as cited in Harloe & Williams, 2009) ascribe the development of the learning commons to a "paradigm shift" in which colleges are changing from institutions that "provide instruction" to institutions that produce "learning with every student by whatever means work best" (p. 515). Woodward (2009) states that "the best way [for libraries] to approach the twenty-first century is to focus on the total student experience" (p. 86).

Huwe (2010) agrees that the migration to digital resources has created renewed interest in building physical spaces in libraries where people can "study and commune together," and he attributes that interest to communities that "still need places to congregate in order to learn" (p. 29). He is dismissive of reports that state: "We don't

need collections, we need online domains; we don't need buildings, we need portals; we don't need reference, we need comprehensive information utilities" (p. 29). Simmons-Welburn, Donovan, and Bender (2008) are not quite as dismissive, for they emphasize the importance of online domains, stating that "today the library's virtual space plays as crucial a role as its physical space, notably as it is expected to be available twenty-four hours a day from any location with an Internet connection" (p. 133).

The student perspective sometimes gets lost when changes are considered, so Jackson and Hahn (2011) conducted a study in which they assessed "the academic library as place." Interestingly, they found that the students who were surveyed "expressed an overall preference for those images classed broadly across all areas (exterior, interior, items) as traditional versus those classed as modern" (p. 434). In light of the survey results, Jackson and Hahn suggest approaching building projects with caution. They state:

> While students may request a coffee shop, computer stations, and the latest technology, this cannot reflexively be considered to be a wish for those things to the exclusion of more traditional design and items. Traditional and modern elements can happily coexist, but careful planning and sensitivity to these subtle, but significant desires are required. (p. 437)

Organizational s**tructure.** Arnold (2010) provides an historical perspective regarding the reporting structure of the library within the community college. She looks back at the early to mid-1990s when four-year institutions, universities, and community colleges invariably reported to their institution's chief academic officer. Arnold explains that reporting structure has changed, however, during the last 15 years. She states:

> Community college libraries may be located within the instructional division of the college, but they might also be located within the academic support services division (a group that includes counselors, academic advisors, tutoring, etc.) or even the information technology division. (p. 229)

In Arnold's (2010) opinion, community college libraries should remain in the instruction area of campus because they are central to "student learning and classroom instruction" (p. 229).

Within libraries, the reporting structure varies depending upon the size of the library and the number of employees. Shoaf (2011) mentions long time library structures that include teams and flatter structures, and he describes the hierarchical library structure that has "leaders at many levels" (p. 102). Regardless of size or structure, though, Patillo, Moran, and Morgan (2009) state that academic librarians value autonomy (pp. 280, 288).

Even in hierarchical organizational structures, Lubans (as cited in Shoaf, 2011) says leaders are followers and followers are leaders. He describes the concept as "leading from the middle" since "the leader both leads and is led" (p. 102) at the various levels in a hierarchy. Good followers "understand how to join in the organization's mission, how to adopt the values, and most of all, how to instill a sense of empowerment among other staff members to do the same" (pp. 102-103), and successful leaders bring "coaching and collaboration" skills to the organization (p. 103).

According to Schlosser (2011) "the modern library" employs "a higher percentage of high-level and professional staff" (p. 153), which may explain their willingness to lead and follow, as well as their desire for autonomy.

Moran (2010) states that having an "open organizational structure" depends upon adhering to principles that foster an open atmosphere and informed staff. The principles Moran suggests using to ensure a library's organizational structure is open and staff are informed are as follows:

- Library-wide and departmental visions and goals are developed collaboratively.
- Roles are defined broadly in relation to service and users.
- Focus in every department is on the users.
- Information flows freely.
- Limited hierarchy is in place—shared authority and control.
- Decisions are made at the point where maximum knowledge about the issue exists.
- Each person assumes responsibility for his or her own performance and for helping colleagues. (pp. 99-100)

Services. Keiser (2010) observes that libraries have traditionally emphasized resources and collections, but that appears to be changing as libraries shift their focus to user needs that are constantly evolving. Success is now measured by a library's ability to be flexible in adapting to needs (p. 20). Particularly important is an emphasis on learning how students work; how they want to see information as new forms are developed; and how they will be using the information that they find (p. 50). Keiser describes the library's website as a "portal," or entry point, that assists users in locating guides, resources, and information (pp. 51-52). Neal and Jaggars (2010) describe other tools, such as social computing technologies, search engines, and content-sharing websites that "move content and services into the network environments where scholars and students live and work" (p. 59).

Library services encompass a variety of forms, including databases that contain magazine, journal, and newspaper articles—and in some instances ebooks. Herring (2011) states that

> Google notwithstanding, good, reliable information is only scantily present online. The bulk of trustworthy, reliable information still resides only in aggregated databases, some of which are affordable only to libraries, since access costs literally as much as a compact car. (p. 33)

Tapping into a library's online or physical resources and services, however, requires adequate information literacy, so academic libraries are increasingly focusing on teaching students how to search, retrieve, evaluate, and cite information from a variety of sources. Law (2010) states that staff are working on their information literacy skills because "there is a huge area of exploration and innovation to be undertaken in everything from reference management to social networking for research" (p. 9).

Walter (2011) observes that it is incumbent upon libraries "to develop new approaches to our digital service environment" (p. 7) if achieving excellence is a goal. An electronic communication technology called chat reference or synchronous virtual reference is an example of a new approach to reference service. Passonneau and Coffey (2011) describe chat reference as an opportunity "to dynamically reach students" by "providing real-time feedback to the user" via instant messaging or text messaging—thus bypassing the asynchronous email service that has been in vogue for several years (pp. 276-277). The authors are concerned about the lack of qualitative textual studies on this service, however, stating that "a close textual reading of these transactions has not been examined to determine how well we are doing" (p. 277). They mention the possibility of "technological ineptitude" that could "make us semantically clumsy or unable to provide the level of reference service that we would be capable of in a face-to-face transaction" (p. 277).

Another new approach impacting library service is the use of mobile devices, such as smart phones and iPods that access the World Wide Web. The 2012 *NMC Horizon Report* (Johnson, Adams, & Cummins, 2012) from EDUCAUSE lists mobile applications as one of the six emerging technologies that are projected to enter "into

mainstream use for teaching, learning, and creative inquiry" (p. 6). Seeholzer and Salem (2011) state that 39% of Americans use mobile devices to access the Internet (p. 10). Therefore, they state that academic libraries have an opportunity to increase their outreach by "using the mobile Web to deliver library instruction, access book and audiobook collections, conduct audio tours, send out text message notifications, and provide reference assistance" (p. 10). They advocate analyzing student users' needs before creating mobile websites. They found that students (a) use mobile devices to contact a library and to access library websites for research; (b) want content on library websites to be "simple and basic"; (c) want to have a "customizable experience"; and (d) view the design of library websites as important (pp. 17-18). Seeholzer and Salem emphasize the need to involve students when "planning new Web-based initiatives" (p. 19), since functionality is critical if students are to use the new technology.

In 2004, Warnken reviewed changes that had resulted from new technologies and discussed possibilities for future development. Her predictions proved to be fairly accurate. Specific technologies that were reviewed include: "the emergence of the web and the decentralization of information distribution; the widespread use of course management systems with electronic posting of information and links to electronic reserves; the integration of information literacy with the curriculum; . . . the shift in focus from collections to customers"; the use of electronic forms of information, first in CD-ROM format and then in databases; and the development of an information commons concept (pp. 322-323).

In spite of dramatic advances in library services during the last 10 to 15 years, Daly (2011) found that a library perspective on services is not necessarily a student's

perspective. In 2009-2010, she conducted interviews with nine undergraduate students at Duke University. She analyzed how the students, all of whom volunteered to participate in her study, navigated through the process of researching and writing their honors thesis. Although they had positive comments concerning the library, one of the more interesting findings was "that many [of the students] were unaware of the full extent of library services and resources available to them. For instance, one student did not know that he could access library resources from off campus and rarely used the library homepage to access subscription resources" (p. 410). Daly concluded that there were several benefits to conducting the study, including the revelation that libraries need to "get to know [their] users and their unique perspectives" in order to do a better job of supporting them (p. 411).

Budgets. Arnold (2010) addresses the current funding crisis in community colleges and focuses on the impact the crisis is having on community college libraries. She states that the primary funding sources for public community colleges are state and local governments, and she observes that dependence on these sources make community colleges particularly "susceptible to fluctuations in the economy" (p. 223).

The fluctuations are pronounced when states such as Texas, which has a constitutional "pay-as-you-go" limit on spending (Legislative Budget Board, 2010, p. 36), are forced to address budgetary shortfalls by reducing spending on such areas as higher education. In 2010, for example, the Governor of Texas directed state agencies and higher education institutions "to submit a 5 percent biennial budget reduction plan" (Paredes, 2010), and a few months later, the Governor and the Legislative Budget Board proposed an additional 10% reduction in state funding that was projected to "cost

colleges and universities collectively more than $800 million" (Haurwitz, 2010). Ultimately, the state reduced funding 5% in FY2010 and 2.5% in FY2011 (Texas Higher Education Coordinating Board, 2011f, p. 3).

The impact of budget cuts on community colleges has been significant, and libraries are particularly vulnerable when reductions are considered. Arnold (2010) states that funding for libraries at two-year institutions "has not kept pace with the rapid growth of enrollment, campuses, and programs." She notes that "this has been the case during the current economic recession, as well [as] prior to the recent economic downturn" (p. 223).

Lack of adequate library funding during a time of technological change is an issue for most libraries, especially in light of a document entitled *Perceptions of Libraries, 2010: Context and Community* (2011) that states "from 2003 to 2008 . . . academic libraries increased e-resource expenditures by 233%, according to [the] National Center for Education Statistics" (p. 39).

Schlosser (2011) notes that libraries are struggling to maintain funding for current services and collections, as well as new technologies. She states that "financial scarcity 'will tend to choke needed investments in emerging services addressing new user needs and new kinds of content'" (p. 154).

John Lombardi (as cited in Havens & Storey, 2010), a university president and advocate for library assessment, states that university libraries "face continuing questions regarding their relevance and a declining share of the university budget" (p. 4). He offers the following suggestions for moving academic libraries up the "funding stack" on campus: "identify elements and methods for measuring . . . library performance; observe

the indicators of effectiveness; demonstrate how you support the [institution's mission]; [and] serve students in the expanding academic activities that occur online" (p. 9). Lombardi posits that "in today's economic malaise, what we know may not be as important as what we can show" (p. 4). He states that libraries should not dwell on particular elements of technology but should find "a way to demonstrate [their] library's value no matter what the technology, services and cultural issues are in play" (p. 10). According to Lombardi, improved funding will follow if libraries can show their value and relevancy to constituents as they assist in fulfilling the educational mission of their institutions.

Personnel and allocation of human resources. Goetsch (2008) addresses changes that have occurred in academic libraries in the past 25 years and how those changes have impacted librarian positions. She states that librarians need "state-of-the-art technical skills," "specialized expertise of library training," and "interpersonal/communication skills" (p. 160). After examining vacancy announcements in 1995, 2000, and 2005, Goetsch found that in 1995 announcements featuring "electronically-enhanced job titles" were prevalent (p. 162); in 2000, "a higher level of technical skills and experience" was needed (p. 163); and by 2005, "specialized positions" such as Web Services Librarian began appearing (p. 164)—although instruction and information literacy were also predominantly featured in the announcements.

In addition, Goetsch (2008) found that the organizational structure of academic libraries has been redefined by changes in technology, primarily due to a blurring of boundaries (p. 165); collections have shifted from print to electronic resources and

individual items within the collections have shifted to "interrelated and/or interlinked items" (Morrison, as cited in Goetsch, 2008, p. 166); changes have been made that assist in meeting the needs of users in order to maintain relevancy; and the need to retrain and retool staff has been an ongoing concern (p. 166). The next evolution envisioned by Goetsch is an "information mediation and interpretation" (p. 167) function that academic libraries will need to assume. She predicts that academic libraries will play a larger role in archival management of electronic institutional records so "data can be retained, accessed, and preserved for future generations" (p. 168).

Goetsch states that training for new positions will require rethinking the profession's current educational requirements, and she suggests that some skills will come from training that is outside the profession, i.e., not specific to libraries. Surprisingly, her analysis of vacancy announcements revealed that postings of academic librarian skill requirements are in some instances obsolete, and a few even include skills related to card catalog tasks that have "in fact disappeared from librarian's jobs" (2008, p. 170).

To ensure librarians are adequately proficient, the American Library Association (2009) initiated a study in 2008-2009 that examined the competencies needed by all graduates of ALA accredited master's degree programs in library and information science. Although traditional competencies are included in the report, its focus is on competencies related to technology. The report covers "the profession; information resources; the organization of recorded knowledge and information; technological knowledge and skills; reference and user services; research; continuing education and lifelong learning; and administration and management" (American Library Association,

2009). Simmons-Welburn, Donovan, and Bender (2008) suggest that librarians should upgrade their expertise and skills and continue working to fulfill the institution's mission rather than "traditional library functions" (p. 132).

Researchers such as Long and Applegate (2008), Bell (2009), and Haycock and Garner (2009) address changes that have taken place in librarians' education, competencies, and opportunities. Lynch (2008) discusses library education in a historical context, and Mackenzie and Smith (2009) look at library education and question the ability of library schools to train effective leaders for the profession. Grimes and Grimes (2008) are skeptical about the need for a master's degree in library science, stating that it peaked in the early 1990s, but started declining by the year 2000.

Applegate (2010) explains that "horizontally, within library work, there are boundaries primarily oriented around the iconic master's degree (MLS): who has it, who does not; who is a professional, who is support or specialist staff" (p. 288). She states that boundaries and jurisdictions are integral to being a professional and that they affect the work librarians do and the controls that are placed on them. Todaro (2010b) suggests that librarians include a discussion about professionalism and the philosophy of librarianship when they are interviewing for jobs, when answering library users' "why" questions; and when writing "grants, annual reports, and memos for management" (p. 214) among other things. She lists the following principles of a profession as they relate to librarianship: (a) librarians have a philosophy that explains who, what, and why about the field of librarianship; (b) librarians are recognized as experts in the field of librarianship; (c) librarians have "generalized and systematic knowledge with a theoretical base"; (d) librarians "primary orientation is to their public"; (e) librarians

"have a high degree of self-control of behavior"; (f) librarians "are governed by a code of ethics"; (g) librarians "have a system of rewards" that is based on "work achievement"; and (h) librarians have competence testing for members of the profession (pp. 213-214).

Several studies have looked at the qualities of library directors. A study conducted by Lynch and Smith (2001) examines library director qualifications and requirements in job advertisements covering a twenty-five year span and finds that education requirements declined slightly; although the ALA accredited master's degree in library science has still been required in a high percentage of job advertisements. In the area of technology, they find that knowledge of, or experience with, automated library systems was needed by 1998, but specific technology related skills, such as database searching, were not required of administrators at that time (p. 414). Young, Hernon, and Powell's (2004) survey of directors and assistant directors shows that leaders should be able to grasp the complex environment in which libraries operate and should have a knowledge of digital libraries. Interestingly, Beck and Bonous-Smit's (2008) study on the type of individuals who should be leading libraries indicates that "college-educated paraprofessionals are viewed as being able to do the day-to-day work and are just as oriented to management in the digital future" as professionals (p. 175).

To address the technology needs of libraries, Houghton-Jan (2007) advocates increasing the technological competence of all library staff and alleviating a common library phenomenon in which a few staff members are overworked technology "go-to people" that lead the rest of the staff in decision making and innovation. Houghton-Jan states that this type of situation leads to an unhealthy "bifurcated staff," and she

recommends appointing a task force at each library to establish technology competencies for the library that will include "incentives" and "consequences." After the initial competency assessment is complete, she states that individual training needs should guide the process. Houghton-Jan notes that "technology skills and education are essential and critical not only to the success of the employee but also to the success of the entire organization in its mission to serve its users" (p. 54).

Signorelli and Reed (2011) agree that training is required to develop needed competencies, but they caution that the training should not be easy. In fact, they suggest that "training in a good organization should be work" (p. 59). Keiser (2010) thinks that the library of the future will require everyone to do more since fewer resources will be available. She advocates offering training opportunities for both librarians and support staff that will enhance skill sets and advance professionalism in the library. In addition, she suggests that routine questions formerly answered by librarians should be given to paraprofessionals, or support staff, so librarians can focus on complicated reference questions (pp. 49-50). Defa (2008) states that, "there is often no visible differentiation between the librarian, paraprofessional, and even the student employee" (p. 139), and White (1998) agrees, stating that "the public cannot distinguish the qualified from the unqualified and in our desire to appear 'democratic,' we make sure they can't do so" (p. 117). He states that there are differences, however, primarily due to different education levels.

Law (2010) is concerned that library schools are closing and fewer students are graduating at a time when libraries and librarians need more expertise, not less (p. 10). Hunter and Ward (2011), for example, point to the need for librarians to have a skill set

that includes "competence with a wide variety of technologies, assessment methodologies, and strategies for collaborating with students and faculty" (p. 267). They state that libraries depend upon the librarian's ability "to capture information about these emerging changes and to quickly adapt their services and activities" (p. 267).

Since librarians work closely with faculty when teaching research skills classes, Arnold (2010) observes that they should be classified as faculty. Karp (as cited in Arnold, 2010) states that "librarians' lack of teaching faculty status results in librarians not being seen on the same level as faculty" (pp. 227-228). To enhance cooperative ventures with faculty, Williams (2009) describes a framework in which librarians with subject expertise serve as library liaisons for academic departments. She states that "the ability to build strong relationships is critical" and that "this framework redefines traditional roles" of librarians (p. 4). Wyss (2008) agrees that subject expertise is needed and suggests that a second master's degree in a subject discipline would enhance the "scholarly credibility" (p. 808) of librarians. He states that the minimum degree held should be an ALA accredited master's degree in library science.

Since support staff/paraprofessionals are usually not required to have a degree in library science, researchers are looking at intergroup relations between paraprofessionals and professionals. Fragola (2009) has looked at the two groups to examine the amount of tension and to determine if the roles of both groups are clearly delineated. She found that the groups worked well together, but that roles were perceived to be somewhat blurred. To ensure relations remain cordial, Fragola suggests creating joint training and workshop sessions; valuing the committee participation of both groups; encouraging group interaction; and ensuring library leadership is open to new ideas/opportunities and

that it values the contributions of everyone (p. 24). Todaro (2010a) lists territorialism, communication issues, coworker issues, and change resistance as potential areas for conflict in libraries (pp. 116-117), and she suggests ways to manage it, including formulating conflict management protocols.

Beck and Bonous-Smit (2008) discuss changing staffing patterns at circulation desks, in technical processing departments, and at the reference desk. They state that "the trend is toward fewer support staff positions as operations in the technical services and in circulation are further automated" (p. 173). They credit "the explosive growth of the Internet," as well as "the decreasing costs and increasing power of personal computers" (p. 171), for movement away from the reference desk and toward virtual services such as chat reference.

King (2008) advocates "future proof[ing]" libraries by focusing on hiring capable, "creative," and "passionate" individuals who can adapt and thrive in a constantly changing environment. He advises hiring librarians who are "not just comfortable with change but able to lead it," and he cautions libraries to refrain from hiring "people who want a job just for the sake of having a job" (p. 30).

Collections. According to a 2011 Ebook Penetration & Use in U.S. Libraries Survey (Miller, 2011), 95% of the academic libraries that responded to the survey say that they offer ebooks and that they expect to devote at least "19.1% of their budgets" to purchasing ebooks within the next five years. In a *Chronicle of Higher Education* opinion column, Prensky (2011) ridicules paper books and suggests banning non-electronic books on college campuses to force students to use electronic books. He says

it "would be a symbolic step toward a much better way of teaching and learning, in which all materials are fully integrated" (p. A30).

Kolowich (2011) notes that "the idea of libraries with no bound books has been a recurring theme in conversations about the future of academe for a long time" (p. 35), and he points to a library at the University of Texas at San Antonio as an example. The university's Applied Engineering and Technology Library has a collection of books that are only available in electronic form, i.e., the library does not have any paper books. Kolowich admits it is not the norm to have a totally digitized book collection; however, he observes that academic libraries are reducing the number of paper books they own, and they are choosing instead "to focus on beefing up their electronic resources" (p. 35). Epstein (2008), though, states that just because some "books will now be stored digitally and transmitted electronically it does not follow that human beings will hereafter read Dickens or Proust or Norman Mailer on electronic screens" (p. 10).

A Future of the Book survey conducted in December 2009 by a research service connected to the Colorado State Library found that two out of three respondents, or 63% of the 1,326 respondents, thought "that paper books would never disappear"; 33% of the respondents "predicted their demise in from 21 to 100 or more years"; 4% of the respondents thought that "paper books would vanish within the next two decades"; and 1% of the respondents thought that "libraries would not exist or would circulate only electronic materials in 10 years" (Helgren, 2011, p. 41). Respondents came from different types of libraries, with about a quarter of the respondents employed in academic libraries. According to survey respondents, factors that influence the format choice for books include "the existence of multiple formats, technological advantages,

emotional/aesthetic appeal, content, cost, and time/generational change" (p. 41). Regarding the benefits of having ebooks, Shirley, Plumer, and Waukechon (2010) note that the trend results in opening areas that can be used for a variety of activities and events after book shelves are removed (p. 131).

Wisner (2010), a community college librarian, is concerned about the loss of paper books when ebooks and other digital materials are added to collections. Wisner states:

> The great libraries built since the Middle Ages were shaped around the book, the most familiar symbol of knowledge to this day. If predictions run true, books in their current form will begin a gradual process of disappearance, analogous to handmade books after the invention of the printing press. (p. 36)

Wisner (2010) points to an English instructor who used to visit the library and bring her students for library skills classes taught by librarians. After three years of not visiting the library, she explained to Wisner that she did not need to go to the library since she is able to conduct research at her desk. Wisner says he assumes the instructor is also conducting her own research skills classes (p. 36).

To counteract that mindset, Hoek (2011), a university librarian, suggests that libraries take the following proactive actions:

> Libraries today must continually incorporate new technologies and deliver an expanding array of information and services in ways that are useful and convenient for patrons. It is entirely reasonable—even innovative—that some libraries have taken to using Netflix and Kindles. Though unquestionably violating license conditions, those rogue libraries are also upholding long-standing tenets of our profession. (p. 21)

The license conditions to which Hoek refers are end user license agreements that restrict how products can be used and who can use them. Mantel (2011) says that essentially libraries do not own their electronic books. They license the books through

distributors, such as OverDrive. The books do not reside on the library's server; instead, they are located on the distributor's server. This arrangement is possible because the books are licensed, so traditional copyright laws do not apply (p. 631). Hoek (2011) says he is concerned about the limitations being placed on collections, but he is even more concerned that "libraries are doing nothing about it" (p. 21). Shirley et al. (2010) describe a solution being advanced by the publishing industry but considered unfriendly to libraries. Labeled DRM or Digital Rights Management, this solution is a process by which "ebooks with DRM cannot be opened except on a compatible device authorized by the person who purchased the book" (p. 127). Another solution that is more favorable for libraries and is not harmful for publishers entails joining a library consortium that purchases ebooks at a discounted price and shares ebook platforms. Negotiations are then conducted from a position of strength because a group of libraries is being represented (p. 129).

Mantel (2011) describes an issue related to ebooks that started in 2004 when Google announced plans to digitize "the full text of books in the public domain" and to make them available to the public at no cost (p. 642). Google entered into agreements with large public libraries and well known universities to scan and add the books to the search engine's database. Google scanned over fifteen million books. However, in 2005, authors and publishers charged Google with infringement of copyright, and the case is still in litigation (p. 642).

To address negativity about ebooks and the "information age" in general, Darnton (2011, p. B9), a librarian at Harvard University, lists the following myths and explains why each is wrong and should be challenged:

- "The book is dead." Darnton says this is not true and provides statistics on the number of books being published either traditionally or in digital form to document it.
- "We have entered the information age." Darnton says communication has increased the exchange of information, "but every age is an age of information."
- "All information is now available online." Darnton calls this myth absurd and says, for example, that only "about 12%" of all the books in the world have been digitized.
- "Libraries are obsolete." Darnton says library users "abound" all over the country, and he lists all of the services and resources libraries provide.
- "The future is digital." Darnton agrees this statement is true, but he states that it is "misleading" because the world may be digital "in 10, 20, or 50 years," but printed material will still have a place. He cites other historical developments to demonstrate that "new modes of communication do not displace old ones, at least not in the short run." (2011, p. B9)

Related Studies

According to Cooper (as cited in Merriam, 1998), "the value of any single study is derived as much from how it fits with and expands on previous work as from the study's intrinsic properties" (p. 50), and Bryant (2004) states that "all dissertation research should acknowledge and identify other dissertation studies on closely related topics" (p. 173). In line with these directives, the research studies in this section are included because they relate in various ways to the current study that looks at the impact of technology on specific aspects of community college libraries, i.e., physical structure, organizational structure, services, helping meet the institution's educational mission, budgets, personnel, allocation of human resources, and collections. Creswell (2009) suggests highlighting "the most important studies" and capturing "major themes" (p. 44), and that is the format used in this section. Studies are discussed chronologically by publication date, starting with 1997 when the Internet became a primary information and communication channel. Different areas in which technology has impacted academic libraries are emphasized in the studies.

Kenerson (1997) surveyed academic library directors at two-year and four-year institutions to investigate the impact of technology on library personnel. The results of his study indicated that the number of professional librarians, professional staff, and support staff did not increase or decrease significantly when a library automated. He found that skills sought in hiring policies did change, however. Computer knowledge was found to be important for professional librarians, but not as important as it was for support staff in an academic library. Kenerson recommended the need for further studies to determine (a) if automation increases staff productivity; (b) if automation and job description upgrades disrupt organizational structures; and (c) which positions in the library have been affected the most by automation.

Ostro (1998) conducted an ethnographic case study at an academic library that focused on organizational culture and change during a time of automation. Using a multiple perspective framework the study looked at three views of the library's culture, i.e., integration, differentiation, and fragmentation, to determine the implications computers have for libraries and for library personnel. The integration part of the study, which focused on consensus, examined changes in reference and instruction after the introduction of information technology and found that the teaching role of librarians intensified and that it enhanced the librarians' faculty status. The differentiation part of the study, which focused on dissensus, found that introducing technology encouraged subcultures, especially among the systems support team and among branch librarians. The fragmentation part of the study, which deals with issues that cause anxiety and introduce ambiguity, found that there were concerns about relations with stakeholders

outside the library, deprofessionalization, faculty status of librarians, and what the future holds for librarianship,

O'Donnell's (1998) longitudinal study is not directly tied to academic libraries; however in examining the role of chief information officers (CIO), he found evidence that their roles are expanding into academic libraries. The study indicated that CIO positions are becoming more prominent, especially at institutions that stress strategic planning, at private institutions, and at larger institutions. Plus, the study found that the reporting level was higher and the span of control was greater for CIO's who were responsible for the library. O'Donnell's study indicates that there is a potential for computer services and the library to clash when technologies for the two areas are merged. A suggestion for further research includes a more in-depth look at CIOs and the academic libraries that report to them, specifically how institutions with this reporting structure differ from other institutions; the background of CIOs who are in this reporting structure; and perceptions of CIOs regarding the role that technology plays in higher education.

McKiel's (2001) case study analyzed perceptions of librarians at the Ivy Tech State College Library System to investigate how operations changed and how the future was viewed regarding dissemination of information via electronic resources rather than print technology. He found that librarians perceived (a) that library operations had continued to persist—including acquisitions, circulation, reference, instruction, organization, and cataloging—in spite of the expansion in electronic resources; (b) that electronic operations took more time and effort; (c) that efficiency and productivity improved; (d) that more cooperation was needed in utilizing electronic resources within

the system and with agencies outside the system; and (e) that some operational control had shifted to agencies outside the system. McKiel also found that the librarians who participated in the study expected that they would continue operating in the context of electronic resources as those resources took over operations that were formerly print-based.

Winters (2004) surveyed the perceptions of library directors in California about the future of community college libraries. Themes that emerged included (a) changing librarian roles, (b) new organizational options, and (c) challenges and benefits resulting from technology. Regarding changing roles, survey results indicated that librarians needed to more closely align professional development with technology related job tasks, including reference, instruction, and maintenance of online electronic resources; that paraprofessional library workers were assuming more responsibility for activities that were formerly reserved for librarians, including circulation and technical services; and that both professionals and paraprofessionals did not have the technology skill sets needed for the future. Concerning organizational options, Winters' research indicated structures would change as librarians started partnering with other areas on campus. In addition, purchasing of resources across the state was viewed as desirable, but respondents did not think it would occur before 2015. Consortia were viewed positively, but adequate institutional and state funding appeared to be unlikely. Regarding the challenges of technology, the survey respondents, i.e., library directors, viewed technology positively; they perceived that online resources would continue benefiting libraries and students; and they indicated that library support staff would be providing

support in technical areas, while librarians concentrated their efforts on areas such as instruction and online resources.

Moore's (2006) study also focused on community college library directors' attitudes regarding the library as it would be in the future. He surveyed library directors and conducted follow-up interviews with directors who were willing to participate. Findings from Moore's mixed methods research indicated that the library would continue maintaining a physical presence on campus; adoption of emerging technologies would increase to meet needs; the learning commons concept would continue being a goal; skills, job tasks, titles, and job descriptions had changed and would continue changing due to technology; cost constraints would continue being a factor in decisions regarding electronic resources; and those constraints would decrease as colleges formed external collaborations. His suggestions for future research at community college libraries included: organizational changes due to the adoption of technology; interactions between technology in the library and technology in the institution; marketing needed to overcome the idea that libraries are obsolete; and the ways in which e-learning will affect libraries.

Stanley (2010) surveyed students at a large community college to learn how they used technology and how they perceived the virtual and physical library on their campus. She found that students regularly use the library; that second-year students use the library more than first-year students; that a majority of the students have a computer and Internet access; that students use some form of technology every day, especially text messaging and social networking; and that the most frequently used technologies in students' courses are library technologies.

Strecker (2010) focused on academic librarians' perceptions at different types of higher education institutions, including community colleges. Using a couple of survey instruments, she explored librarians' perceptions of technology in relation to (a) service delivery to students and faculty, and (b) appropriate organizational structures for delivery of services. Results of the study indicated that successfully providing services to students and faculty requires structuring libraries to work in teams and understanding that leadership occurs at all levels. Regarding organizational structures, the results indicated that librarians prefer to work in an organizational structure that is flat.

Summary

This literature review of research studies, articles, online documents, books, and dissertations discussed the ways in which community college libraries are addressing their institutional curricular missions—transfer, vocational-technical, continuing education, community service, and developmental education; how technology has impacted the physical structure, organizational structure, services, budgets, personnel, allocation of human resources, and collections of academic libraries; and how related studies have addressed issues being researched in this study on the impact of technology on four high technology community college libraries.

The literature reviewed in this chapter was instrumental in discussing the study's major findings in Chapter 5. Instances in which the study agreed with the literature were noted and areas of disagreement were discussed in Chapter 5.

The next chapter, Chapter 3, will explain the research design and methodology used for conducting the study. It will also describe the study's validation measures and its ethical guidelines.

Chapter 3

Methodology

Introduction

This study is a bounded, multiple site, and multiple case study that is qualitative in its approach. Chapter 3 explains the methodology that guided the study as the following central research question and subquestions were answered.

Central Research Question

How has the adoption of technology by community college libraries changed the library and the roles of people employed within the library?

Subquestions.

- How has the adoption of technology impacted the physical structure of the library? (RQ1)
- How has the adoption of technology impacted the organizational structure of the library? (RQ2)
- How has the adoption of technology impacted the services offered by the library? (RQ3)
- How has the adoption of technology impacted the ability of the library to help meet the institution's educational mission? (RQ4)
- How has the adoption of technology impacted the capital and operational budgets of the library? (RQ5)
- How has the adoption of technology impacted personnel employed in the library? (RQ6)

- How has the adoption of technology impacted the human resources allocated to the library? (RQ7)
- How has the adoption of technology impacted the collections in the library? (RQ8)

Library technology in the context of this study encompasses online subscription databases, integrated library systems, library web pages, library copy centers, overhead projector/computer systems in smart classrooms, computer work stations, and all library hardware and software. Resources such as DVDs; VCRs; microforms and microform machines; and CD-ROMs and CD-ROM towers are also forms of library technology.

Creswell (2009) states that "the key idea behind qualitative research is to learn about the problem or issue from participants and to address the research to obtain that information" (p. 176), and that is the approach that guided this study.

Qualitative Research Design and Rationale

Creswell's (2007, 2009) description of qualitative research and Bogdan and Biklen's (2007) description are similar. According to Bogdan and Biklen, a qualitative approach entails (a) using naturalistic settings as data sources and researchers as "key instrument[s]"; (b) describing the data collected with "words or pictures rather than numbers"; (c) focusing on process with how, why, and what questions rather than focusing on "outcomes or products"; (d) working inductively from the bottom up rather than deductively from the top down; and (e) being concerned with "participant perspectives" to make sense of, and provide meaning for, issues under consideration (pp. 4-8).

A qualitative approach was selected for this study since an in-depth analysis of different perspectives was needed to fully explore and understand the impact of technology on community college libraries. The researcher was the sole instrument in collecting data for the study from multiple sources, and most of the data were collected in a natural setting "where human behavior and events occur" (Creswell, 2009, p. 195). Sources of data included interviews, observations, and relevant public documents that were collected at four community college libraries in Texas. Data that were collected for each case contributed to "a description the reader might make if he or she had been there" (Creswell, 2009, p. 196). By providing extensive detail about four individual cases, the focus was on the specific, rather than the general, aspects of the study. Semi-structured interviews included open ended and probing questions that focused on how, why, and what types of inquiries.

The structure for this qualitative study employed a constructivist paradigm that Creswell (2007) describes as "a traditionalist approach to planning qualitative research" (p. 47). Traditional introduction and procedures sections were incorporated into the study, as opposed to other forms that use an advocacy/participatory format or a theoretical lens structure (pp. 48-49).

Case study design. Common approaches to inquiry in qualitative research include the narrative, phenomenology, grounded theory, ethnography, and case study. This study uses a multiple site, multiple case study approach, which is a research method that has been described by Creswell (2007), Stake (2006), Yin (2009), and others. Creswell (2007) defines case study research as "a qualitative approach in which the investigator explores a bounded system (a case) or multiple bounded systems (cases)

over time, through detailed, in-depth data collection involving multiple sources of information" (p. 73). After collecting and analyzing the data, the researcher "reports a case description and case-based themes" (p. 73). Boundaries for the system, or case, consist of the time, place/setting, events, and processes that constrain the case (p. 244). Creswell states that either multi-site studies involving several programs or within-site studies involving single programs are appropriate forums for investigation (p. 73).

Creswell uses the terms multiple case study and collective case study somewhat interchangeably, stating that in collective case study research, researchers select multiple cases to illustrate an "issue or concern," which is labeled an instrumental case when one bounded case is selected "to illustrate this issue" (2007, p. 74). An intrinsic case study, on the other hand, focuses "on the case itself . . . because the case presents an unusual or unique situation" (p. 74). When researchers study multiple cases, Creswell suggests they use Yin's "logic of replication, in which the inquirer replicates the procedures for each case" (as cited in Creswell, 2007, p. 74).

This study on the impact of the adoption of technology on eight specific areas in community college libraries incorporates the following methodologies suggested by Creswell (2007), Yin (2009), and other qualitative researchers:

- The study consists of multiple cases that were bounded by time and setting. The on-site visits were one time occurrences, and processes were in place for clarifying or extending data collection off-site as needed. On-site visits for the study took place at four community colleges in Texas that have libraries that were deemed high technology according to a ranking system created by the researcher.

- The case colleges selected for the study have libraries that illustrate issues or concerns related to the impact of technology on eight specific areas in the libraries.
- Methodologies were replicated at each case site, i.e., the same open-ended questions were asked; the same non-participant observations were made; and similar documents were gathered at each of the case colleges.
- Detailed, in-depth data collection from multiple sources of information was employed to inform the study. Sources of data included one-on-one in person interviews; non-participant observations; and a review of public documents at each case college.

Purposeful sampling. According to Creswell (2007), an appropriate number of cases to include in a multiple case study is four or five because that number allows "ample opportunity to identify themes of the cases as well as conduct cross-case theme analysis" (p. 128). Seven college contacts were invited to participate in this multi-site, multi-case study on the impact of technology on community college libraries, but three declined to do so. The researcher surmised that the three contacts that declined to participate did so for the following reasons: time, budget, and/or workforce reductions.

A purposeful sample was used in the study. Sites were selected because they could "purposefully inform an understanding of the research problem" (Creswell, 2007, p. 125). Restricting the sites to colleges with high technology libraries facilitated comparisons and ensured libraries were selected that had been impacted by technology.

In selecting the sites, the researcher ranked community college libraries in Texas using the Texas Academic Library Survey (Texas State Library and Archives

Commission, 2009), which is a state-wide survey that was conducted by the Texas State Library and Archives Commission during odd numbered years. The survey was coordinated with an almost identical Academic Libraries Survey that was conducted during even numbered years by the National Center for Education Statistics (NCES), which is located within the U.S. Department of Education and the Institute of Education Sciences (IES). According to a Program Coordinator at the Texas State Library and Archives Commission, the State Library decided to discontinue the Texas Academic Library Survey in 2011 after the National Center for Education Statistics indicated they were going to start surveying academic libraries every year instead of every two years (S. Malek, personal communication, February 1, 2012).

High technology designations were determined using the following categories of data collected in the 2009 Texas Academic Library Survey: library expenditures (i.e., one time purchases of software and machine readable materials, e.g., serial backfiles; ongoing commitments to current electronic serial subscriptions; and operating budget expenditures for computer hardware and software, including maintenance); library collections (i.e., number of electronic books and number of electronic reference sources and aggregation sources, including citation indexes/abstracts and full-text article databases); and library electronic services (i.e., in-house digitization, online reference service, and technology for library users with disabilities).

The ranking methodology for selecting high technology libraries was simple. Each community college in Texas, excluding large community college districts that reported library data collectively for their districts, was listed alphabetically by the researcher. The categories of library technology data were recorded in columns

according to institutional names where the libraries are located. After all data were recorded, the responses within each category column were ranked, starting with the lowest response figure, and thus the lowest number, and going to the highest response figure, and thus the highest number. When duplicate responses occurred, the same number in the ranking was recorded. For instance, if two libraries were 13th in the number of electronic books held, they shared the same number in the ranking, i.e., 13 in this example.

Ranked numbers were used to determine which libraries had the highest ranking within the technology related categories. The final ranking was a comparison of the sum of the categories for each library. Libraries with a high total were considered high technology libraries for the purposes of this study. In addition to the data category rankings, the researcher considered Texas Academic Library Survey responses to questions dealing with electronic services, i.e., to yes/no questions in which the libraries indicated if they provided (a) documents digitized by the library staff, (b) library reference service via email or the web, and/or (c) technology that assists patrons with disabilities. The researcher checked all aspects of the ranking methodology multiple times to ensure rankings were accurate.

After a group of high technology libraries was identified using the 2009 Texas Academic Library Survey results, invitations to participate in the study were extended in spring 2011. The rankings of the libraries that were invited to participate are included in Table 1. To protect confidentiality, coding was used to mask the names of the institutions. Case colleges are identified throughout the study as Case College A, B, C,

Table 1

Rankings of Libraries Using Texas Academic Library Survey Results

Ranking of the Library	Case College Library or Reason for Not Participating
#1	Library did not respond to invitation to participate in the study
#2	Case College C Library
#3	Library unable to obtain permission to participate in the study
#4	Case College B Library
#5	Case College A Library
#6 (tied)	Case College D Library
#6 (tied)	Library declined to commit to participate in the study

or D. For researcher convenience, case colleges have been labeled in the order in which they were visited, not the order in which they were ranked.

The libraries at Case Colleges C and B were in the original group of the four highest ranked libraries. The other two case college libraries, A and D, were not part of the original group. They moved into the top four rankings when two of the original libraries did not accept the invitation to participate.

The permission process for including a college in the study entailed contacting the Institutional Review Board (IRB) office at the potential case college, when an office was available. The researcher requested approval from the IRB office to contact the library director in order to extend an invitation to participate in the study. Only one institution had an IRB office among the colleges that accepted an invitation to participate, and one institution that did not accept an invitation also had an IRB office. Initial contacts at the other colleges were with the public information officer (PIO) or

with the chief academic officer (CAO). Details regarding this process were included in the researcher's IRB project form at the University of Nebraska-Lincoln. When access was granted from the potential case college's IRB office, PIO, or CAO, the researcher informed the IRB and Research Compliance Coordinator at the University of Nebraska-Lincoln Institutional Review Board Office and requested permission to contact the library director at the institution.

After the Compliance Coordinator reviewed the request and granted permission, the researcher mailed an introductory letter to the college's library director. The director was invited to participate in the study by allowing the researcher to visit the library, observe the library, gather public documents, interview the director, and interview four other individuals regarding the impact of technology on the library at that institution. The director was asked to indicate his/her agreement to participate in the study by signing and dating a statement at the end of the introductory letter that said the director agreed to participate. The letter was then mailed back to the researcher. A copy of this introductory letter is included in Appendix B.

Libraries that did not respond to the initial invitation to participate in the study were contacted with a follow-up email message or, depending upon the circumstances, with a follow-up telephone call. A telephone call was necessitated when the researcher needed a more immediate response due to scheduling constraints for visiting the case college libraries.

After the director of the library at a potential case college library agreed to participate in the study, a consent form was emailed to him/her. He/she was asked to return the signed and dated form to the researcher via fax or a scanned email attachment,

and he/she was also asked to suggest the names of four individuals that could be contacted to participate in the study, i.e., a faculty member in a high enrollment area, the academic officer to whom the director reports, a librarian, and a member of the library's support staff. In all instances, the directors supplied names of individuals to invite and in all instances the individuals acquiesced to be interviewed. A last minute substitution was made at one institution, but the position of the individual remained the same. Participants in the study, other than the directors, were provided with a consent form in their introductory letter, and they were informed that a copy of the form could be signed prior to commencing the interview during the researcher's site visit.

When libraries declined to participate, the researcher moved to the next college in the ranked list of high technology libraries, and the process started again—until four institutions/library directors agreed to participate in the study. Each time a different institution was invited to participate, the researcher contacted the IRB and Research Compliance Coordinator at the University of Nebraska-Lincoln and requested approval to contact the college. The researcher did not anticipate the difficulty involved in finding four high tech libraries that would be willing to participate in the study, so the process was time consuming. However, IRB guidelines were followed, and all adjustments and changes in the original IRB project form were sent to the Compliance Coordinator at the University of Nebraska-Lincoln for review and approval.

Table 2 provides selected data about the case college libraries that derive from the results of the 2009 Texas Academic Library Survey. The researcher used this data to rank libraries according to their level of technology. Community colleges with libraries that ranked highest in technology were selected as potential case colleges for the study.

Table 2

Texas Academic Library Survey Results for Case Colleges

Case College	C11	C14	C18	D23(2)	D27(2)	G40	G41	G42	Ranking
A	under 100	under 100	76,000	29,000	157	N	Y	Y	# 3
B	9,000	45,000	21,000	23,000	74	N	Y	Y	# 2
C	15,000	74,100	110,000	31,000	90	N	Y	Y	# 1
D	4,000	33,000	65,000	28,000	54	N	N	Y	# 4

Note. Adapted from the Texas State Library and Archives Commission's *Academic Library Statistics*.
Note. The rankings are based on the researcher's methodology that is explained in Chapter 3.

C11 = one time expenditures for software and machine readable materials (e.g., serial backfiles)
C14 = subscription expenditures for electronic serial publications
C18 = expenditures from the library's operating budget for computer hardware and software, including maintenance
D23(2) = electronic monographs held that have been cataloged by the library and are accessible through the library's catalog
D27(2) = electronic reference sources and aggregation [database] sources held
G40 = documents digitized by the library staff (Y/N)
G41 = library reference service by email or the web (Y/N)
G42 = technology to assist patrons with disabilities (Y/N)

Three libraries ranked as high or higher than the selected case college libraries; however, as explained in Table 1, for various reasons those libraries did not participate in the study. To protect the identity of the participating libraries, data numbers in Table 2 are rounded rather than exact.

When categories for all of the colleges responding to the survey were ranked, the researcher numbered the lowest ranked library for each category number 1 and the next lowest ranked library number 2, etc. This process ensured the highest tech library would have the highest number ranking when the sum of all of the columns was computed.

The following sections explain how the case college libraries ranked in the different survey categories and why they were considered high tech in the context of Texas Academic Library Survey data.

Case College A. Although the ranking for two of the survey categories for Case College A's library were among the lowest in the survey, two other categories were among the highest in the survey and, therefore, contributed to the library's high ranking. The low categories were as follows: (a) one time expenditures for software and machine readable materials such as serial backfiles (C11 in the survey results), and (b) subscription expenditures for electronic serial publications (C14 in the survey results). The high categories were as follows: (a) expenditures from the library's operating budget for computer hardware and software (column C18 in the survey results), and (b) the number of electronic reference sources and aggregation sources held (column D27-2 in the survey results). Aggregation sources in the context of the Texas Academic Library Survey refer primarily to online library subscription databases. Survey results for Case College A indicate the library focuses its efforts on purchasing aggregation sources rather than individual one time or subscription materials and publications.

Case College B. The ranking for two of the survey categories for Case College B's library ranked slightly lower than the mid-range of the overall rankings for those categories, and one of the survey categories ranked in the top half of the rankings for that particular category. All together, the rankings contributed to Case College B library's relatively high ranking when compared to other libraries in the survey. The category that ranked in the top half of the rankings for that category was the following: expenditures from the library's operating budget for computer hardware and software (column C18 in

the survey results). The categories that ranked slightly lower than the mid-range of the rankings for those categories were as follows: (a) subscription expenditures for electronic serial publications (column C14 in the survey results), and (b) electronic reference sources and aggregation sources held (column D27-2 in the survey).

Case College C. The results from all five of the survey categories for Case College C's library ranked near the top of the rankings. Those categories were as follows: (a) one time expenditures for software and machine readable materials such as serial backfiles (column C11 in the survey results); (b) subscription expenditures for electronic serial publications (column C14 in the survey results); (c) expenditures from the library's operating budget for computer hardware and software (column C18 in the survey results); (d) electronic monographs held that have been cataloged by the library and are accessible through the library's catalog (column D23-2 in the survey results); and (e) electronic reference sources and aggregation sources held (column D27-2 in the survey results).

Case College D. One survey category for Case College D's library ranked fairly high in the overall rankings and contributed to Case College D library's high ranking. That category was as follows: expenditures from the library's operating budget for computer hardware and software (column C18 in the survey results). Two other survey categories ranked in the mid-range of the rankings for those categories; however, the rankings were high enough to boost the library into the #6 position—and ultimately into the #4 position. Those mid-range ranked categories were as follows: (a) subscription expenditures for electronic serial publications (column C14 in the survey results), and

(b) electronic monographs held that have been cataloged by the library and are accessible through the library's catalog (column D23-2 in the survey results).

Role of the researcher. In this qualitative research study, the researcher's role was neutral and objective. Interview transcripts, on-site fieldnotes from observations, and public documents were collected for analysis by the researcher in an unobtrusive observer capacity at case college libraries.

The researcher's qualifications for conducting the study include: (a) holding a Master's Degree in Library Science from the University of Texas at Austin, which is one of three American Library Association accredited institutions in Texas; (b) holding a Master's Degree in American Studies from Baylor University in Waco, Texas, which is relevant to understanding the uniquely American community college; (c) completing an internship at the George Bush Presidential Library and Museum in College Station, Texas; (d) completing coursework for a Doctor of Education Degree in Educational Studies at the University of Nebraska-Lincoln; (e) working in a community college library in Central Texas for over 20 years; and (f) serving as an interim director of library services for a total of two years at two different times at McLennan Community College in Waco, Texas.

There was no direct connection between the researcher and the participants or the research sites for the study, and the researcher's own institution was not involved in the study. To protect the identity of the participants and the research sites, participants were not named and case colleges were masked by coding the names of the institutions.

The researcher filed an Institutional Review Board (IRB) project application with the University of Nebraska-Lincoln prior to contacting the proposed case colleges. All

IRB protocols and procedures were followed in the study, including obtaining required consent forms from participants.

Creswell (2009) suggests developing a brief proposal that can be used "to gain access to research or archival sites" (p. 178). He describes gatekeepers at research sites who may need to "provide access to the site and allow or permit the research to be done" (p. 178). If proposals are needed, Bogdan and Biklen (2007) state that researchers will need to explain what they are doing, if the activity will be disruptive, how the findings will be reported, why the site was selected, and how the participants will benefit from the study (pp. 87-88). Gatekeepers at the proposed case colleges for this study were the library directors. Therefore, a proposal was developed and each of the items suggested by Bogdan and Biklen were incorporated into the introductory letter that the researcher sent to library directors at the proposed participating institutions. A copy of the introductory letter is included in Appendix B.

Biases. Yin (2009) states that investigators "should be unbiased by preconceived notions" and that they "should be sensitive and responsive to contradictory evidence" (p. 69). Creswell (2007) states that in "good" case studies, the researchers are "reflexive or self-disclosing about his or her position in the study" (p. 219). The researcher for this study was educated as a traditional librarian prior to the transformative changes that took place in libraries during the 1990s; consequently, the potential for bias or preconceived notions was present. However, rigorous measures to counteract potential biases and assumptions were incorporated into the study's research design. To ensure an accurate and credible study was conducted, (a) data were collected from multiple sources; (b) systematic procedures, based on Creswell's (2007; 2009) approach to multiple case

study research, were used throughout the study; (c) reviews of public documents and on-site, non-participant observations verified the high technology ranking of participant libraries and provided descriptive details of the cases; (d) transcripts were reviewed by participants for accuracy and to provide feedback on needed changes; (e) various groups of experts and peers reviewed and critiqued interview questions prior to on-site visits; (g) another coder cross-checked the coding process used with interview transcripts; and (g) member checking with library directors at the institutions verified the accuracy of the study's findings and interpretations.

Data Collection

Principles. Bogdan and Biklen (2007) state that "the term data refers to the rough materials researchers collect from the world they are studying; data are the particulars that form the basis of analysis" (p. 117). The data and data collection methodologies that formed the basis of analysis for this study accomplished the following objectives: (a) ensured multiple perspectives were represented, (b) contributed to the study's credibility, and (c) provided ample data to answer the research questions. Per Creswell's (2007) suggestion, the data were stored and backed up in multiple locations and formats to ensure it remained secure (p. 142).

Data collection sources and methods for accessing sources. Creswell (2007) states that data collection methodologies for case study research should typically be "extensive, drawing on multiple sources of information" (p. 75) in order to add "depth" to the case (p. 246). He states that "confirming or triangulating data from several sources" serves to validate qualitative studies (2007, p. 45). According to Yin (2009), individual sources have strengths and weaknesses, and multiple sources complement

each other (p. 101) and develop "converging lines of inquiry" that corroborate each other (pp. 115-116). The detailed data needed for this qualitative, multi-case research study were collected from the following sources in order to confirm and triangulate data:

- transcripts of semi-structured one-on-one interviews with library and non-library personnel at each community college;
- on-site fieldnotes from non-participant observations at each library/institution;
- public documents gathered on-site or found on institutional websites that verified the high technology designations and that provided information about the libraries participating in the study; and
- data obtained from the Texas Academic Library Survey that were used to rank the level of technology at community college libraries in Texas.

A detailed description of the data sources and the methods for accessing them is discussed in the following sections. The reference point for looking at technology varied a bit from library to library, since the rate of adopting technology varied; however, most libraries started experiencing significant technological changes when Internet browsers facilitated access to the World Wide Web in the mid-1990s, so data collection centered on events that occurred during the last 10 to 15 years.

Semi-structured interviews. Interviews with personnel at four high technology community colleges in Texas were the primary focus of the study. Miles and Huberman (1994) describe researchers' attempts to capture qualitative data "from the inside" as a "process of deep attentiveness, of empathetic understanding (Verstehen), and of suspending or 'bracketing' preconceptions about the topics under discussion" (p. 6). To

gain that depth of understanding, the interviews for this study were conducted on-site in a natural setting, and the researcher conducted interviews that focused on the perceptions of personnel regarding the impact of library technology at the four case colleges that were selected for the study. Interviews were conducted with a faculty member who teaches in a high enrollment area; the academic officer to whom the library director reports; the library director; a librarian; and a member of the library's support staff at each of the participating case colleges. Questions were open-ended and follow-up questions were probing, for as Bodgan and Biklen (2007) state "interviewing requires flexibility" (p. 105) and probing questions such as "What do you mean?" or "What did you say then?" (p. 102). By asking such questions and by suggesting participants provide examples, interviews produce data that reveal participant perspectives, according to Bodgan and Biklen (p. 104).

The interviews for this study took approximately sixty to ninety minutes each to complete. To enhance the reliability of data collected, the researcher requested permission to record the interviews, and the audio recordings were transcribed following the interviews. All participants acquiesced to being recorded. They indicated their agreement by initialing a statement to that effect on the consent form that was signed prior to the interview. Notes were also written by the researcher during the interviews in order to supplement recordings with "descriptive" and "reflective" fieldnotes (Bogdan & Biklen, 2007, pp. 120-124).

Interviews were one time occurrences. Only one interview was conducted with each of the five participants at each of the four participating institutions. If follow-up questions were needed for clarification or additional information, participants were

contacted via email or by telephone. The on-site interviews were narrowly focused on collecting data relevant to the study's research questions. Creswell (2007) states that interview questions are "a narrowing of the central question and subquestions in the research study" (p. 134), and he suggests adopting the following components in the "interview protocol" (pp. 133-135), which is the protocol that was used in this study:

- a multi-page form with a header for recording essential information and for reminding the researcher (a) to explain the purpose of the study; (b) to request consent for the interview (including asking the participant to read and sign the consent form); (c) to provide confidentiality information; (d) to explain how long the interview is projected to last; and (e) to explain how results of the interview will be used if that has not been done prior to the interview;
- questions that have "ample space" for writing responses;
- a minimal number of "open-ended questions"; and
- closing comments that include thanking the participant and requesting permission to ask follow-up questions at a later time if needed.

The interview questions included in the Interview Protocol in Appendix D were reviewed using an alternative pilot process that included (a) library personnel, (b) a pool of experts, and (c) several faculty members who reviewed the questions and made comments. An authentic pilot test could not be conducted since participants in the pilot would be part of the actual study, and that would pollute the study. Library personnel in this alternative process consisted of two community college librarians and a member of a community college library's support staff who were asked to review the interview questions for clarity and to determine if additional questions should be asked. The pool

of experts consisted of two current library directors, one former library director, and a CAO (chief academic officer), all of whom were located at institutions that did not participate in the study. The experts were asked for comments and suggestions for improving the interview questions. Four faculty members at the researcher's institution were asked individually to critique interview questions for clarity and for improvement.

Refinement of the interview process using library personnel, the pool of experts, and individual faculty members is in line with accepted qualitative research practices. The purpose of a pilot study, according to Creswell (2007), is to "refine the interview questions and the procedures further" (p. 133). Yin (2009) states that the scope of a pilot "can be much broader and less focused than the ultimate data collection plan" (p. 93). He suggests selecting pilot cases according to "convenience, access, and geographic proximity" (p. 93). This study's alternative process accomplished the objectives of a pilot study in its refinement of the interview questions.

For the most part, questions were considered consistent, clear, independent of each other, relevant to the research questions, capable of generating adequate data/discussion, and broad enough to encourage different perspectives. Most of the commentary concerned adding probing questions that would move the discussion forward and keep it focused on the impact of technology. One faculty member suggested asking interviewees about overall changes in each of the eight research areas during the last 15 years and then following each of those broad discussions with a question asking how the changes related to the adoption of technology. Although a logical suggestion, the researcher decided too much time would be spent on irrelevant

areas, since the majority of the ninety minutes allotted for each interview needed to be focused solely on changes related to the impact of technology.

Two faculty members wondered why high enrollment or high growth areas were being emphasized in RQ4, which is the research question that looks at technology's impact on each library's ability to help meet educational missions. The researcher had a number of options for narrowing the broad topic of missions, as evidenced by the discussion of educational missions in the literature review. The researcher, however, decided that the focus for this study should not be on how the question was narrowed, but rather on how technology impacted the selected area. This approach kept responses from meandering from one area of the college to another, and it made comparisons easier. The researcher also opted to limit the discussion on missions to high enrollment areas because libraries looking at the costs/benefits of providing services and resources usually consider the number of students likely to use the services and resources when making decisions about offerings. The researchers' supposition is that specific services and resources were likely available for high enrollment areas, so students and faculty in high enrollment areas would have an opportunity to be exposed to the library's technology offerings.

Also related to RQ4 were comments by three participants in the pilot that indicated confusion about the meaning of "high enrollment areas," since the term "areas" could refer to divisions, programs, departments, disciplines, etc. Given the open ended nature of qualitative research, the researcher decided to let each interviewee interpret the phrase as desired by using any definition of areas as the basis for his/her answer.

Based on input from the only CAO that participated in the pilot process, probing questions on the impact of technology on the library's physical structure (RQ1) were added. The questions inquired about changes in the use of space allocated to the library and about library services that might be provided in multiple areas on campus, e.g., in conjunction with learning centers. The CAO also noted that technology budgets may be outside the purview of the library, e.g., some library technology funds may be listed in the IT department's budget, so a probing question was added to RQ5 to remind the researcher to inquire about this if the interviewee did not address it. Regarding the impact of technology on human resource allocations in RQ7, the CAO suggested giving interviewees plenty of time to think about indirect effects, as well as direct effects. For instance, the CAO stated that some changes in the allocation of human resources may be due to program changes that are due to technology.

A couple of individuals participating in the pilot, one an expert from the pool of library directors and the other a member of a library's support staff, questioned the lack of specificity in RQ1, which concerns the impact of technology on the library's physical structure. They suggested clarifying "physical structure," which could be a building, interior space, office layout, repurposing of space, renovated structure, etc. The comments speak to the nature of qualitative research, an approach that encourages multiple interpretations. The suggestions from these individuals helped the researcher formulate probing questions to ensure all aspects were considered.

Similar probing questions were added to RQ6, which asks about the impact of technology on personnel employed in the library. Probing questions were added to

inquire about position activities, changes in duties, changes in job titles, and changes in professional development/continuing education needs.

Staff levels are relevant to RQ7, which concerns the impact of technology on the allocation of human resources; however, the support staff member thought this topic might be addressed by interviewees in RQ6. The researcher agreed that might occur, but decided the coding process would take care of overlapping answers, since the primary objective during the interviews would be to encourage interviewees to address the study's eight research questions. All questions were asked in the same order for every participant.

One of the most obvious, yet insightful, comments came from a library director who also functions as a dean at his/her community college. The director thought it would be interesting to find out if interviewees thought technology had made, or was making, libraries obsolete. As indicated in the literature review, the relevance of libraries is being widely debated, which is a concern for librarians and others in higher education. Therefore, the researcher added a probing question to RQ4 that asked about the relevancy of the library in helping to accomplish the educational mission of the institution in light of changes in technology. Also added to the probing questions for RQ4, and based on feedback from the same director, was a question inquiring about technology and how it had changed the types of assignments being made, including usage of the library by students.

Lastly, a faculty member suggested the researcher should assist interviewees with RQ3, which inquired about the impact of technology on library services, by dividing the question into categories, i.e., services for students, faculty, the community, staff, etc.

Therefore, a probing question was included to ensure the categories were covered in the interviewee's response. The same faculty member indicated a probing question was needed for RQ2, which inquired about the impact of technology on organizational structure, that would ask about changes in the area of the "college hierarchy" to which the library reports. A probing question was added to inquire about changes in the person/position to whom the library reports.

In addition to the pilot process, there were other considerations regarding the study's semi-structured interviews. For instance, as indicated in Creswell's (2007) interview protocol, the researcher needed to ask participants to sign a consent form that stipulated the following items: the participant's right to withdraw from the study at any time; the purpose of the study; procedures used in the study; known risks, if any; benefits for participants; and efforts to ensure confidentiality (Creswell, 2007, p. 123). Creswell (2007) states that "a researcher develops case studies of individuals that represent a composite picture rather than an individual picture," so information that could identify individuals is not presented in the final study (p. 141). This study followed Creswell's guide, for as previously stated, identifying information was masked and coded to protect confidentiality. The study did not include individuals' or institutions' names when discussing interviewee perspectives. The four case colleges were identified as Case College A, B, C, or D.

Prior to the on-site visits, the researcher requested IRB approval to contact the proposed case colleges. After permission was granted from UNL's IRB office and after permission was granted from the proposed case colleges' IRB office, PIO, or CAO, the researcher invited library directors at the proposed case college libraries to participate in

the study. Directors who accepted the invitation were asked by the researcher to suggest the names of five individuals at their institutions for participation in the study. The researcher then contacted each of the suggested individuals to request an interview. In addition to the library director, participants at each college included a faculty member who teaches in a high enrollment area; the academic officer to whom the library director reports; a librarian; and a member of the library's support staff. A total of 20 individuals were interviewed, i.e., five participants at each of the four case colleges. The interviewees included 14 women and 6 men.

Three days were allotted for each of the four site visits; although, for logistical reasons, one of the site visits was reduced to two days. Interviews, observations, and public document retrieval were conducted during the visits. The researcher asked questions, recorded the interviews, took notes to supplement the recordings, and then had the audio recordings transcribed following the interviews.

Observations at participating libraries. Creswell (2009) suggests using an observational protocol for recording information during on-site visits that includes both reflective and descriptive notes (pp. 181-182). The researcher, as a "nonparticipant" observer (Creswell, 2007, p. 139) during site visits at the participating case college libraries in this study, wrote descriptive and reflective fieldnotes for items listed in the Non-Participant Observation Protocol in Appendix F. The observations verified each participating library's high technology designation and provided details about the libraries, such as the availability of personnel to assist students with technology, the existence of a smart classroom for library instruction, or the availability of open access computer areas in the library.

The researcher verified high technology designations using information or activities that were readily observable either in the participating libraries or on their websites. Usage of the observation protocol ensured sufficient comparable observations were made at each participating library. Bogdan and Biklen (2007) state that "the idea is to stimulate critical thinking about what you see and to become more than a recording machine" (p. 163); so, the researcher recorded all pertinent insights and observations that assisted in verifying levels of technology and in describing the libraries.

Public documents. Pinnegar and Daynes emphasize the need to "collect extensive detail about each site or individual studied" in order to "elucidate the particular, the specific" (as cited in Creswell, 2007, p. 126), and Bogdan and Biklen (2007) state that "increasingly, qualitative researchers are turning to documents as their primary source of data" (p. 64). In this study, the researcher collected public documents that contained "extensive detail" about the cases in order to (a) verify the level of technology at each of the participating case college libraries, and (b) obtain information that added to the descriptive details about the colleges and their libraries. Documents that were collected "as available" from the library directors or from the colleges' websites included the following items: campus master plan, reaccreditation study/report, annual library statistical reports, student and faculty library surveys, aspects of the library budget relevant to technology, library/college organizational charts, strategic or long range plans for the library, and library/college mission statements. The researcher attempted to verify with the library director at each case college that the documents collected were the most current available. Appendix G contains the Public Document

Review Protocol that was created to ensure a uniform document retrieval process was followed at each of the participating case colleges.

Data Analysis

Creswell (2007) compares the analysis of data to a spiral in which the process moves "in analytic circles rather than using a fixed linear approach" (p. 150). His non-linear approach to data analysis was followed in this study. The first loop, or circle, in Creswell's spiral is data management, which entails converting data to text and organizing it in a form that will allow easy retrieval and analysis. Computer programs are available to assist with this component of the research. Creswell states that computer programs tend to be "most helpful with large databases" (p. 165). The data for this study were considerable, so the researcher initially followed Creswell's guide and used specialized software to organize the data. Organizing and coding data in software, however, did not produce a comprehensive visual display for an adequate analysis, so a series of tables were created by the researcher. A table for each of the eight research questions was divided into rows for cases and columns for participants. Data files for each question were filed in the relevant table.

Initial data management steps for the study consisted of (a) using a transcription service; an independent, trained transcriber; and the researcher to transcribe interviews, and (b) creating documents for descriptive and reflective notes, observation notes, and public document notes. Data and documents were stored in computer files, and hard copy/print data were stored in a locked cabinet or in the researcher's locked office. Protocol forms that were created by the researcher, located in Appendix F and G, facilitated the organization of data. The data were read by the researcher multiple times,

as suggested by Creswell (2007, pp. 150-151), and categories of information started coalescing from that activity.

The next major activity, based upon Creswell's (2007) data analysis spiral, is to "describe in detail, develop themes or dimensions through some classification system, and provide an interpretation" (p. 151). Creswell states that detailed description is a good starting point when discussing a case in a qualitative study. Details need to be provided in the context of the case study's setting, place, or event (p. 152). The researcher included observed descriptions of the case colleges and their libraries. Quantitative data from the United States Census Bureau, Carnegie Classifications of Institutions of Higher Education, the National Center for Education Statistics, the Texas Higher Education Coordinating Board, and *The College Blue Book* were also included in the case descriptions. To protect the identity of case colleges, data numbers were rounded rather than exact, and in some instances ranges and approximate figures were used.

With multiple cases, such as this study of high technology libraries at four case colleges, Creswell (2007) suggests using a format in which a within-case analysis is followed by a cross-case analysis. The within-case analysis provides "a detailed description of each case and themes within the case," and the cross-case analysis follows in which themes across the cases are analyzed. Interpretations of meaning or assertions about the cases are also presented (p. 75). That is the methodology that was followed in this study. The within-case analysis and cross-case analysis are discussed in Chapter 4, and the interpretations or assertions about the cases are included in Chapter 5.

Creswell describes a word table approach for cross-case analysis that is suggested by Yin (as cited in Creswell, 2007), and that approach was adapted by the researcher when creating tables that facilitated the analysis of interview data. Yin's word table displays data about individual cases using a "uniform framework" that facilitates looking for similarities and differences among the cases (p. 163).

Coded categories were used to analyze the transcripts of interviews in a systematic manner. Stake (2010) defines coding as "sorting all data sets according to topics, themes, and issues important to the study" (p. 151). The coding for this study consisted of "lean coding," which Creswell (2007) describes as five or six initial categories that expand to additional categories as the data are reviewed and re-reviewed (p. 152). The initial categories in this study corresponded to the topic in each of the eight research questions. This is in line with Creswell's (2007) guide to use a priori, or pre-existing, codes and then to be "open to additional codes emerging during the analysis" (p. 152). In the same vein, Miles and Huberman (1994) refer to a "provisional 'start list' of codes" that derives from a study's "conceptual framework" or research questions, among other things (p. 58).

As much as possible, interviews in this study were coded using in vivo codes, which Creswell (2007) describes as "names that are the exact words used by participants" (p. 153). To cross-check the coding process used with interview transcripts, the researcher in this study asked a colleague to review and code independently passages in the text of a transcript to check for "intercoder agreement" (Creswell, 2009), i.e., to see if "another coder would code it with the same or a similar code" (p. 191) as the researcher. Outcomes of the cross-check showed that there was

intercoder agreement, for the same or similar codes were used, so the researcher proceeded with the coding process.

Methods of Validation

Creswell (2007) recommends that researchers "employ accepted strategies to document the 'accuracy' of their studies," which he calls "validation strategies" (p. 207). Specific strategies suggested by Creswell that were employed in this study include: clarifying researcher bias; using multiple and different sources of data "to shed light" on the study's "theme and perspective" (pp. 208-209); and using member checking to solicit library directors' views on the accuracy of the study's findings and interpretations.

In February 2012, the researcher emailed copies of the findings section and the implications for practitioners section of Chapter 5 to the four library directors at the case college libraries in this study. Three directors responded and indicated that they concurred with the findings and with the implications for practitioners. The fourth director stated that she would be responding after the initial email was sent, but no response was received. The researcher sent a follow-up email the next week; however, a response was not received.

Other forms of validation in the study included an alternative pilot process in which library personnel, a pool of experts, and several faculty members reviewed, critiqued, and refined interview questions—and a cross-check of the coding process for transcripts to check for intercoder agreement.

In addition, interview participants had an opportunity to review transcripts for accuracy. A transcript of each participant's interview was emailed as an attachment in June 2011. Of the 20 individuals who participated in the study, 11 participants

responded via email to verify that their transcripts were accurate, to clarify statements, or to correct spellings. Eight participants indicated that their transcripts were accurate and did not recommend any changes. Two participants clarified content that was marked "unintelligible" in the transcripts. Another participant clarified wording that was misconstrued due to what he/she labeled a "Texas accent." Misspellings of products and names were also corrected. For instance, in one case, TACHE, or the Texas Association of Chicanos in Higher Education, was incorrectly spelled Hitachi in the transcript.

Ethical Issues

Bogdan and Biklen (2007) caution qualitative researchers to follow ethical guidelines when conducting research. Several of the guidelines they espouse are relevant to this study, including honoring participants' privacy; informing participants about the length of the interview and adhering to it; protecting participants' identity; treating participants with respect; being clear about the terms of the agreement; and "tell[ing] the truth" when writing and reporting findings (pp. 49-50).

This study adhered to each of Bogdan and Biklen's guidelines. Regarding confidentiality, information obtained during the study was not connected to individual participants or institutions. To protect the identity of the participants and the research sites, participants were not named and case colleges were masked by coding the names of the institutions. It is possible that a diligent researcher could backtrack information that the researcher retrieved from documents and other credible sources and, thus, could possibly identify institutions and participants in the study. However, it would require a determined effort for an individual to do so. Data/information from documents and other

credible sources were important to include as descriptive detail about each case and as context for the impact of technology on each library.

Electronic data were stored in computer files in password protected computers. Portable storage devices, such as flash drives, and hard copy/print data were stored in a locked cabinet or in the researcher's locked office. All of the files for the study will be retained by the researcher for four years following completion of the study.

Regarding the transcribing process, transcripts of interviews were only viewed by (a) the researcher, (b) transcribers at the Bureau of Sociological Research at the University of Nebraska-Lincoln, and (c) two independent transcribers that were hired by the researcher and that were approved by the IRB and Research Compliance Coordinator at the University of Nebraska-Lincoln. All of the transcribers were knowledgeable about protocol and about research-related duties and functions because they had to certify that they completed CITI Limited Research Worker training in Human Research Protections. The independent transcribers enrolled in and completed the online CITI training required of all transcribers at UNL, per instructions from the IRB and Research Compliance Coordinator at the University of Nebraska-Lincoln.

In addition, a confidentiality statement that is included in Appendix E was signed and dated by all of the transcribers. Copies of the signed confidentiality statements will be retained in the researcher's files for four years. Transcribers agreed to ensure information contained on audio recorded tapes and in interviews was held in confidence. The independent transcribers informed the researcher that they deleted all audio files and transcripts from their computers and external drives after they transcribed the interviews. After one of the independent transcribers encountered computer difficulties, she aborted

the process of downloading audio files to her computer and withdrew from the project before interviews were transcribed. The Bureau of Sociological Research has followed standard protocol for the bureau, which is to maintain transcripts of interviews transcribed by employees in their office in secure files for verification purposes.

Of the 20 interviews transcribed, the Bureau of Sociological Research at the University of Nebraska-Lincoln transcribed 9 interviews, the independent transcriber who remained with the project transcribed 6 interviews, and the researcher transcribed 5 interviews. To ensure interviews were accurately transcribed, the researcher reviewed all of the interviews that were transcribed by the independent transcriber and all of the interviews that the researcher transcribed, which resulted in 11 interviews going through the transcription process twice to ensure accuracy. In addition, portions of the interviews that were transcribed by the researcher were checked independently by a colleague of the researcher.

The process of transcribing 20 interviews took approximately two months to complete and was labor intensive. All of the transcribers, including the Bureau of Sociological Research employees, used Express Scribe, which is software that is freely downloadable from the web, to transcribe interviews. The software has a playback component for audio recordings that is controlled by a foot pedal. An Infinity foot control pedal was purchased to facilitate the process; however, it was not required, since the keyboard also controls the audio. The researcher used an Olympus VN-6200 PC digital voice recorder to record interviews and a Sony cassette-recorder to provide back-up. Only one malfunction occurred with the digital recorder during an interview, and the

cassette recording of that interview was used to transcribe the portion of the interview that was missing.

In accordance with the IRB consent form that participants signed before data were collected, all participants were fully informed about the design and purpose of the study. Participants were also informed in the introductory letter sent by the researcher that they would have an opportunity to review their transcripts for accuracy after the interviews were transcribed. The final verification of transcripts indicated that overall the interviews were recorded and transcribed accurately.

Summary

This chapter has explained the research design and methodology for conducting this study on the impact of the adoption of technology on four high technology community college libraries in Texas. The bounded multi-site, multi-case study followed methodologies recommended by Creswell (2007) and other qualitative researchers for multiple case studies. Validation measures and ethical guidelines for the study were also discussed in this chapter. The next chapter, Chapter 4, includes the study's findings in the context of a within-case analysis and a cross-case analysis. The final chapter, Chapter 5, discusses the major findings, provides implications for practitioners, and includes suggestions for future studies.

Chapter 4

Analysis of Data

Introduction

This chapter includes an analysis of data collected from interviews with participants; observation fieldnotes; and public documents that were gathered on-site or found on institutional websites at four community colleges in Texas. The observation fieldnotes and the public documents were also used to verify the high technology designations of case college libraries. Appendix F includes the non-participant observation protocol, and Appendix G includes the public document review protocol.

All of the on-site visits were scheduled during a period of two months in spring 2011. Participants at each of the community colleges included a faculty member who teaches in a high enrollment area; the academic officer to whom the library director reports; the library director; a librarian; and a member of the library's support staff. To protect the identity of the participants and the institutions, participants were not named and the case colleges were identified in the analysis as Case College A, B, C, or D.

Interview questions were organized around the study's eight research questions that focused solely on the impact of technology on eight areas at each community college library, i.e., physical structure, organizational structure, services, ability to help meet the institution's educational mission, capital and operational budgets, personnel, allocation of human resources, and collections. Participants in the study each participated in and constituted an interview. After the participants were interviewed, audio recordings of the interviews were transcribed, and participants had an opportunity to verify their interviews.

Analysis of the interviews started with an in-depth coding process that commenced after all of the interviews were transcribed and verified. An initial attempt to code the transcripts involved using ATLAS.ti software, which is a qualitative data analysis tool that organizes and retrieves data for large projects or studies. The final product, however, did not produce a comprehensive visual display for an adequate analysis. Therefore, the researcher divided participants' responses to interview questions into eight categories, or themes, that corresponded to the study's eight research questions, and a table was created for each theme. The tables were not part of ATLAS.ti. The process was created by the researcher. Figure 2 is a photograph that presents an angled view of the physical structure table and the seven tables that follow it. Light weight insulation board and duct tape to anchor the clear plastic folders were used to create mobile tables that could be stored in a secure office area. The tables were 5'8" long; 4' high; and 3/4" thick.

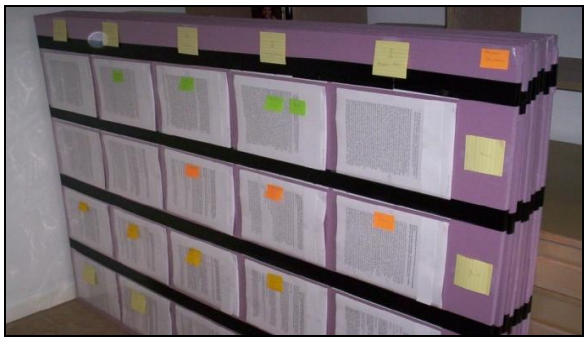

Figure 2. Three-dimensional thematic tables that facilitated data analysis.

When creating the first table, the researcher gathered responses to interview questions one through three that dealt with the impact of technology on the physical

structure of the library. The responses to questions one through three were then filed in the flexible plastic folders in the physical structure table according to participant title/position and also by case. So, for example, each faculty member's responses to questions one through three were filed in the column designated for faculty and in the row according to case. The process was repeated in the physical structure table for each participant. This type of table was created for all eight research question themes/categories, i.e., physical structure, organizational structure, services, ability to help meet the institution's educational mission, capital and operational budgets, personnel, allocation of human resources, and collections. This manual, three-dimensional process for organizing, sorting, and connecting data assisted the researcher in manipulating and filtering the data.

In conducting the analysis for this study, the researcher followed the guide of Creswell (2007), whose typical format for multiple case studies "is to first provide a detailed description of each case and themes within the case, called a within-case analysis, followed by a thematic analysis across the cases, called a cross-case analysis" (p. 75).

Creswell (2007) states that "the researcher analyzes the data for specific themes, aggregating information into large clusters of ideas and providing details that support the themes" (p. 244). The themes in this study were aggregated into "large clusters of ideas" (p. 244) predetermined by the study's research questions. Both the within-case analysis and the cross-case analysis deal with issues related to the impact of technology on each case college's physical structure, organizational structure, services, ability to help meet the institution's educational mission, capital and operational budgets, personnel,

allocation of human resources, and collections. Creswell cites Stake, who calls this form of analysis the "development of issues" (as cited in Creswell, 2007, p. 244).

Within-Case Analysis

Tables that provide context for the with-in case analysis are included in this section. Table 3 shows the Carnegie Classification, both area served and size, for the four case colleges in the study.

Table 3

Classification of Case Colleges Using Carnegie Classifications

Case College	Area Served	Size
A	Public Suburban-Serving	Medium Two-Year
B	Public Rural-Serving	Medium Two-Year
C	Public Rural-Serving	Large Two-Year
D	Public Suburban-Serving	Medium Two-Year

Source. Carnegie Foundation for the Advancement of Teaching. (2011).

As indicated in Table 3, two case colleges serve rural areas and two serve suburban areas. Carnegie defines rural and suburban institutions as follows:

> Urban-serving and suburban-serving institutions are physically located within Primary Metropolitan Statistical Areas (PMSAs) or Metropolitan Statistical Areas (MSAs), respectively, with populations exceeding 500,000 people according to the 2000 Census. Institutions in PMSAs or MSAs with a lower total population, or not in a PMSA or MSA, were classified as rural-serving. (Carnegie Foundation for the Advancement of Teaching, 2011)

Only one case college in the study is classified as a large community college, and the other three are classified as medium-sized community colleges. Carnegie defines size as follows:

> Institutional size is based on full-year unduplicated credit headcount, where small is defined as less than 2,500; medium as 2,500 through 7,500; and large as greater than 7,500. Size is based on IPEDS data for 2008-2009. (Carnegie Foundation for the Advancement of Teaching, 2011)

The first three items in Chapter 3's Table 2, i.e., C11, C14, and C18, list selected 2009 library technology budget data for the case college libraries. Additional 2009 budget information is included in the following table, i.e., Table 4. The table provides selected asset and revenue information from the case colleges' overall 2009 budgets. To protect the identity of the case colleges, data numbers in Table 4 are rounded rather than exact.

Table 4

Selected Budget Information from Case College Financial Profiles

Institution	Net Asset	Tuition/Fees	State Appropriations	Maintenance Ad Valorem Taxes
Case College A	41,000,000	6,000,000	10,000,000	9,000,000
Case College B	59,000,000	7,000,000	13,000,000	6,000,000
Case College C	71,000,000	12,000,000	25,000,000	33,000,000
Case College D	40,000,000	4,000,000	14,000,000	7,000,000

Note. Adapted from Texas Higher Education Coordinating Board. (2011b).

The last table provided in this introduction to the within-case analysis section of the study is Table 5. It is an observation checklist that the researcher used to verify each participating case college library's high technology designation and to obtain details about the libraries. Per the Non-Participant Observation Protocol form located in

Table 5

Observation Checklist Used to Verify High Technology Designation of Case College Libraries

	Case College			
Technology Item	A	B	C	D
Online access to databases	Yes	Yes	Yes	Yes
Off-campus access to databases	Yes	Yes	Yes	Yes
Availability of electronic books	Yes	Yes	Yes	Yes
Open access computer lab in library	Yes	Yes	Yes	Yes
Librarian(s) embedded in online courses (e.g., Blackboard)	No	Yes	No	Yes
Copy center in library for students and/or for faculty	No	No	Yes	No
Instructional design support area for students/faculty	Some	No	Some	Some
Instructional "smart" classroom for library instruction	Some	Yes	Yes	Yes
Online tutorials	Yes	Yes	Yes	Some
Online federated, multi-search capability	No	Some	No	Some
Online reference service	Yes	Yes	Yes	Yes
Online subject guides to web sources, databases, books	No	Yes	Yes	Some
Journal search capability (e.g., TDNet/Serials Solutions)	No	Yes	Some	No
Personnel available to assist students with technology	Yes	Yes	Yes	Yes
Librarians available to assist students with databases	Yes	Yes	Yes	Yes
Microsoft Office on computers in library	Yes	Yes	Yes	Yes
Off-campus access to a college network drive	No	No	No	No
Capability for digitizing materials in the library	Some	Yes	Some	No
Web pages maintained by the library	No	Yes	Yes	Some

Note: "Some" indicates (a) that at least one participant said "yes" and at least one participant said "no"; (b) that the researcher saw some evidence of the item, but not enough to record a definitive "yes"; or (c) that the item is available in the library's building, but the library is not responsible for the service or activity.

Appendix F, the researcher recorded descriptive and reflective notes during and following non-participant observations at the case college libraries. The researcher also reviewed available public documents, websites, and other information to corroborate survey data and to verify high technology designations, per the Public Document Review Protocol form that is located in Appendix G. In some instances, the libraries indicated they had added technology that was not available at the time of the 2009 survey, e.g., the ability to digitize documents, so that information was incorporated into Table 5.

The within-case analysis of each case in this study begins with descriptive information that is intended to "generate a picture" (Stake, 2006, p. 3) that is rich and detailed. Quantitative data was obtained from the United States Census Bureau, Carnegie Classifications of Institutions of Higher Education, National Center for Education Statistics, Texas Higher Education Coordinating Board, and *The College Blue Book*. Researcher observations from site visits to the colleges have also been included.

Following the "detailed description" (Creswell, 2007, p. 75) of each case are the themes within the case that relate to the impact of technology on the library's physical structure, organizational structure, services, ability to help meet the institution's educational mission, capital and operational budgets, personnel, allocation of human resources, and collections.

The researcher examined participants' responses that derived from one-on-one interviews with five individuals that took place at each of the four case colleges. Since the participants have different roles and responsibilities, they brought unique perspectives to the interviews. Participants at each college included a faculty member who teaches in a high enrollment area; the administrative officer to whom the library

director reports; the library director; a librarian; and a member of the library's support staff.

To protect the identity of the participants and the institutions, participants were not named and the names of case colleges were masked using coding. The term "interviewee" is used interchangeably with the term "participant" when referring to individuals who were interviewed, and the four case colleges are identified as Case College A, B, C, or D.

Within-case analysis of Case College A.

Description. Case College A is classified by Carnegie as a medium-sized public suburban-serving community college. Although the college is located near a large metropolitan area, the town in which the college resides has a relatively small population of approximately 25,000. According to census data, about 22% of the population has a bachelor's degree or higher compared to 25.8% statewide. The median household income is approximately $45,000 a year, which is slightly under the statewide median household income of $49,646. Approximately 15% of the population fell below the poverty line between 2006 and 2010, and the state average is approximately 17%.

It should be noted that in addition to statistical data about Case College A and the community in which the college resides, descriptive information is also included in this section that is based upon researcher observations from the site visit to the institution during spring 2011. The observations are intended to present a picture and to add the detail that Stake (2006) and Creswell (2007) advocate including in a qualitative research study. Statistical data were obtained from the United States Census Bureau, Carnegie

Classifications of Institutions of Higher Education, National Center for Education Statistics, Texas Higher Education Coordinating Board, and *The College Blue Book*.

Although Case College A has some education centers in other locations, the main campus is in a busy part of town that is somewhat removed from the heart of the town. It is surrounded by apartments and a middle class older neighborhood on one side. On the other side, one block over, a commercially active road with restaurants, businesses, and hotels connects the college with a major highway. Ample parking is available, and landscaping is not a primary focus—perhaps due to rough terrain with sharp inclines. The obviously older buildings are in need of repair, so there is a comfortable, but worn and dated look to the school. Early in the morning and between classes during the day, students, many of whom dress in ranch type garb, mill about on campus. The college has a housing/dorm area that is within walking distance for students.

The student population is between 5,000 and 7,500, and the ethnic breakdown is approximately 81% White, 10% Hispanic, 3% Black, and the remainder other ethnicities. The overall population for the state is approximately 45% White, 38% Hispanic, 12% Black, and the remainder other ethnicities, so the ethnicity of this college does not reflect the ethnicity of Texas. It is a predominantly White institution.

Enrollment at Case College A grew almost 30% between 2005 and 2010. To keep up with rapid growth, the faculty appears to have expanded—primarily by hiring adjuncts. Part-time faculty outnumber full-time faculty by almost a third.

The library, built in the late 1960s, has a welcoming environment. Plants are everywhere, and space is used to the maximum. The library is a two-story building with glassed-in offices and rooms located on the perimeter of the floors. Shelving ranges with

books are evident, but computers for students are a central focus. Library staff is spread out in the library for maximum service coverage. Impressive signage informs users of the considerable services and resources the library offers. A computer lab is located in Case College A's library, but the director of the lab does not report to the library's director.

This within-case analysis of Case College A covers the impact of technology on the following library related themes: physical structure, organizational structure, services, ability to help meet the institution's educational mission, capital and operational budgets, personnel, allocation of human resources, and collections.

Impact of technology on Case College A library's physical structure. According to input from participants, space needs at Case College A are considerable. The college failed to pass a bond election that was intended to fund several building and renovation projects, including projects at the library. To fill needs not met due to the failed bond, every room on campus is being used to the maximum. The library's computer lab has been placed in a difficult situation—largely due to space and technology needs on campus. As stated in one interview, the computer lab is "kind of a tricky thing to call or talk about" because the library operated the lab for student use and library instruction until approximately three years ago, when another area on campus that needed space, computers, and offices was moved into the library's lab area. This had a significant impact on the library. The computer lab could no longer serve as an open access general purpose lab and library instruction area; instead it was repurposed for use by faculty and classes. According to two interviewees, faculty have priority in scheduling their classes in the lab, since their technology needs cannot be met in many of the classrooms on

campus. Library personnel accept these circumstances because they realize similar alternative facilities for faculty are not available at the college.

A theme that emerged at Case College A, as stated by a participant, is that the library has been "retooled and reinvented" because the impact of technology has been so significant. For instance, the library is moving from print to online resources, so shelving for periodicals and reference materials is decreasing. The library has added computers and computer work stations—and they are filling every available space in the library. A project in which wiring has been added to areas and tables so plugs are available to accommodate students' laptops is mentioned by most participants. Wireless access has also been increased and is now available throughout the library.

As technology evolved over the past fifteen years or so, Case College A library's physical space changed in other ways as well. For example, space dedicated to audiovisual equipment morphed into a media center with computer applications that could do the work that bulky equipment used to do. An interviewee states that "the new trend is going away from AV media and we are calling it information resources." The information resources area contains computers, HDTVs, LC projectors, laptops for checkout, handicap accessible equipment, and other resources that are needed by students and faculty.

Impact of technology on Case College A library's organizational structure. According to input from three participants, an area in the institution's organizational structure that has been significantly impacted by technology at Case College A is the IT department—and developments in that area have in turn impacted the library. Even

though IT is a separate entity at the institution, issues related to information technology emerged as a primary theme related to the library.

IT does not report to the library at Case College A, and it is not part of the library's chain of command, but it does share some technical duties with the library. For instance, a highly competent employee in the library's technology area has been assigned the lead role in responding to the college's technology requests, while IT assumes a secondary role for those requests. In other words, the library receives requests for technology assistance on campus before requests are sent to the IT department.

Understandably, the technology employee in the library is in demand on campus—to the point that the IT department would like to transfer the employee out of the library and into the technology department. An interviewee explains that the library has "had to fight two IT directors for that [i.e., to keep the employee in the library]. They want to have total control."

Instead of moving an employee out of the library, one participant thinks that the college needs to move a technician, or technicians, from the IT department to the library because the technology department is "sort of buried in a different corner." Regarding that perceived need, the participant states:

> You know the library is just sort of the hub to me at the college because that is where your students come, that is where your community members come, so I would like to see a reorganization where we shift some of those technicians into the library and they have a bigger face on campus so to say, so that that's a place when students come in and they have got a computer and something is wrong with it they know automatically this is information resources. Well, information resources covers a lot of things and I think technology is evolving and the libraries are going to evolve, so I see the need for that to occur. . . .

Although not related to technology, the library's reporting structure has been altered during the last 10 to 15 years. The library reported directly to the vice president

of instruction until a reorganization at the college placed the library under a senior administrative officer in the college's instructional area during the last few years. The main impact has been an additional layer in the flow of information up and down the communication chain, according to an interviewee. Within the library, the organizational structure has remained flat and stable during the last 10 to 15 years. The staff is small, so all employees report directly to the library's director.

Impact of technology on Case College A library's services. As the library moves away from a focus on print and audiovisual materials and toward an online information resources concept, it continues to add online access to databases containing journal articles, magazine articles, newspaper articles, and collections of ebooks. A participant mentions the importance of TexShare, a resource sharing consortium sponsored by the Texas State Library that enables libraries to purchase a core set of databases at a discounted set price that is based on enrollment. TexShare has enabled Case College A's library and most libraries in Texas to expand their database offerings.

The participant notes that the college recently completed its self study report for the Southern Association of Colleges and Schools (SACS), and he/she states that "we constantly are struggling with these rural areas that we have to provide the same access." Online subscription databases are one way the college is providing parity of access for students in rural areas. Although there is an effort for the library to increase its off-campus access capabilities, the participant notes that some students do not have access to computers at their homes. They depend upon the library's computers "to complete their coursework."

In addition to the availability of computers and databases, participants mention other services that have been impacted by technology, including an online catalog that takes the place of a physical card catalog; online tutorials in multiple formats that are easily accessible on and off campus; wireless access throughout the library that assists in addressing lack of power and wiring issues; laptops that are available for checkout; smart classrooms on campus that are used to train students to conduct research using online resources; a professional development area that offers webinars and technology related workshops for faculty; technology assistance with podcasting, You Tube conversions to video, and other activities; better accommodations for students and faculty with disabilities; and the ability to locate journal articles and books in databases that previously may have required using an interlibrary loan service.

Services that have been discontinued due to the impact of technology are extensive. Three interviewees mention changes dealing with microform machines that were used for printing and copying. The machines were removed when periodicals became available in online databases. Work stations with CD-ROM towers also disappeared after information on CDs was delivered in an online format. Some large sets of reference books were discontinued in hard copy form and purchased in databases because, according to a participant, "students just would rather use the computer version." One of the interviewees observes that paper journals have all but disappeared, stating that "there are still a couple of paper journals that we keep there, but I think as time evolves those will continue to be phased out because they're available online." An interviewee also mentions the change from two-way interactive classrooms to digital video classrooms.

As for services being planned due to the adoption of technology, an interviewee anticipates adding a technology person to the library's staff and he/she also envisions the library using technology such as cell phones or smart phones to provide services. Another interviewee states that students are already using their phones to take pictures of call numbers instead of writing the numbers down "like you or I would." Both interviewees anticipate students increasing their use of mobile devices to access the online catalog and library databases. The second interviewee thinks new services at the library will include an online chat service and a text a librarian service for synchronous communication with faculty and students. In addition, the library will probably be investigating "what's free on the Internet," since funding is tight; however, the library may also be increasing access to online journals and databases.

Impact of technology on Case College A library's ability to help meet the educational mission. Two themes emerge in this section on helping to meet the institution's educational mission—the importance of the computer lab and the importance of library databases. The general consensus among participants at Case College A is that the computer lab that is located in the library is one of the most important ways in which the library assists students in meeting the educational mission of the college. The lab may be moved out of the library since the director of the center does not report to the director of the library; however, computers will continue being a part of that area—it will function as a general computer lab and as an instructional classroom for library skills training, according to an interviewee. He/she states that "in our area, we have a lot of students that aren't going to be able to be given a computer and say 'go be successful'—they're still going to have to have that human element.

They're going to need guidance." A second interviewee states virtually the same thing: "We're working with kind of high risk students that sometimes are left out, and I think they're the ones who need one on one." The first interviewee makes an additional point about the need to continue teaching technology to community college students. He/she states that "technology is going to change every month, so it's not like our students are going to learn technology today and then they're not ever going to need it again."

Participants list the following areas in which library technology assists in meeting the college's educational mission: the library's Docutek data storage server that provides an online venue for faculty to place reserve materials, including course syllabi, for their students; TexExpress, which is an interlibrary loan and document delivery system that is available via TexShare; computer carts that are delivered to classes for use by instructors who do not have computer labs available; extensive hours that enable students, especially students living in dorms, to use resources when all other labs and support services are closed; accessible database resources 24/7 for online students; technical resources and services for special needs students; research assistance for faculty needing specialized resources, for example for the nursing program's simulation lab; an array of medical databases, DVDs, and a designated area in the library for allied health students to access databases; a new database with documentary films for various subject disciplines; article databases for specific areas on campus, e.g., the English and Science Departments; research instruction on electronic resources for students upon request from faculty; and computer software for math and keyboarding courses that students may use in the library.

Faculty, including a faculty advisory committee, advise the library on issues related to student and faculty needs; serve on library hiring committees; and perform other functions that assist the library in serving its students. One participant notes that in the past instructors have asked students to get several books for research assignments, but that appears to be changing. He/she states:

> What the students have been reporting to the instructors over time, though, was that that just doesn't work, especially depending upon their topic, so again that's where kind of Ebsco falls into and J-Stor—they've become really popular because they can go over to that you know and just do a topic search and . . . they just dive into the material.

Regarding the relevancy of the library as it pertains to the educational mission, another participant states:

> The library is going to be retooled [due to changes resulting from technology], and we are going to jump on that wagon or we will probably be left behind because I think students, our consumers, are going to demand it. . . . But I don't think we are going away.

Impact of technology on Case College A library's capital and operational budgets. A theme that emerged regarding capital and operational budgets is that library technology budgets may be among the most complicated on college campuses. Participants at Case College A's library mention various areas from which library related items are funded, e.g., technology in the library's Faculty Development Room was funded by a Title III grant; the copier/fax machines were funded by the IT Department; and the library's rewiring and Wi-Fi projects were funded by the Maintenance Department's budget. In addition, the library's computers have been funded at various times by TIF—the Texas Infrastructure Fund—grants; the college's IT Department; and the VP's Office.

Recent expenditures include a new server for the library and an upgrade to its integrated library system that also includes a new service agreement for $15,000. Databases, although largely funded by the TexShare program, are expensive. An interviewee states that a budget transfer from the book and AV account to the software account in the previous year enabled the library to purchase databases that were requested by faculty.

The same interviewee summarizes the impact of technology on the library's budget, saying the budget "has grown greatly. I would say, well with the software, you know, I know that the budget has more than four times what we started with, and of course TexShare is a big part of that savings." Another participant states that he/she has observed a "steady increase" in the budget over the years, especially as the library purchased databases "to fill in the gaps" in areas where specialized subject databases are needed. For instance, Medline was purchased to fill a need in the allied health areas.

All five participants indicate that the college's budget for the next fiscal year will be lean due to budget cuts from the state. Along with all departments on campus, library purchases will be minimal. An interviewee states that "we need to leave that money allocated to book collections, electronic resources—we need to let that be adequate, but we're looking at zeroing equipment." Another interviewee notes that the library has "had to look at about a 10% cut," so instead of asking for more and expecting less, the library, and entire campus, is having to "do more with less." Capital expenditures are virtually non-existent since the college failed to pass a bond election that was intended to fund several building and renovation projects, including projects at the library.

Impact of technology on Case College A library's personnel. Job titles and salary levels for library positions at Case College A have remained consistently the same from 1995 to 2010, or in some cases have "gone backwards," according to an interviewee. He/she explains that approximately eight years ago, the college participated in a job analysis project that sought to standardize job titles and salaries in an equitable way. The outcome of that project was less than desirable since, as the interviewee states, individuals involved with the project did not "respect how much the staff used technology, and the librarians too." He/she felt the positions warranted a higher rating in the reclassification that resulted from the study.

Another participant explains that job titles at the library are essentially generic because "a reference librarian is still a reference librarian." He/she thinks that duties tend to be the same duties that have always existed; however, with technology, the employee may now be doing "less of one and more of another" job task. Regardless of the degree of change, though, the participant sees the need for staff and librarians to receive "constant training," in order for library personnel to be "one step ahead of the students" as technology evolves.

Library personnel "have to have technology skills" and for that reason library jobs have "become harder," according to another interviewee. He/she states that former employees "who have worked here have come back for jobs and have never had any computer expertise, so [we] couldn't hire them." A different participant shares his/her personal experience, stating:

> You know when I came in there weren't computers on this campus, but I think in order to survive you have to make a decision. You have to make a decision to change. You have to make a decision—you don't have to like technology, but

> you have to embrace it and you have to use it to help you do your job more effectively and more efficiently.

An interviewee describes some library support staff jobs that are dependent upon using technology to accomplish job tasks. He/she states that the library employs "an acquisitions clerk, and I don't think we would without technology. And we have a cataloging assistant and I don't think we would without technology—because she wouldn't be able to catalog if it wasn't for technology." Regarding librarians, another interviewee says "you can no longer have a librarian that doesn't know computers. If you have a librarian that doesn't know computers, I don't know where that librarian has been."

Accepting and using technology in the library has not been easy for some employees, though, according to one of the participants. He/she states:

> I would say now people are willing to accept it, but it's just really hard to in some cases, depending upon their skill level of how it is. We do have some staff that is real reluctant still to adapt to it, but you know when we actually have it in place they just—it just takes them a while, but they'll actually then you know just, they don't want to, but they will have to [adapt to it].

A participant does not view acceptance or rejection of technology as an age related phenomenon. He/she explains as follows:

> We have a range of people all the way from the student worker who is 18 to the middle aged person—or some people here have been retired and have come back to work and things like that. So we've got a very broad age spectrum, and I think everybody here has adapted pretty well.

When asked how the adoption of technology has impacted relations among library personnel, every participant at the Case College A library said that technology has improved relations. The reasons given include the following: communication improved, primarily due to email; library personnel are more involved in library

operations because everyone has to know about technology; technology has streamlined work in that "there's a right way to do it and there's not three different people's perceptions of how it should be done"; and it has brought the staff closer because they "have to work together, but . . . each of the staff have their own specialty."

One library worker's name is mentioned repeatedly. Participants invariably express admiration and respect for the technical skills and knowledge of this person. For instance, he/she is described as being "on the cutting edge" and a person who "knows everything that is going on." This early adopter of technology hears about updates and other issues related to technology before most other areas on campus, and he/she works closely with IT to coordinate the library's technology initiatives.

The IT department was responsible for the library's website until recently when the public information office was assigned responsibility. An interviewee states that "the library is not always the first and so for five years we have been working on the website." It is not clear if the change is a beneficial one, since concerns continue, and the library website is still not a priority.

Impact of technology on Case College A library's allocation of human resources. Although there is some overlap with personnel issues, the allocation of human resources is focused on the increases or decreases in library personnel as the college allocates resources to fill positions. According to an interviewee at Case College A, the primary area in which technology has impacted the allocation of human resources at the library is in the addition of a part-time evening technician who was hired to assist students and faculty with technology. The intent in hiring that employee was to have an evening equivalent to the daytime technician, who is the liaison with the IT Department. An

additional full-time technology employee is also needed—perhaps an employee who is moved from the IT area to the library—however, with the budget constraints currently in place, the interviewee does not see that happening.

Another interviewee credits the impact of technology for the extension of the reference librarian's hours from part-time to full-time status, stating he/she is needed to help students "one on one" with the databases. The technical services librarian position, which was changed from an acquisitions assistant position, is also mentioned. The librarian in this new position has enhanced the library's report making process using the integrated library system. He/she produces budget reports and "a lot of reports for faculty . . . [for example] bibliographies." An interviewee points out that the addition of two full-time librarian positions fulfilled a SACS reaccreditation requirement.

Two participants mention the desirability of adding a full-time support staff employee to work at the circulation desk. Job tasks at that desk include working with an automated check-out system, as well as assisting students with the printer and other technology needs. Regarding that needed position, one of the participants observes the following:

> Technology has increased the need for more people. You know technology is good when it makes the job easier, but when it makes more steps in a job, it really takes more time . . . I know at the counter, people don't realize how many students come and ask for help and of course we check out headphones and reserves and books.

Another participant states that the current part-time circulation desk employee "does the work of three people because [he/she] has computers," and he/she goes on to note that "technology is supposed to make it more efficient, but sometimes people argue no it doesn't, so I don't know." The main problem regarding the need for a full-time

circulation desk assistant is the lack of coverage when the part-time person is not scheduled to work.

Impact of technology on Case College A library's collections. A participant observes that although "there are professors that still make their students look up things in paper, it seems to be less and less. When I first got there, it seemed like half the faculty wanted something in paper." The participant also notes that the library used to order circulating books by O'Henry and Hemingway, but now that many titles are available online, those basic titles are not being ordered as much. Another interviewee questions if "over time could it be that it becomes we don't have any shelved books anymore or we just have Kindles and . . . online books." But he/she goes on to state that "who knows thirty years from now, but for within the next few years that I can envision, I think we'll just continue to enhance with online resources, but keep some traditional resources there." A third participant appears to agree with that sentiment, for he/she states:

> I don't see us going away from the collections, but I think you're going to see a greater reliance on the electronic resources simply because that's the most efficient way that everyone on this campus that calls themselves a [name of college] student—that they can access information.

An interviewee describes a theme that is evident regarding changes in the reference collection and other print materials due to technology. He/she states that Case College A library's "bigger large volume series," such as publisher Gale's reference book sets, have increasingly been pushed aside as more electronic resources are available. The same movement has been observed with periodical titles. Physical volumes are only kept for the departments that "absolutely want or need" the titles for their classes. Areas like the allied health programs "have a lot of their resources online

and it has helped a lot during clinicals," according to another participant. He/she states that "it allows them access from the hospitals" or from home.

Even reserve collections have felt the impact of technology. A participant describes a data storage server, which is part of the library's integrated library system, that has multi-purpose capabilities. He/she states that the library can "scan in documents, articles, whatever it is that instructors supply us with, including like syllabuses, stuff that the instructors never even thought about, and provide that for everybody." Before purchasing the data storage server, items on reserve used a great deal of shelf space and there were copyright issues. Now, the participant says "it's all copy protected so it allows us to put a lot, even more materials up there." Students use a "standard password" that is "universal" to access materials off-campus.

Another theme that is stressed by one participant at Case College A is the struggle to understand ebooks as budgeted items that may not be available for continuous ownership; that may be hosted off-campus; and that may be charged to a book budget, software budget, or technology budget. The business office requires annual inventories of its print collections and appears hesitant to approve database purchases of books and/or collections that the library does not own. Consequently, a participant mentions a need to communicate and develop a relationship with the individual in charge of the business office to facilitate purchases.

Within-case analysis of Case College B.

Description. Case College B is classified by Carnegie as a medium-sized public rural-serving community college. Although the population of the town in which the college is located is small, approximately 13,000, the college serves several nearby rural

towns and one medium-sized town. According to census data, about 19% of the population in the town where the college is located has a bachelor's degree or higher, compared to 25.8% statewide. The median household income is approximately $44,000 a year, which is less than the state's $49,646 median household income. However, only 13% of the population fell below the poverty line between 2006 and 2010, and that is below the state's 16.8% level.

It should be noted that in addition to statistical data about Case College B and the community in which the college resides, descriptive information is also included in this section that is based upon researcher observations from the site visit to the institution during spring 2011. The observations are intended to present a picture and to add the detail that Stake (2006) and Creswell (2007) advocate including in a qualitative research study. Statistical data were obtained from the United States Census Bureau, Carnegie Classifications of Institutions of Higher Education, National Center for Education Statistics, Texas Higher Education Coordinating Board, and *The College Blue Book*.

Case College B's campus is surrounded by an obviously older, somewhat rundown neighborhood, except for a busy road and intersection that is located in front of the college. For the most part, the college's buildings are aged and dated, and landscaping is minimal. A long central mall connects the main core of the campus, but building entrances do not necessarily open onto the mall. For instance, the library's entrance opens onto a small parking area that is perpendicular to the mall.

The college has approximately 500 housing spaces available for students in nearby campus housing. The student population is between 5,000 and 7,500, and the ethnic breakdown is approximately 62% White, 11% Hispanic, 19% Black, and the

remainder other ethnicities. The overall population for the state is approximately 45% White, 38% Hispanic, 12% Black, and the remainder other ethnicities, so the ethnicity of this college does not reflect the ethnicity of Texas. It has a greater White and Black population and a lower Hispanic population.

Enrollment grew almost 39% between 2005 and 2010. As with Case College A, the faculty has expanded to keep up with the college's rapid growth, and adjuncts outnumber full-time faculty. Currently, there are approximately one third more adjuncts than full time faculty.

Case College B's library is a 1960s era building. It was built in the same decade as Case College A's library and is similar in structure. Thelin (2004) observes that "one estimate was that on the average, a new public community campus opened each week [in the United States] during the decade starting in 1960" (p. 300), so a number of community college libraries in Texas were built during that period.

Case College A's library consists of a stand-alone facility with two floors, a centrally located stairway, and offices and rooms situated on the perimeters of both floors. Furniture, carpeting, signage, and décor are worn and dated. Plans for refurbishing are on hold as the college struggles with budget issues. A large multi-purpose, high tech computer lab is available on the second floor of the library, but only part of the lab currently reports to the library.

This within-case analysis of Case College B covers the impact of technology on the following library related themes: physical structure, organizational structure, services, ability to help meet the institution's educational mission, capital and operational budgets, personnel, allocation of human resources, and collections.

Impact of technology on Case College B library's physical structure. Prior to 1998, technology at the library was "very basic," according to one of the interviewees. He/she states that "there really were no computers in the library" until 1998 or so. At that time, a computer center was established on the second floor of the library that combined developmental English, writing, and math areas with a computer lab for the library. According to the interviewee, all of the computer labs on the second floor except the library's lab, will soon be "migrating out of there . . . and all of that area up there will belong to the [library]."

Major renovations are needed in the library, according to another interviewee, who hopes there will be "a total renovation," especially in the area where labs are moving out. Among other things, he/she envisions adding several study rooms that function as follows:

> The study rooms that we want to do would be both for independent study, some small ones, but some larger ones through group study. And in those group study rooms to have the technology that they would need to do whatever they need to do for their class. . . . And they would have access to a computer and a board projection system and so forth.

However, the state's budget crisis is a recurring theme among the case college libraries. It has interrupted Case College B's building and renovation program, and thus, the library's vision for an improved facility. Originally, the library was projected to be the last building on campus to be renovated in the current rebuilding program; however, those plans are now on hold for at least two, or maybe three, years.

Interviewees envision changing the building's appearance to a more contemporary look. One of the interviewees describes incorporating a learning commons concept where students could get together in groups of 6 to 8; "have access to

computers and work on projects together"; and perhaps have a coffee bar, which would create a "relaxing, inviting environment." Opening a coffee bar in the library is not possible, though, until renovations occur, for as another interviewee states, "We can't plug in a coffee pot without blowing up a fuse." A third interviewee explains that "right now, we're struggling with not enough electricity, not enough sockets, not enough ability to get the computers wired up."

Although there are 14 computers in the downstairs area, plus 15 laptops for students to check out for use in the library, the first floor does not have the space needed to create a learning commons area envisioned by the staff. Currently, there are stacks with bound volumes and reference books; "a magazine reading area that has remained static," according to a participant; and study tables and chairs arranged throughout the center of the floor.

The library would like to create "pod areas" where students could have room and privacy for individual work or for "two students to sit in part of the pod and work together with one computer." The participant calls the pod areas "electronic stations," and advocates having more technology in the physical facility than is currently available. He/she wants to make the physical plant more attractive for students, so usage is increased in-house and not just online. For him/her, technology has opened doors for students, but some important aspects of the physical library have been overlooked while online access has been emphasized.

Positive features that are fairly new in the library's physical structure are a couple of rooms that were created approximately six years ago on one side of the library's first floor. The rooms include a collections room, which is basically a meeting/archives area

that is not intended to be technologically advanced, and an instructional classroom, which is a smart room with a computer/projector system that can accommodate research instruction for over 30 students.

The physical structure of the library was adequate until the 1990s, when technology started having an impact. Regarding that impact, one participant states that "libraries are no longer people reading books in the stacks." Another participant agrees with that assessment and goes a step further, stating that "technology is in everything that we do."

Impact of technology on Case College B library's organizational structure. Technology has also driven the library's current organizational structure. An interviewee credits the director with hiring personnel who have appropriate skills for an academic library today. He/she states: "We've probably got the same number of people that we did maybe 10 years ago, but they are at a higher level and they are more specialized." When the interviewee first arrived at the college in the 1990s, email was not being used; the library was directed by an individual who did not like or want to use computers; and relations between the library and IT were strained. The interviewee credits the current director with turning the library around.

Another participant notes that the number of librarians expanded in the last 10 to 15 years to include a systems/electronic librarian and a coordinator who maintains the library's web pages. Concurrently, the number of unskilled paraprofessionals decreased "because with the paraprofessionals, they don't always understand the importance of things the way a librarian does, why a library does things."

According to an interviewee, the library's staff is small and they "pretty much have always reported to the director." The library's director has reported to the vice president in charge of instruction since the college's inception. The interviewee states that due to the size of the staff, there are no plans to change the organizational structure. He/she observes that "the biggest changes as far as staffing is concerned has been in job descriptions and job duties," not in reporting structure.

Impact of technology on Case College B library's services. Participants report that library services have changed significantly over the years at Case College B. When using the library before computers were added, one of the participants notes that "you were lucky if you ever saw a librarian." Now, however, since students "have anywhere from very minimal computer experience to some that are just really high tech," librarians are needed more than ever. He/she explains that even students "that are high tech haven't necessarily ever used a library database," so it is helpful to have a reference librarian available who is "able to answer questions and assist students locating the correct database or how to put in different words or subject headings, or whatever, to get where they are trying to go."

For another interviewee, the first thing that comes to mind concerning the impact of technology on library services is "bibliographic instruction," a term that is outdated but that is synonymously used to refer to the library or research skills classes that are usually taught by librarians. He/she states that research skills classes are "so much more important now because of the electronic resources." Granted "the library is more accessible because of online resources," but he/she notes that "it also requires maybe

more knowledge to access it." To illustrate the point, the interviewee shares his/her own research experience as follows:

> If you had to do a research paper 20 years ago, how did you do it? If you started thinking about it, you know all that, you go to the library, see what you can find. Card catalog and all of that. And maybe the *Reader's Guide to Periodical Literature*. Different indices like that. Write stuff down on note cards and organize them and all that. There was a place where knowledge was kept. And the library was the depository of all that. You have people there that can help you access that. And now, it's at your fingertips. And of course there is a guiding system, what they can believe, what they can't believe. What is good information, what is not, and so forth. But, it is just totally different. I mean that is just part of the changes that are taking place. And it is, to put in a little cliché there, it is a total paradigm shift. It really is.

One of the participants reminisces about the constant change in the last 10 to 15 years, stating "every year we did something better. Bigger and better. And now those changes are smaller. . . . when you add a new database and stuff like that, it doesn't have the impact of adding a webpage." He/she lists several changes in services that are due to technology, including the following new services: authentication of students via a proxy server that allows for off-campus access to online resources; laptop checkout for in-house use; a cost saving print control system for computer printing; cataloging that is driven by technology as the library converts from Dewey to the Library of Congress Classification System; library instruction that is taught with technology and replaces a tour; computer labs with all sorts of software; online tutorials; handouts that can be updated and printed efficiently; and digitized copies of the local newspaper. He/she would like to implement a radio frequency identification system, or RFID system, when possible. The system would allow for self-checkout and would provide a theft detection system, among other things.

Another participant lists additional changes in services due to technology, including the availability of databases; web pages with an array of information and links; easily accessible online forms, such as the form that enables instructors to place materials on reserve; and an "Ask a Librarian" email reference service. A participant states that software, such as Microsoft Office, is now also available and has impacted job tasks in all areas of the college.

According to an interviewee, services that have been discontinued due to the impact of technology include: CD-ROMS; microfiche and microfilm to some extent; most hard copy/print journals, magazines, and newspapers; and hard copy/print indices. All have been, or are being, replaced by online resources in databases. Equipment that students used before computers were available are now rarely used, for example, microform reader/printers and tape duplicators. Since video usage has decreased, the library has also "cut down on the TV, VCR, DVD combos."

Services at Case College B's library are in a state of transition from hard copy traditional resources to online database resources; from in-person reference to an online presence; and from older, outdated equipment and materials to software that is multifunctional. All are changes experienced at the library during the last 15 years or so, according to interviewees.

A theme that several participants mention regarding the impact of technology on library services is the need to comply with Southern Association of Colleges and Schools' reaccreditation requirements, which includes having "the same resources available to online students as the face-to-face students, the on-campus students."

Interviewees say this need has been a driving force at Case College B's library as it transitions from print to online resources.

Impact of technology on Case College B library's ability to help meet the educational mission. To illustrate the impact of technology, an interviewee describes the impact it has had on the Allied Health areas of campus and states that having access to journals in an online format has been important for nursing students whose "schedules are pretty rigid and pretty tough." He/she observes that it is "very important" for students to be able to access information "from the building where their classes are held, from their home, from wherever they are." In addition, accreditation standards require that students use current resources, so the library works with the Allied Health areas on campus to ensure appropriate resources are available in an accessible format.

Another interviewee describes the value for instructors, especially English instructors, to be able to show credible library resources during class periods where students may use mobile devices or laptops to access the library's resources while the instructor projects the information on a screen in a smart classroom. Instructors can "go to the library's website, open up a database, remind students how to search, remind students what elements from an article need to be placed in the works cited entry—and be able to point those out with your mouse or your laser pointer up on the screen." Teaching in this manner, according to the interviewee, has "facilitated student access and instructor pedagogy." He/she states that there "is less intimidation with a medium they're used to—knowing how to use it—navigating searches and things like that." In general, he/she thinks the availability of online resources "alleviates a lot of obstacles that students may have encountered previously."

In addition to fewer obstacles, the interviewee perceives that library technology has impacted students and instruction in other ways, as well. For instance, he/she states that assignments have changed as the availability of resources has increased; the focus on resources has shifted to "what is an academically acceptable source"; and the availability of online library tutorials has forced students to "solve some of their own problems," rather than requesting assistance.

Another interviewee corroborates that nursing and English are two high enrollment areas that use library resources, especially online databases, extensively. He/she states that the library has purchased "a lot of literature, criticism type things" for English, and it has a "medical art image database" for the college's nursing program. Since faculty have difficulty finding time for library skills instruction sessions, he/she states that the library is using technology to take library instruction to students by "embedding" library tutorials in online classes.

The library works with faculty to get what they need "on the computer or in some cases keep it where they are—if they need it to be in their building as opposed to the library," according to a participant. He/she explains that this involves "constantly herding" faculty, especially in subject discipline areas that the library "doesn't hear enough from." Both faculty and students in the music and nursing areas are described as active users of electronic resources. In the case of nursing, the library's online resources are used not only to prepare for class assignments, but also to review for certification exams. He/she notes, however, that "there are a lot of faculty that just don't feel like they need the library. That's just over there. And I've got my lecture so I don't need the

library." He/she states: "I think that's always a challenge—to try to integrate the library."

In discussing the relevancy of the library on campus, a participant describes a faculty library committee that provides input on services and resources and makes suggestions for improvement. The committee seeks to ensure the library remains relevant for students. He/she states that in the past "the library was an active, dynamic place that was the center of campus activity. Now, that's not the case because students have access to these resources at home." Another participant is confident, however, that the library will continue being relevant, for he/she states:

> As far as information is concerned, you still have to have somewhere or somebody or some department that is going to coordinate their resources, that's going to provide those services—and that's the library. . . . And there are some things that just don't lend themselves to the electronic.

Impact of technology on Case College B library's capital and operational budgets. Funding for library technology at Case College B derives in part from a foundation that was formed by a local family. Originally, foundation funds were intended to be used for purchasing books. However, according to an interviewee, a committee of retired faculty and administrators that approves the library's foundation purchases agreed that funds could also be used for electronic resources. Another interviewee explains that the library has even used foundation funds to purchase a digitization machine to convert the town's local newspaper into an online form that will alleviate the need for outdated microfilm.

The college has used capital funds to add rooms to the library's downstairs area, according to a participant. One of those rooms is an instructional classroom that is used primarily for teaching library skills classes. Capital funds were also used to build several

computer labs that are interconnected on the second floor—although only one of the labs currently reports to the library.

An interviewee explains that at one time the college collected a separate fee that was tied to a credit hour and could be used for technology; however, a lawsuit in Dallas stopped that practice because colleges "didn't have the authority to levy that kind of charge on students—and so everybody just kind of took all their special funds . . . and combined it into a general fund." Computers in the library's second floor computer center and its first floor open area are funded with a portion of the general fund that is designated for technology. Approximately a third of the computers are replaced each year on a rotating basis. Although the first floor area only has about 15 computers, the college plans to purchase additional computers and laptops for usage in that area. According to the interviewee, however, there are concerns about network capacity and also wiring in a building that was built in the 1960s.

Decisions regarding technology purchases from the general fund are the responsibility of a technology committee, and only student related expenses are funded via the technology committee. A participant states that the deans, the library director, and the instructional council are all part of that committee. In addition to allocating funds for computer purchases, the technology committee has also approved funds for security gates, a satellite dish, a server, and some database subscriptions. Staff computers and other technology expenses for employees are funded through the college's IT area. The library's own contract and services fund handles resource sharing fees and maintenance fees for the library's integrated library system. Other library funds are used for electronic serials and electronic books.

The library director's "very creative" approach to funding technology is described by an interviewee. For instance, he/she states that a Friends of the Library account enables the library to control the library's printer system and, thus, to ensure print funds that are collected do not go into the college's "big black hole" never to be seen again.

Overall, one of the interviewees does not think the budget for the library has changed as technology has evolved; although costs have shifted. He/she states:

> What I've noticed is they worked through the differences in their budgets here, and there's not a whole lot of difference if you account for inflation and so forth except periodicals and books have declined slightly. And as a percentage of what we spend [at the college], I'm sure they've gone way down.

Another interviewee refers to the library's place in the allocation of resources and its value for the campus, stating:

> I feel that the library is important to them. And I think that they are pleased at where we've come, where we want to go, is the feel—that is according to the administration. . . . Are we the most important thing? No. Academics is the most important thing. But they recognize that we support the academics.

The library was projected to be the last building to be renovated in the college's current rebuilding program, but those plans are now on hold. Since the state's budget crisis has interrupted the college's building and renovation program, plans for capital improvements at the library are being postponed two to three years, according to the interviewee.

Impact of technology on Case College B library's personnel. Innovators and early adopters as technology gurus are a theme in the area of personnel. An early adopter of technology at Case College B was a former technical services librarian who maintained the library's web pages, cataloged materials for the online catalog, and

served as the general technology person for the library. When that person left, a participant states that three people were required to take over various parts of the technical services librarian's duties because "it's hard to find people that have the skill sets that can do so many different things and are so good at them all." He/she explains that the librarian hired to assume responsibility for the library's technology two years ago has a library degree, but the librarian "hasn't learned as much about libraries yet because [he/she] is a techie."

It has taken several years to staff the library with individuals who are skilled in technology, but most of the participants view the library as being in a good place as far as personnel are concerned. An interviewee states:

> [The library] is pleased with the personnel and the various job descriptions of each one, the levels in which they're hired in—you always try to get more money for [personnel]—but [we're] not having to try to get clerical people to do a higher level job now and that sort of thing. [We've] got librarians, technical librarians, research librarians—there are different ones.

Another theme concerns the library's relations with the college's IT department. Although relations with IT are currently satisfactory, according to an interviewee, a former library director had difficulties with the IT department because "they were supposed to back up everything every day or something, and something would happen and he would find out that it hadn't been backed up in three months." Evidently, the library had purchased a system without obtaining input from the IT director, so the IT area "didn't feel any need to keep up with it. . . . It got to where they wouldn't even talk to each other."

There were also disagreements over the location of the library's server. The library's former director, who the interviewee describes as a person who "if you put a

computer down in front of him he just didn't know what to do," did not want the server in the library, but the IT director did, so it was placed in the library. Current library personnel realize the value of letting library employees maintain the server because they can "make sure things are more attuned to the needs of the library than if you had to go through IT," according to the interviewee. He/she states that "the IT director we've got now is okay with that; we've reached a truce of sorts."

In discussing the skill sets of current library personnel, one of the participants states:

> You compare the people that we had ten, eleven, twelve years ago, compared to the ones we have now, there's really no comparison. There's more, again, more specific skill and knowledge that different people have to have. . . . I think the ones who did not know technology, or who were not familiar with technology, or embrace the technology, are gone. [The library] hired people for the most part who were either technologically attuned or were willing to learn. I think that [the library] got mostly people who were already competent in technology when [the library] hired them, and [the library] put that on the job descriptions.

Another participant agrees, but he/she notes that when you have a "staff member who does not have that level of skills—if they can't do it . . . you find a niche for them. And that niche gets smaller and smaller each year." He/she notes that "job descriptions, people, skills, everything has changed with technology."

A participant has observed a trend that puts student workers "on the front lines" in the library's "physical plant," while professional librarians are working on technology matters in the background. He/she expresses a need to reverse this trend while "we still have a library," saying "if we're going to have a physical library it needs to be a fully serviced, proactively helpful environment."

Regarding relations among library personnel and how they have been impacted during the last 10 to 15 years due to technology, an interviewee observes that library

personnel "all work together, and we meet when we need to. And at least a couple of times a semester we can talk about any issues." Professional development continues to be an important factor for library personnel, according to another interviewee, so "training and physical resources to be able to do it—computers that are up to date and browsers that work and that sort of technology" are needed.

Impact of technology on Case College B library's allocation of human resources. Although there is some overlap with personnel issues, the allocation of human resources at Case College B is focused on increases or decreases in library personnel as the college allocates resources to fill positions. According to a participant, Case College B's library "kept pushing for additional staff" during the past decade and eventually got what was needed. The participant explains the current status as follows:

> We're fully staffed now. . . . We've got people who have the proper credentials and experience and knowledge of libraries. . . . I think clearly we've got more and higher level of library personnel. And again, more specialized and more attuned to and competent with technology. . . . They're a good group of competent people that really are attuned to what's happening in libraries now.

An interviewee observes that an additional librarian in acquisitions and a staff support person in technical services may be needed in the future. Another interviewee mentions the possibility of adding a "virtual librarian" to be available online; however, he/she notes that enrollment would have to increase before additional positions are added in the library, and if positions were added, he/she assumes paraprofessionals would be added before professionals. The interviewee states: "I don't foresee the Board allowing us to hire any more professionals for a long time."

Impact of technology on Case College B library's collections. A theme that emerged regarding collections at Case College B is the continuing decrease in print

materials as online resources increase. One participant thinks "the money that we put into books is going to continue to decline and electronic resources are going to continue to increase." He/she envisions having to decide whether to purchase books for a "Kindle or something like that versus buying bound books." The participant states that in the past he/she would compare changes in education to the changes that took place after the printing press was invented. Now, he/she realizes how accurate that statement really was. The participant explains:

> I'd quote that when I needed to make a pitch for more technology. . . . But I have to say I didn't really believe it, deep down in my heart. But I do now; we're already seeing evidence of that. Not just in the libraries, but in the way we teach students, in the way they learn, the way we retrieve information. It's all changed.

The participant goes on to say that "buying books every year is going to very quickly become a thing of the past."

Pointing to the advantages of purchasing electronic resources, another interviewee states: "We try to make everything possible available electronically. So that it impacts the maximum number of students. We are trying to serve them, and that's the format that they need." In addition, currency is a benefit with electronic resources. The interviewee notes that "you can spend like $5,000 on a big set of encyclopedic knowledge on whatever topic and it's going to be outdated the next year. But if you buy the electronic version you have to pay $2,000 every year, but it is always going to be current. Down to the week sometimes." Plus electronic resources are purchased "to provide access to the distance education, the online students, and also to save space." However, the interviewee also observes:

> Books are not going anywhere. You may have electronic versions, but most of the time the students—I know I personally prefer a book if it is a book about a subject—if I'm going for an encyclopedic, online's a great way. But a book

> about a topic—I need to go browse the table of contents, the indexes, thumb through the book, looking to kind of browse for topic areas. You can't do that on a computer.

A participant notes "that 10 years from now [the collection] is going to look very different than it looks now" due to the increase in ebooks, Kindles, and other technology, but he/she too stresses that "you are always going to have books. You are always going to need librarians. The computer can't answer questions the way a one-on-one with a student can . . . it's just the look of it is going to change."

In spite of the emphasis on an electronic collection, another participant describes current efforts by the library to make the print collection more accessible and more utilized. For instance, books and periodicals are being integrated into one collection with one classification system, which means periodicals have call numbers, and they are being shelved next to books with similar call numbers. A color coded labeling system is planned in which reference books are one color and periodicals are another—enabling students to readily discern which materials may be checked out and which may not.

Within-case analysis of Case College C.

Description. Case College C is classified by Carnegie as a large public rural-serving community college. The city in which it is located has a population of more than 300,000, so this is by far the largest location of a case college in this study. To be classified a suburban serving community college, the institution would have to be located in a statistical area in which the population exceeds 500,000. The city is located within a metropolitan statistical area, but based on census data used by Carnegie, the population for the area has not quite reached 500,000.

According to census data, at least 21% of the population has a bachelor's degree or higher, compared to 25.8% statewide. The median household income is approximately $43,000 a year, which is lower than the state's $49,646 median household income, and a higher percentage of the city's population, almost 19%, fell below the poverty line between 2006 and 2010, compared to the state's 16.8% level.

It should be noted that in addition to statistical data about Case College C and the community in which the college resides, descriptive information is also included in this section that is based upon researcher observations from the site visit to the institution during spring 2011. The observations are intended to present a picture and to add the detail that Stake (2006) and Creswell (2007) advocate including in a qualitative research study. Statistical data were obtained from the United States Census Bureau, Carnegie Classifications of Institutions of Higher Education, National Center for Education Statistics, Texas Higher Education Coordinating Board, and *The College Blue Book*.

Case College C has two campuses that are located in the same city. One campus is substantially smaller than the other, and it is focused on specific programs. The college's main campus, which is the location of the library examined in this study, is located in an older part of a highly populated area. Buildings surrounding the campus are run-down commercial establishments, as well as 1950-60s era homes and other structures. The campus is large and spread out. Construction is ongoing at the college, and renovation of a nearby building has impacted Case College C's library since classes are temporarily being conducted in library classrooms. There is a sense of vibrancy about the campus as faculty and students move about between classes. Ample parking is available, and in fact, parking areas are located on two sides of the library.

The college is strictly a commuter campus—it does not have campus housing. There are over 12,000 students, and the ethnic breakdown is approximately 19% White, 50% Hispanic, 3% Black, 21% "race/ethnicity unknown," and the remainder other ethnicities. The overall population for the state is approximately 45% White, 38% Hispanic, 12% Black, and the remainder other ethnicities, so the ethnicity of this college does not reflect the ethnicity of Texas. It is notable for its large Hispanic population.

Enrollment only grew around 3% between 2005 and 2010 at Case College C. Reduced funding from the state and from tuition revenue may account for the large number of part-time faculty at the college. The number of part-time faculty is almost double the number of full-time faculty.

The current library, built in the mid-1970s and renovated in the mid-1990s, is noticeably larger than many of the other buildings on campus. It replaced the original library that was built when the college opened in the late 1930s. The first impression upon entering the library's multi-storied building is that it is a gathering place for students. Plentiful seating and a television that is set on a cable news channel welcome visitors to a large foyer area. A sizable computer lab is located near the TV/foyer area, and a well staffed circulation desk is also located in the same vicinity. Another floor contains the reference area and reference book stacks. Reference desks are located near the stairwell and elevator, so inquiring students have no difficulty finding them. Offices for staff are scattered throughout the building, and the library director's office is located on the top floor.

Although the library's carpet is worn, walls have been painted many times, and there are musty areas—there is also a lot of energy in the building. Classes meet,

individual and group work is ongoing, and students study and/or use computers. Special study spaces have been created in each corner of the library, and they are heavily used by students talking on cell phones, texting, reading, or sometimes napping. The corner areas are sunny, comfortable, and have pleasant views of the college's campus.

This within-case analysis of Case College C covers the impact of technology on the following library related themes: physical structure, organizational structure, services, ability to help meet the institution's educational mission, capital and operational budgets, personnel, allocation of human resources, and collections.

Impact of technology on Case College C library's physical structure. The primary impact of technology on Case College C library's physical structure has been the addition of a computer lab, repurposing of space, and a recent initiative, according to a participant, that is oriented toward creating a learning commons. He/she describes the learning commons as follows:

> What we want to be able to do, of course, is maximize the use of our space and the focus being on teaching and learning. . . . The learning commons that we talked about before is an idea that attracts me very much. And the involvement of libraries in information literacy, and general education competencies being not just a passive reservoir of information but to provide courseware, content, physical spaces that encourage students to learn how to learn—how to use information to make decisions.

Although funds are not currently available for redesigning spaces, the participant envisions developing a learning commons concept, including "the tasks and duties attached to the concept," before the physical space is reconfigured. According to another participant, collaborative learning spaces and study rooms are located throughout the library, so those spaces could be utilized until funding is available.

Regarding the large computer lab on the first floor of the library, the participant who described collaborative learning spaces also provides some historical perspective on the lab. He/she explains that the computer lab moved into a space vacated by administrative offices that moved to another floor when the library was renovated in the mid-1990s. Initially, the lab had 50 computers, and it now has more than twice that number.

Another participant describes the computer lab as follows:

> They finished the first [floor] and that was when they built what we call the [name of the lab], which now has major technology going on. Scanners and computers and printers. . . . There's been updating with the computer software and updating on computers, you know since then but it's kind of stayed this way and it's, it works pretty well.

Over time, computer classrooms were also added in the library. The classrooms are used primarily for training purposes, and some are specifically designated for library skills and research instruction sessions.

Another change that occurred in the physical structure of the library during the 1990s was the formation of a systems/automation services department. An interviewee notes that one of the first activities for this department was creation of a digital catalog, which was the initial step toward an integrated library system that controlled most of the library's major functions. He/she describes Texas Infrastructure, or TIF, grant funding that paid for computers and for fiber-optics throughout the building. After the library's technical services area downsized, automation services personnel moved into technical services' former offices and storage space. Historically, technical services has focused on acquisitions, collection development, and resource management. With the migration

to online resources, some of the workload in areas such as technical services changed, and the areas downsized.

Although the library currently has multiple floors, they were "built in stages" with different floors being added during different periods of renovation, according to a participant. Due to its size, the library has some novel features. For instance, the participant says one of the newer additions is a film room, which shows movies to students on a fairly regular basis. A professional development center for faculty is also located in the library; although it has not reported to the library director for several years. Technology workshops and training have been available for faculty at that center. With budget cuts, however, the center is slated to close.

Impact of technology on Case College C library's organizational structure. Case College C is "in the process of reviewing" the college's organizational structure, according to an interviewee. He/she states that the plan for the library is to "look at models and then work with the management team to develop options for how to match tasks to services and fit within the evolving mission of the college." There is interest in the idea "of college libraries being involved in information literacy, general education competencies, and a more proactive environment for teaching students how to use information to help them make decisions and not just as a kind of passive repository."

The interviewee states that the library started with a "fairly traditional structure" and that structure has been modified and has evolved to accomplish "different tasks" during the last 10 to 15 years. A participant describes a library management team that functions as a decision making unit within the library; however, that structure may change when the college reorganizes. He/she states:

> Up to now, it has been the librarians, the unit [i.e., the library management team] has, which happened to be librarians [who] vote. You know we have other librarians who are reference, and we have one unit head that's exempt, so it's that group of people [that] gets together with the director and decides.

Another participant explains that the main change in the library's organizational structure has been "the creation of an entire department" that has responsibility for the library's automation services. He/she states that the automation department functions as a "service unit to all of the other departments, rather than have them intermixed with either technical services or circulation." The current structure is meant to ensure personnel working in specific areas are "better" in those areas than in other areas. The participant describes the automation area as a "strong department" that "keep[s] everything running." He/she states that one of the department's duties is to maintain the library's servers, which is important because the library was "always last in line" when the IT area had responsibility for them.

The broad range of responsibilities in the library's automation department are described by an interviewee as follows:

> [The department has] ten servers, approximately 450 computers between staff and student use computers. [Personnel] maintain the in-building infrastructure for both of the buildings [at the college's two campuses]. [Personnel] get called upon to do cable TV in the building . . . administer the library system, [and] administer the web pages which is about 140 pages. . . .

A participant states that there is concern that things will be changing because Case College C, along with other community colleges, is "cutting back" due to funding issues. The researcher for this study received email messages from participants after the on-site visit that stated the college had started restructuring soon after the site visit. One of the changes involved moving personnel from the library's automation department to the college's IT department. Other significant changes were planned, but as one of the

participants indicated, he/she "was waiting for the dust to settle . . . [and] as yet, it hasn't."

Impact of technology on Case College C library's services. The main development regarding the impact of technology on library services at Case College C has been the addition of computers and the creation of a "new computer lab," according to an interviewee. He/she describes pre-computer days as going "to a library and then [going] to the hard copy, you know, reference things and the cross-referencing."

Three participants mention other computer related services, such as creation of a library website; remote databases for distant users; all sorts of new printers and copiers; a high tech movie room that offers a film series; and more interfaces for training tools. One of the participants states that some technology driven services have not been particularly successful, such as placing forms online for individuals to request books; however, one service that is only a year or so old, the library's mobile website, has been quite popular with library users. According to another participant, a somewhat different service that was made possible by technology is the ID system that moved from campus security to the library and that brings new students and faculty into the library each semester during registration.

An interviewee adds to the list of library services that have been impacted by technology, noting the smart classrooms where librarians can teach students research skills; the availability of technicians to provide assistance with technology; delivery of audiovisual material/equipment, laptops, and projection systems to classrooms upon request; specialized databases for different subject disciplines; phone, email, and chat reference services for immediate user assistance; televisions that cycle campus events,

such as Women's History Month or Poetry Month; and a large screen television in the foyer that is always on a news channel in order to advance student awareness of history and culture.

Regarding future services, an interviewee states that the library hopes to introduce Kindle, or a similar ebook product, and to develop relations with textbook vendors so the library can "serve as the check-out source" for e-textbooks. Additional services that the library is contemplating include social media, such as Facebook; QR Codes, which are quick response codes that share some characteristics with bar codes; and RDA, which is a form of cataloging that includes resource, description, and access.

A participant describes services that have been discontinued as automation and electronic resources have become more common. For instance, the library no longer has six typewriters—instead, it has reduced that number to one. He/she states that "if somebody's still using it, we wouldn't discontinue it just because of technology. If we discontinued it, it would be because it wasn't needed anymore." The participant also mentions significant cutbacks in the print periodicals, and the library's goal that "if we can find it in full text electronically, unless there's a good reason for having it in print, we'll drop it—and the good reason is usually an accreditation need."

An interviewee adds CD-ROM towers to the list of services that have been replaced by online databases. He/she also states that although DVDs and other audiovisual materials are still available, the library is transitioning away from those older forms of technology.

Another interviewee notes that microfiche, microfilm, hard copy titles, and the card catalog have all been discontinued. Essentially the catalog is still a tool of the

library, but its form is different. He/she notes that most of the changes that have resulted from technology have consisted of "new tools to do the things we've always done."

Impact of technology on Case College C library's ability to help meet the educational mission. Since the library is "as much a part of teaching and learning as what goes on in the classroom," a participant envisions "the library being more interactive with faculty." In relation to the educational mission, he/she would like to see "more conversations about how instruction and the library really interact with each other to reinforce the general education competencies."

As stated in one of the interviews, the "campus has been fairly slow to embrace technology." The library has been supportive of distance learning by making databases "available remotely," and ebooks have been purchased "on a regular basis so that distance learners have that access." However, "there has been very little concern or questions from the instructional areas about needing help."

An interviewee provides an example of a service that is available to one high enrollment area on campus—the nursing program. He/she states that computers in the library have been "dedicated" for usage by nursing students. The computers have the same nursing application software that is available in nursing labs. Video tutorials for "specific resources and specific classes" are also available.

The library's service orientation is appreciated by faculty, according to an interviewee. He/she states that it is particularly helpful for students who "have never even been in a library before." The following description indicates the degree to which librarians provide technology assistance for English students:

> If a student has a question they'll sit down with the student at the computer and say, "Okay let's look for it"—with you. They don't just say, "Oh, it's in

> EBSCO." It's "Go look in Academic, read this," or Twayne Series or something. They actually physically get up and help the student do it, so they're proactive, I guess. And I think students, particularly in English developmental classes, I think that's really, really important because those students have, there's that gap where they're already, they're scared, and they don't want to ask for help. So if you just say, "Hey, let me help you, let's just do it" and you show them how accessible it is, it's not a problem.

Also mentioned were library orientations in which classes go to designated rooms in the library that have computers for every student. Students access databases along with the librarians instructing the classes. A participant states that he/she particularly likes how librarians "key in totally different classes . . . so students don't have to figure out: 'Which database do I have to look at in order to find the material I need?'"

The participant admires the way "databases and the accessibility of them make . . . students feel like quote unquote they're just googling. So it feels natural to them. And so it's not scary." He/she also likes the fact that "the library is not afraid to also just link to really good websites, too, like modern poetry or you know legitimate websites. They're not like 'Oh, we're just gonna make students just use the library.'"

In recent years the library has supported Blackboard courses by providing faculty with technological "equipment to access what they need." This is important, according to a participant, because the library is "open the most hours of any building on campus."

An interviewee mentions the impact online tutorials have had on students and faculty. He/she states that all faculty have to do is link to library tutorials in Blackboard and then faculty do not have to go through multiple instructions regarding usage of databases or other library services. They can include the link in Blackboard, and students "can click on it and they're there. So it's a one step easy thing and the library has already created it and it's done."

Other library offerings that help support the educational mission are laptops, DVDs, and televisions that are delivered to regular classrooms for faculty to use with their students. An interviewee describes an instructor who wanted his students to have "a movie theater experience, and so he had [the library] wheel over their projection and laptop equipment" to his classroom.

Faculty in the English Department and other subject discipline areas serve on a library committee that provides a forum for collaboration and communication. An interviewee relays that the committee's primary function is to support the library in an advisory capacity.

Although all of the case college libraries conduct comprehensive surveys to gage student and faculty satisfaction with the library, per public documents collected by the researcher, a participant at Case College C describes an additional quick survey that is available on the library's website and at each service desk. Three brief questions are asked to determine what students like about the library, what they don't like about the library, and what they think could improve the library. Results are tabulated in the director's office to ensure a rapid response to comments.

Impact of technology on Case College C library's capital and operational budgets. A couple of significant Texas Infrastructure Fund (TIF) grants that the library at Case College C received in 1998 and 2001 enabled it to start purchasing equipment, especially computers. A participant states that "there has been a shift of increasing costs you know because we're supporting so many work stations." According to the participant:

> We had tried to replace at least 30 computers every year. So that our plan is that unless there is something that demands it elsewhere, we put the newest

> computers in the student [computer] center because they have the heaviest computing load both in time of use and in breadth of software that needs to run—you know, the complexity of software that needs to run on them. And what we do is we rotate out. And we try to do 30 at a time so that when we're rotating out, we can do an entire classroom at a time.

The library's equipment budget is now "almost always computer equipment," according to an interviewee. The amount of money spent on audiovisual equipment in the library's operating budget is decreasing, primarily because newer buildings are fully equipped with up to date audiovisual resources, so additional purchases are not needed.

As explained in one interview, operational budgets, especially salaries and supplies, have increased. The salary budget at Case College C's library has grown because the automation department expanded, and the supplies budget increased due to increased needs in the library's computer lab. For instance, the library runs "through twenty, thirty grand of paper a year" due to a free printing service that is offered to students. Although the college charges a student computer fee, which is different from Case College B, the library at Case College A does not receive an automatic portion of those funds. Instead, the library has "to beg like everybody else" to maintain an adequate supply budget each year.

An additional operational expense that has continued to expand each year is the database budget. A participant states he/she is grateful for "TexShare's variety of databases" because "we could be more selective about where we were putting our database dollars. Even with that said, with the incredible cost savings that we had through TexShare, our database budget has continued to grow."

An interviewee reiterates the same theme shared by other participants, i.e., that "a lot of the cost now goes into computers, computer programs, licenses, printers, scanners" and into the day to day expenses for things like cartridges and paper.

When asked if the library's technology purchases are funded from the library budget or the information technology (IT) budget, a participant explains that it has "been in flux" as follows:

> We used to have our own budget and, within the last four or five years, they've been moving those budgets over to IT. Sometimes we don't know whether the budget is in-house or over there. But the software and equipment, I believe, has moved to IT. We can still handle hardware that is considered supply.

None of the participants know what future funding for technology purchases might be. One interviewee states that "we just don't know what's being planned." He/she explains that "we zeroed out our equipment budget this year. We bought nothing." In fact, he/she observes that the library will be "going with Software as a Service wherever possible" if staff is cut in the automation department. SAAS is software that is installed on the library's server; however, the software "resides up on the vendor's server and you have administrative rights to configure that software as you need to, but you're not responsible for backups; you're not responsible for hardware maintenance."

According to a couple of interviewees, capital expenditures over the last 10 to 15 years have included changing the location of some departments and adding a large computer lab, computer classrooms, a film room, and several instructional/smart classrooms. The next project will probably involve repurposing existing space to form a learning commons area. In spite of budgetary issues, one of the participants states:

> We have a vision and a want and a need for, to continue innovating despite budget concerns. We find a way to make it work for the students and to make sure that they can access what they need to access in the most sort of up-to-date, efficient manner so that they're not left behind when they transfer, you know move along. They're not going to be like "What? What is this? I've never used this before."

Impact of technology on Case College C library's personnel. The need for computer skills is a theme that emerged regarding library personnel at Case College C. Every participant at the college affirms that computer skills are needed for most positions in the library. One interviewee describes a recent change in library personnel that resulted from the impact of technology. He/she states that some reference positions changed "from reference librarians to assistants [after] looking at the competencies related to the position and the actions in that position." Other participants indicate the change may also have been related to the college's economic situation, which is focused on cutting costs.

A participant observes that library personnel "have adapted to technology." However, he/she is convinced that library professionals have been in the business of conserving a culture that values passing on a "repository of information," and that tradition is now making it hard to shift in another direction that values technology. He/she states:

> [It is] because of technology, because of the Internet, because of Facebook and blogging and all this other stuff, that the nature of conserving the culture has effectively changed at the core, at the root. So, what now is the function of a library is the conversation that I'm hearing more about. And I think that there are camps, as with any discipline, about how does technology help us or hurt us in terms of protecting the culture. Does it really add value or are we losing something in the conversion? And those are worthy debates and discussions . . . we can debate about all that we want, but what [we also need] to focus on is how do we reconfigure what we do to conserve and prepare people to face the new normal.

Another participant observes that library personnel at the college have not been resistant to technology and states that this is true for all ages. He/she notes that "the nice thing about library workers is if you get people who really care about providing service, because this is a service profession, they'll learn what they have to learn to provide the service." Until recently, the college supported professional development with a teaching and learning center that is located in the library and that offers technology training. Due to budget cuts, however, the center is being closed.

Regarding library personnel and how they have been impacted by technology, an interviewee states:

> They seem, well, happier . . . the technology has made things easier. And more, they get excited about "wow, we have this new database." . . . So they're excited that they're telling [faculty] about these things that they have and they want [faculty] input, so they're enthusiastic, certainly.

The impact of technology on relations among library personnel has been collaborative. However, decisions are still being made by a library management team comprised of librarians and the library director, according to an interviewee. Another interviewee thinks library personnel "relate in a different way now than we did before." For instance, now all library personnel can "pretty much look up" everything they need to know. He/she goes on to say "I guess we just communicate in a different way now. We kinda know what we need and what we're talking about . . ."

Although technology has been a positive influence, an interviewee relays that the library has "had problems in the past of being able to find a qualified part-time person" to do "the technical part of webpage development." The library finally had to hire a full-time person to work on webpage development in the automation department. The automation department is now fully staffed with several full-time employees. An

interviewee explains that "the library has its own technical staff. It has its own server, so they have, they're like completely separate from IT." The library does not "call the IT department on campus, which supports the whole campus, we call our people and they keep up with the automated system" and other areas of library technology. However, if problems occur with the Internet, library personnel "have to go through them to kind of figure out what's going on." The relationship with the IT area is a collaborative one, according to the participant, who explains that the library is "not completely autonomous." The benefit of having an automation department in the library is the ability to "get immediate service" for problems and glitches. Changes are being made in the automation department, however, according to an email sent to the researcher from a participant after the site visit at the library. The college is in the process of restructuring the automation area as a cost saving measure.

One participant's observations cover personnel issues in several of the library's departments. For instance, he/she states that job descriptions in the library's technical services department have remained largely the same over the last 10 to 15 years. He/she notes that reference personnel have been using databases rather than microfiche and microfilm for the last 10 years or so. Changes in staffing in the library's computer center are described as follows:

> We have two full-time [people] in the [center] and then they have some part-time people. And now, of course, they have student coverage . . . every shift, they try to have a staff in there. So it, usually, it works out. They get a little short, but [circulation desk personnel] can help cover when it needs to be covered.

Impact of technology on Case College C library's allocation of human resources. Although there is some overlap with personnel issues, the allocation of human resources is focused on the increases or decreases in library personnel as the college allocates

resources to fill positions. Over the last 10 to 15 years, there has not been an increase in the number of librarians employed at Case College C's library due to technology other than adding an automation librarian. A participant notes that the automation librarian was actually hired in 1994, which is one year earlier than the period examined in this study, i.e., 1995 to 2010. In addition to the librarian, the automation department employs three full-time support staff whose focus is technology.

The student computer center is another area that has hired new employees due to the impact of technology. The lab hired support staff who could assist students with software and hardware issues. A participant states that the library does "not hire technicians for that. We hire people with a strong service orientation who have technological skills. Because the importance there is not the technology, it's the service." According to the participant, technicians usually are not "people people" whose focus is "to help people." He/she states that a service orientation is essential for employees working with students.

Future changes in the allocation of human resources at the library are open questions that depend upon how the college positions itself "for effectiveness going forward." An interviewee states that if academic support and the library are going to be key elements on campus, they must do the following:

> We need to be able to know how we're doing and how our students are interacting with the information and how it's helping them in the things that we say everyone should learn, which is why [we're] focusing on general education competencies.

A participant is fairly certain that the library will soon start reducing the number of positions in the periodicals area. He/she states that "that's one of the things I think

they're slowly doing away with. Because the periodicals . . . because you can find most anything online" in library databases.

Impact of technology on Case College C library's collections. When discussing collections, a theme upon which participants agree is that in-house print periodical subscriptions are being cut significantly due to the availability of online subscription databases that contain an increased number of periodical titles. A participant notes that "the [in-house print] periodicals collection is on the decline and will be truly declined this year. You know, I think it's [going] be cut in half." Another participant agrees that usage of print periodicals is "slowly slowing down, stopping. I wouldn't say stopped. You can't get everything online." However, he/she states that the library has "pulled a lot of titles" from the print periodicals collection.

Although students at Case College C have embraced periodical databases, they are still in the process of getting used to electronic books. According to an interviewee, the library is "not sure about [its] future with ebooks." He/she states that library employees are fairly certain that the library's "print collection is still more popular than the e-books." Another interviewee humorously states that libraries should never have let "computers in the building." He/she goes on to relate that library surveys at Case College C indicate "some people still like . . . old books."

However, one of the librarians at the college has suggested moving "to an e-audio book format," according to an interviewee. Another interviewee states that circulation "has decreased in print materials," so the library has started diverting "a significant amount of resources . . . from print to electronic." The decrease in print resources is described as follows:

> Print resources are on the decline and we are purchasing, you know, what used to be print materials in electronic [form] . . . our reference collection is really smaller. . . . All of those shelves used to be the seven foot ones, and they're all dropping. We're pretty soon going to be getting in the last two rows of the four foot shelves. We've really cut back on that collection. . . .When we renovated this building we were sure that the collection, the third floor, would hold the collections for at least ten years. I think now it will probably hold it in perpetuity.

Another participant agrees, stating that "reference books may very well go away because of the efficiency of updating online." He/she "can see print being highly curtailed if not eliminated . . . at least in the academic setting."

An interviewee mentions a variety of collections/resources that have been impacted by technology during the last 10 to 15 years. For instance, the library has moved away from "16 mm, which is almost obsolete"; rarely uses slides; still purchases VHS, but usage "has slowed down"; and has "a lot of CDs we circulate."

Another area impacted by technology that is relevant to collections is interlibrary loan. A participant states:

> The notion that we have to have a copy of everything in a library is changing. And how we access it. Interlibrary loan, and I haven't done a lot of research on that element, but I can imagine that that is evolving immensely due to all of this cyberizing through content.

Within-case analysis of Case College D.

Description. Case College D is classified by Carnegie as a medium-sized public suburban-serving community college. Its service area is large, but the college's main campus is located in a town with a population of approximately 13,000. The town has an older, historic look, and unlike many small towns, the town square and courthouse are vibrantly busy during the weekdays.

According to census data, approximately 18% of the population has a bachelor's degree or higher, compared to 25.8% statewide. The median household income is around $32,000 a year, which is significantly lower than the state's $49,646 median household income. A large portion of the town's population, approximately 25%, fell below the poverty line between 2006 and 2010—a level that is well below the 16.8% statewide level.

It should be noted that in addition to statistical data about Case College D and the community in which the college resides, descriptive information is also included in this section that is based upon researcher observations from the site visit to the institution during spring 2011. The observations are intended to present a picture and to add the detail that Stake (2006) and Creswell (2007) advocate including in a qualitative research study. Statistical data were obtained from the United States Census Bureau, Carnegie Classifications of Institutions of Higher Education, National Center for Education Statistics, Texas Higher Education Coordinating Board, and *The College Blue Book*.

Although Case College D has several smaller centers and branches in other locations, the main campus for the college is situated on the edge of town near a park, a cemetery, and some older well established neighborhoods. Parking areas are abundant, and approximately 300 campus housing spaces are available. The exterior of the buildings does not appear to match, but efforts are underway to refurbish the most obvious mismatches. Some buildings are fairly new; for instance, the library, which was built in the 1990s, is one of the newer buildings. Landscaping is minimal on the mall area around which most of the buildings, including the library, reside.

The student population is between 6,000 and 8,000, and the ethnic breakdown is approximately 74% White, 11% Hispanic, 13% Black, and the remainder other ethnicities. The overall population for the state is approximately 45% White, 38% Hispanic, 12% Black, and the remainder other ethnicities, so the ethnicity of this college mirrors the state's Black population, but it has a higher White population and lower Hispanic population.

Enrollment grew about 35% between 2005-2010, and in spite of this rapid growth, the number of full-time faculty remains a third larger than the number of part-time faculty.

The library shares its two-story building with another area, the college's information technology department. The library's part of the building is restricted to the first floor. A large circulation desk, comfortable lounge areas, and study tables/chairs welcome visitors as they enter the library. Office space is located in glassed-in rooms at the back of the library, and a large reference desk is also situated toward the back of the room. Approximately 25-30 student computers are located in a computer room near the circulation desk.

This within-case analysis of Case College D covers the impact of technology on the following library related themes: physical structure, organizational structure, services, ability to help meet the institution's educational mission, capital and operational budgets, personnel, allocation of human resources, and collections.

Impact of technology on Case College D library's physical structure. In the context of discussing the physical structure of the library, a participant shared his/her concerns about the financial condition of the college and the college's ability to maintain

its current buildings. However since the library was built in the late 1990s, he/she does not anticipate a need for renovations or changes anytime soon.

Prior to the move to its current building, the library was housed on the top floor of a building that is now designated for administration and student services. An interviewee states that the only reason a new library was built was the availability of funding from a "friend of the college" who had attended the college and who wanted to donate "money to be put into an LRC [Learning Resource Center]." Another interviewee states that the library "is probably at least double the size the previous library was."

A couple of participants describe changes in library spaces that have been impacted by technology since the move into the "new" building. For instance, old index tables were repositioned and wired for electricity so they could be used as a "laptop station for students." The print indexes formerly shelved on the tables were withdrawn due to the availability of online subscription databases. Another area housed the "old card catalog," and it is now the location of computers dedicated to accessing the library's online catalog.

The building in which the library resides has video conference rooms for faculty, but those areas are upstairs and are considered part of the IT department. The conference rooms are described as being "really handy" for faculty. The library has an instructional classroom to teach library instruction sessions for classes, and it also has a computer room with computers that have a variety of software and other features for students. An interviewee describes the instructional classroom as follows:

> In our library we are fortunate to have a smart room classroom, which means that it has all the projectors and the bells and whistles and it's only maybe—we

> maybe have—I'm not exactly sure how many we have on campus but over half of our classrooms are not smart rooms. And so we're very fortunate we have that smart room classroom [that librarians and faculty] can reserve and utilize.

All of the rooms, including the instructional classroom, were adequately wired when the library was built in the 1990s because the college realized adequate accommodations for automation were needed.

The only change one participant would like to see in the physical structure is not directly related to technology; it is more of a service consideration. He/she would like to move "the reference desk and the reference area . . . toward the front" of the library. Students would then walk into the library and see the circulation desk on the left and the reference desk on the right—so the two main service points in the library would be immediately visible. The change would require some renovations, however, because the "computer and everything is hard-wired into the floor."

An interviewee describes study rooms that are needed due to the lack of areas in the library where students can do group work utilizing computers. The current computer lab does not "allow group work . . . so that's a need," he/she states. To make space for the study rooms, the area that houses microfilm could be repurposed, since "microfilm's not used much anymore." Volumes of the local newspaper could be digitized to free additional space. The addition of four new study rooms is envisioned, but the interviewee states that the library "would probably start small and just try to do two, but that's pie in the sky"—primarily due to the economic situation at the college.

Impact of technology on Case College D library's organizational structure. The organizational structure of the library at Case College D is flat, since most of the

employees report to the director and the director reports to the vice president of instruction.

Due to its small staff, the library's employees have multiple roles and responsibilities. For instance, in addition to reference responsibilities, the reference librarian also serves as an informal assistant to the director and is in charge of the computer room. This dual role is advantageous for the library since the reference librarian has technology skills that are needed in all areas, according to two participants.

One interviewee observes that the library's technical processing department has been impacted by technology in the degree to which it is autonomous. Employees complete job tasks with available technology tools. For instance, the department catalogs materials using automation and shared cataloging. The person in charge of the technical processing department is a clerical support staff employee who employs work study students and works with circulation desk personnel to accomplish work tasks in the technical processing area.

A couple of participants indicate that the library would like to reclassify the technical processing employee's position so the individual could work on systems and automation issues, but funding is not currently available to hire personnel to assume his/her other duties, and the clerical employee needs to complete additional education and training. The library recently lost a critical person who performed some of the needed clerical tasks, and budget cuts are delaying filling that position.

Since IT is completely separate from the library, the library director tries to work closely with the head of the IT department, which is located on the floor above the

library. Cooperation and communication with the IT area are themes that emerge as the participants discuss the importance of that relationship.

Impact of technology on Case College D library's services. A participant provides the following personal narrative of the ways in which technology has impacted library services:

> When I did my . . . degree, we didn't have the Internet. We didn't have technology. And I had to drive to the library—to the LRC and physically go through and physically spend that time in the library—doing the—doing the things that were required to be done. And I spent hours and hours and hours and hours traveling and getting there and then trying to find what I needed and—and then, you know, doing that. And now it can all be done from the luxury of your home. At 2 a.m. in the morning, at your own flexibility . . . it's amazing how technology has provided that opportunity. That would—was not there—you had to really want to do this back 25 years ago. . . . I had to go to different libraries. I couldn't just get on the Internet, go there, and go there, and go there . . . it's more convenient and it's just, uh, it's—it's more accessible. And I think that's what technology has done; it's provided accessibility to people who did not have that opportunity before. And that's why we need to take advantage of it. Libraries and LRCs and every other way possible.

The participant is particularly impressed with Case College D library's computer room, including its ability to proctor online tests. He/she states that this is a needed service, since the college's testing center is not open as extensively as the library. The computer room is described as a room with approximately 25 to 30 computers. It is open to all students until 9:30 at night and on Sunday afternoons. Another participant notes that the library does not want the room "to be labeled as a lab"; consequently, it has been designated the computer room.

An interviewee relays that he/she doubts that computers will ever be added to the main room of the library due to "the noise factor." Laptops, however, are available for usage throughout the library, and nearly all of the participants at Case College D mention

the importance of having laptops that check out to students. One of the participants notes that the library was one of the first places on campus to have wireless access.

Technology has impacted other library services, as well. The participants mention the addition of the online catalog that took the place of a card catalog; the addition of online subscription databases that took the place of hard copy periodicals and microfilm; and the addition of library instruction sessions in the smart classroom that took the place of library tours. Two participants also mention an online chat reference service that is being offered during a restricted number of hours on weekends.

Interviewees tout a service for instructors that helps faculty capture their lecture presentations or capture a librarian's research instruction—and then insert the presentations in Blackboard. The lectures are "always out there on a hard drive," and the URL is available to copy and paste into Blackboard. One of the interviewees states that this is helpful "because a lot of the time online students are left out of the loop on things. And that, once again, tightens the net so that no one falls through the cracks." He/she states that "students can open it up and view it like they would a little movie clip or a YouTube clip."

In addition, several participants describe a new database entitled Films on Demand that allows instructors to stream video on a variety of subjects. The director of the college's IT department recently attended a library conference to learn how "to shape the bandwidth so that . . . a student who's just watching a movie for fun would get less bandwidth than an instructor who is showing a video in the classroom." A participant notes that the library director and the director of the IT department "usually have lunch

every day" and are "friends as well as co-workers"—a situation that "works out well for the library."

New services that two participants would like to see added include: more ebooks and the capability to download ebooks with Overdrive software; a print management system that would allow students to use ID card printing and alleviate the need to "physically take the money and give them change"; and a digitization project that would fund digitizing issues of the town's local newspaper that are currently archived on microfilm.

The library continues trying to (a) replace its considerable collection of videos and DVDs with streaming video as funds allow, and (b) migrate to a newer version of integrated library software that would allow centralized searching for a variety of resources. Participants state that the latter project has been ongoing for over a year, and it is nearly ready "to go out to students."

Impact of technology on Case College D library's ability to help meet the educational mission. According to participants at Case College D, high enrollment areas that use the library extensively include health sciences, business, speech, and English. Students enrolled in the nursing program and in other health related areas use the library's VCRs and videotape collection extensively, and they use the library's subject specific medical databases. Reference assistance is available for speech and business instructors who make podcasts for online courses in the library's instructional classroom. Films on Demand is an online video streaming database that is being used by instructors in the English department, as well as in other areas. An interviewee at Case College D describes the advantages of using streaming videos, saying they are "accessible through

the catalog and remotely, and can be imbedded into Blackboard." He/she estimates that there are "three [faculty] consistently, who are using it through Blackboard, but . . . probably six to seven who use it on campus, consistently."

A database entitled American History in Video is particularly popular with history classes. As stated in one interview, "that's all we see our history instructors for—are videos." A participant notes that the library's in-house "video collection is quite outdated," so streaming videos are needed to replace that collection.

Librarians usually canvass faculty to obtain input on new technology. An interviewee describes the library's attitude toward faculty as follows:

> Rather than just [say] I'm going to sit in the library on a throne some place, and I'm going to order what I think, or subscribe to what I think is useful, [librarians] really canvass our faculty to see what is helpful and useful and they're so open to feedback as far as technology is concerned. And, really, I just don't know where they get the money from, I don't know where it comes from, they are so creative with their budget. . . . They really tapped into "take care of your instructors, and the students will follow suit."

According to participants, other ways in which the library assists the college in meeting its educational mission include: conducting "presentations for many professors' [classes] on campus on how to access the online databases"; "providing . . . credible information, reliable information for [students] to complete assignments"; providing remote access to library materials for distance education students; offering computers, software, and technical assistance in the library's computer room; and offering a virtual librarian chat and email reference service.

To sum up the impact of the library's technology on the educational mission at Case College D, an interviewee states the following:

> Basically the technology just allows, through the library, students to have more tools in their tool belt . . . if they learn how to navigate through this technology at

> our college, then the navigation is very similar to what you'll see if you go to another junior college or a four-year university, so that they can see that there is a real application or reason to learn it now. Better now than later—when someone is actually here at the community college level offering to help them learn.

Impact of technology on Case College D library's capital and operational budgets. The budget process for the library at Case College D "changed a lot" when the college hired a new president a few years ago, according to one participant. He/she states:

> Now we do not budget for computers, for example—any kind of equipment like that. We say how many we need and it all goes through—purchases as well as budgeting—goes through the IT department. So, for example, if [we] say [we] need ten new computers in [the] computer room and two staff computers, [we] don't put any dollar amounts on that. That goes, there's a pool of money that's budgeted and during the budget year, when we're ready to purchase, we say—well, they contact us and say, I noticed you needed this. We've ordered it. We're putting that money into your budget and earmarking it for that . . . I think the VP team prioritizes the purchases, but with computers it may just be the IT department. . . . Because they have records on what's the oldest and that kind of thing. And they're very fiscally responsible, too. One of the reasons they went to this system was to standardize what's purchased, I think. But also so that one department doesn't have computers ten years old and thinks that's what they're supposed to live with and another department is getting brand new ones every year.

When the college first started purchasing computers, there was no rotation system, explains another participant. He/she states that the library did not change computers for four or five years, but "as IT grew and as more and more things became technologically driven, we started rotating those computers out—moving them out more regularly."

The library at Case College D only has one copier, and funding for it is not part of the library's budget either. According to an interviewee, the copier "comes through the business office, and they determine the price on that." He/she states that the library is just responsible for housing the copier.

The library's operational budget consists of some technology funding that the library does control—including database purchases that are included in the library's periodicals budget. A participant states that databases are listed in the periodicals budget because online access to periodicals is "just a different method of delivery." Recent database purchases are described as follows by another participant:

> We have definitely had to increase, because of mainly licensing . . . we have purchased a ton of databases. I bet we've added . . . well you know with TexShare [a resource sharing consortium], we've probably added at least ten or eleven new databases over the last five years.

The library has also purchased streaming video databases that are intended to replace in-house videos. As stated in an interview, the library had to add this capability for the following reason:

> Our videos were quickly disintegrating and the cost to replace those—there's no way—we had tried as the budget initiative to replace those and that was not approved. So, we just found another way to be able to provide [videos]. . . . Our main motivation was to purchase something that would not be destroyed—you know like the videos—and it was cheaper, in comparison.

While online subscription databases have increased, the book budget has decreased in the last 10 to 15 years, according to a participant. He/she states:

> The amount of money that we are spending on books probably is less than it was . . . in the past years, again going to the fact that they can get what they need through the Internet and online and other—other ways. . . . I think that probably we're seeing a little bit of a decrease.

The library's services and supplies budget has continued to increase, though, primarily because technology items, such as the annual maintenance fee for the library's integrated library system, are charged to services and supplies. Overall the increases have outpaced the decreases in the library's operational budget. An interviewee notes

that during the last 10 to 15 years the library's "operational budget has definitely increased" due to the impact of technology.

Two technology related projects that will be implemented when funding is available, according to an interviewee, are (a) a print management system, and (b) digitization, via outsourcing, of archived copies of the local newspaper. In addition, another interviewee would like to purchase new laptops and "chairs that [are] equipped to accommodate laptops."

Since the library is located in a fairly new building that was completed in the late 1990s, capital expenditures are not anticipated in the near future. However, a participant discusses the need to repurpose existing rooms and to add study rooms that would provide study space for group work. This would be the first step in developing a learning commons type of environment. However, a frequent theme at Case College D is the precarious state of the college's budget. A participant describes the situation as follows:

> The financial aspect of the—the college is something that you have to take into consideration when—when you're talking about what you're going to do in the future. And I'm concerned about the financial aspect of being able to do anything. . . . The fact that we can use technology to offset some of the—the required—some of the hard copy type of things that we used to do, not just textbooks but magazines and other periodicals and things of that nature I think will be beneficial to us. And I think we will see a decrease in the future possibly in some of the hard copy type of things that we do because they're going to be available online.

Impact of technology on Case College D library's personnel. A theme at the library is one of constancy and consistency regarding personnel. Participants have not seen a change in job titles or a significant change in the number of library personnel over the last few years. A recent retirement left a vacancy in one of the library's support staff

positions, and an interviewee states that the staff member may be replaced by "somebody with a different skill set—maybe somebody with a different set of qualifications than they've had in the past." The interviewee goes on to say that "the Internet has made things so different in the last ten years. And it's going to continue making things different and I don't think we even can envision what it will be like 20 years from now." The skill sets needed are ones "that would be conducive for students that are coming in wanting to go online and wanting to do things through technology and through other—other ways—other types of learning capabilities."

Another participant affirms that library employees need to be "computer literate" and to "know how to help other people learn things on the computer." He/she states that to date library job descriptions have not varied from descriptions in the past, but a major change is in the works as the library shifts duties so there is "somebody in charge of automation and databases and systems." The current plan is to have an existing clerical employee's position "evolve into a professional position," which would be a systems librarian. The clerical employee would fill that position after completing a degree in library science.

According to another participant, a new systems position is needed due to "everything that we have online now--because it's getting to the point where there's so much stuff online and so many systems and software to take care of that you need one person just doing that." He/she describes changes that evolved due to the adoption of technology. For instance when he/she was first hired at the library, they "had to clean the computers off every week to empty the Internet files and try to keep them virus free."

Now software called Deep Freeze has been installed that negates the need for that task, so employees just monitor problems.

Over time, the library has assumed some duties that IT performed in the past. For example, the library is now responsible for its own webpage. An interviewee provides the following explanation regarding that change:

> IT had it before, but we wanted to put that back into our own hands because we needed to have things added, things changed, and those changes were not happening quickly enough. I mean if you purchased a database, you don't want to have to wait six months before it's added.

In addition, the interviewee states that the library is in charge of the library's integrated library system. IT handles upgrades for the system, but changes and customizations are the library's responsibility. Remote access authentication for the databases is also part of IT's responsibility.

Another interviewee explains that IT and the library are "totally separate" areas; although the administration had "at one time talked about maybe putting . . . some of the IT over into the library area." Ultimately, however, he/she states that the college "had an IT person at that time that we felt comfortable with, and we had a . . . LRC person and we just felt like this was the best scenario at this time."

Since the library has a relatively small staff, the library's support staff help provide rudimentary technology and reference assistance. A participant states that "even the clerical people have [completed] some online training," so they can assist when needed. The library ensures librarians are qualified by encouraging them to complete a master's degree in library science. A member of the support staff has responded to this encouragement by pursuing a bachelor's degree and by making plans to complete a master's degree in library science.

Regarding the impact of the adoption of technology on relations among library personnel, a participant praises the benefits of using email to obtain an "immediate response and feedback on things that are going on." He/she thinks that communication is "much better than we used to [have] without that capability."

Relations among the library's personnel have "totally changed," observes another participant. Specifically, he/she perceives that "it has caused us to need to work together . . . with automation, we all tend to try to follow the same procedures even more so because there's always somebody working behind you."

One interviewee has not seen a change, but he/she emphasizes the library's cooperative attitude:

> I can't think of anything that has changed the way we relate to each other. We relate to each other rather well, so I can't think of anything that we've done differently that's made it better or worse. We're like this big happy family . . . I look forward to coming to work every day, and not many people can say that.

A participant thinks the staff at Case College D has adapted well to technology with one exception. He/she describes a former employee who "did not want to try to learn how to do things, like the budget in Excel, so [he/she] never did" use it.

Another participant states the following about library employees and technology:

> All had to move along with technology—technologically. You know, you won't be in the library world for long if you can't adapt to that . . . yeah we're all forced to—not forced in a bad way, but—I do like technology. My personality is such that I'll just play with it until I get it right.

The library's clerical workers/support staff have adapted well to technology, according to an interviewee; however, the computer room has presented challenges. For instance, new computers were recently installed, and the interviewee is concerned that "the software we used to have may not work well on the new operating systems because

they were created before that operating system came." Regardless, the interviewee states that "most of the time technology makes things easier for you, which makes it easier to adapt to it." However, he/she goes on to say that "some people don't even want to give it a chance because they're scared of it or they're not comfortable with it."

With skill set requirements changing, a participant notes that it has been difficult for the library and for the college's IT area to find qualified clerical personnel, primarily because the "pay is so low." However, he/she states that they usually "get a lot of applicants . . . [that are] probably better for what we pay than it could be."

Impact of technology on Case College D library's allocation of human resources. Although there is some overlap with personnel issues, the allocation of human resources is focused on the increases or decreases in library personnel as the college allocates resources to fill positions. The allocation of human resources at Case College D's library has remained fairly static for a number of years, according to four of the five participants. The only change has been a decrease in the number of support staff members after an employee retired a few months ago. That position has not been filled and is currently on hold. In deciding whether or not to fill positions, one of the participants describes the process as follows:

> [The college] takes it case by case, individual by individual, and when someone leaves then [the college will] determine how [it] want[s] to best replace them. And, and what type of position that they'll need—and their qualifications, and [the college will] look at their job description and, and look at the whole scenario to see what [the college] need[s] to do to better serve [its] students . . . there may not be as much a need [for] a hands on book sort of person as there had been in the past.

A participant observes that although the number of librarians has not changed during the last 10 to 15 years, he/she is "not going to say it shouldn't have changed."

The college currently has no plans to increase the number of librarians, but a systems/automation librarian is needed. The participant notes that "IT is increasing in personnel," but they also need it—primarily because they were understaffed. He/she states that "in the last 10 years, they've probably, they will more than double if they're able to hire the personnel that they have already had approved." Another participant explains that IT is busy "behind the scenes" due to changes on campus that include: wireless access to the Internet for students; streaming video of basketball games/sports; the addition of smart classrooms; and the addition of a new technology building.

Regarding librarian positions, one of the interviewees observes that he/she is not sure the college's administration understands the difference in a librarian and a non-librarian position. The library's reference librarian position is an example. He/she states that it is not considered a professional position on campus—although the employee holds a master's degree in library science from an American Library Association accredited school.

Impact of technology on Case College D library's collections. A participant describes the future of library collections as follows:

> We can anticipate in the future there will be more people that will be doing things online and less people that will actually be inside the library, in the structure looking for books. And I think because of that you're going to see a change in the future in terms of the sizes of libraries and LRCs.

According to another participant, in the last ten to fifteen years, the library at Case College D has cut back on the purchase of hard copy/print books. It has also reduced the number of hard copy periodicals by approximately one-third—primarily because "they're available online." As the collection moves online, the library is anticipating purchasing a new database called Overdrive that has "ebooks and audio

books, downloadable, that can be downloaded to pretty much any device." The participant thinks that a similar service to which the library currently subscribes has not been used because the ebooks are "not compatible with iPods or Apple products."

Another participant describes the importance of online resources for students, stating that the library wants to make sure information is "available to distance learning students or to people who are trying to do something remotely." He/she explains that print reference books are still available, but the circulating book collection has "definitely moved to a more digital" ebook format.

Three participants mention an existing video collection that was part of the IT department's media center until approximately five years ago when it was moved to the library. The videos and DVDs in that collection are slowly being converted to streaming video; although, the library still purchases DVDs for people who travel or who lack Internet access. Both DVD and digital formats are purchased, if available, in order "to get coverage both ways."

The importance of having an in-house reserve collection has decreased, according to two participants. However, some faculty still have reserve items available, such as "their notes and what not, solutions, manuals, stuff like that." In addition, some "instructors bring over their textbooks for [students] to come in and look at if they can't get a textbook," according to one of the participants.

In discussing planned changes to the collection, the participant states:

> I haven't heard people say, but I mean there's been several times where we were like—hopefully they won't decide that everything's available online, so we're not needed. Because there still are people who would rather hold a book in their hand than look at a computer screen. I'm one of those. . . . It doesn't cause me to have a headache as quick if I'm looking at something in a book that I'm holding instead of the computer screen.

This is not an unusual perspective, for another participant holds a similar view. He/she states:

> Students essentially, sometimes to my dismay—I know it's great, but I still love books and reference materials—they can access a wealth of research material that's online, available through the . . . library homepage, that only our students can access. And that includes Ebsco, Galenet, Salem Literature, even Films on Demand. They have that at their fingertips either from campus or remotely using their login.

He/she notes that increased access to online materials has "freed" the library to focus on purchasing "just the best quality" in-house materials, i.e., print reference and circulating materials that are "the most popular, the top-selling, the most name-recognizable titles for the students."

Cross-Case Analysis

Continuing Creswell's (2007) guide, the within-case analysis is followed by a cross-case analysis, which is defined by Creswell as "a thematic analysis across the cases" (p. 75). In this study, insights about themes and subthemes across the cases are presented within the context of the study's eight research questions, i.e., physical structure, organizational structure, services, ability to help meet the institution's educational mission, capital and operational budgets, personnel, allocation of human resources, and collections.

To be considered a theme, the topics had to meet one of the following criteria: (a) the topic had to be discussed in-depth by a participant or participants at a minimum of three of the four case colleges; (b) the topic had to be mentioned in interviews with different participants at different institutions four or more times; or (c) the topic had to relate in some way to all of the institutions. Emerging themes are topics that were

mentioned several times, but only one or two institutions discussed them in any depth. They are topics that should be watched for future developments. To protect confidentiality in the cross-case analysis, insights and remarks are either aggregated, as in "all of the colleges," or coded as Case College A, B, C, or D.

Themes related to the impact of technology on physical structure. The library at Case College C is located in a building with multiple floors; libraries at Case Colleges A and B are located in two-story buildings; and the library at Case College D is located on the first floor of a two-story building that it shares with the college's IT department. Themes related to the impact of technology on each library's physical structure include (a) a need to renovate buildings so they can accommodate new technologies, and (b) a constant repurposing of existing space.

The need to renovate is understandable since libraries at Case Colleges A and B are more than 30 years old. Case College C added floors to its building in the 1990s, but it too is in need of updating. Although the libraries have wireless access, participants at Case Colleges A and B express a need for additional rewiring of their buildings, and all three libraries need to upgrade their facilities with new paint, new furnishings, and new flooring. Case College D is not experiencing the same problems since it was built in the 1990s. Libraries at Case Colleges A, B, and D would like to add study rooms that can handle students' technology needs. Case College C's library has study rooms, but the rooms lack adequate electrical outlets for laptop computers. When considering renovations, however, academic officers at the institutions make it clear that economic conditions preclude any changes in the physical structure of library buildings in the near future.

Repurposing of space has been extensive at the libraries, and additional changes are planned when funding is available. Repurposing has been implemented on a different scale at the large library located on Case College C's campus. Since that library has multiple floors, functions on entire floors have changed over time. Changes during the last 10 to 15 years include: moving a shrinking technical processing department to a smaller area and moving a growing automation department into its vacated space; downsizing reference book and periodical shelving areas due to the availability of online databases that are replacing print materials; and moving administrative offices to the top floor so a large computer lab could be added on the first floor.

All of the case college libraries are repurposing space where the card catalog, microfilm cabinets/machines, index tables, and some shelving were located. Case College B's library is the only library in the study that still has a card catalog. It is planning to discontinue use of the card catalog and remove it from the library when technical processing staff no longer need it. Case College B also maintains microfilm cabinets and a microfilm machine, located on the first floor near the reference desk, but they are rarely used. All libraries in the study are either planning to remove microfilm collections, or they have already done so, since online databases have made those collections largely irrelevant.

Three out of the four libraries in the study have added or converted instructional classrooms into smart rooms during the last 10 to 15 years. Case College A is waiting to reclaim its instructional classroom and lab space when the current occupants move to

another building. The instructional classrooms are smart rooms that have technological capabilities that facilitate instructing students about electronic resources.

Computer labs for students have also been created during the last 10 to 15 years. The lab in the library at Case College A does not report to the library, but it is located in the library; the lab in the library at Case College B partially reports to the library; and the labs in the libraries at Case Colleges C and D report to the library. The computer labs that do not report to the library have plans to move out of their respective libraries, which will enable the libraries to expand library services into the vacated areas. The library at Case College A will probably continue using the lab space as a computer lab and, also, as a library instruction area. The library at Case College B is planning to incorporate group work areas into the former lab space. The part of the lab that has been reporting to the library will remain a computer lab and may expand.

All of the libraries are interested in adding or extending group learning spaces to create a learning commons environment that encourages student collaboration. Case College A's library has created a coffee bar near converted tables that are wired for computers. Participants at the library report that the area is one of the most used spaces in the library. Group study rooms will be added when funding is available. Case College B plans to repurpose the library's first floor area by adding a learning commons in that space—again, when funding is available. In the meantime, the library is discussing changes on a smaller scale. The library at Case College C is moving in the direction of a learning commons, and since it is the largest library in the study, it has ample space that could be repurposed to fit a learning commons model. Case College D's library is the smallest one in the study; however, it also aspires to add more

collaborative learning spaces in the form of study rooms. It recently converted several index tables and had them rewired for computer access. This repurposing of space is a first step in the library's plan to add group study areas for its students.

Since audiovisual material has been subsumed to some extent by online resources, the libraries at the case colleges are moving from AV formats to media formats as funding allows. For instance, the library at Case College B has databases with online media, but it also has in-house AV materials. The library at Case College D subscribes to databases such as American History in Video, but it plans to continue maintaining a room in the library that is dedicated to AV materials until additional streaming videos can be purchased.

Themes related to the impact of technology on organizational structure. The main themes related to organizational structure at the case colleges are (a) that the libraries have not altered their reporting structure in any significant way during the last 10 to 15 years, and (b) that relations between the libraries and IT have changed considerably as technology has been adopted during the last 10 to 15 years.

Reporting structures on campus and within the libraries at the case colleges have remained fairly stable in spite of the adoption of technology. All but one of the libraries have reported to their college's chief academic officer since their institutions were established. The library at Case College A started reporting to a less senior academic officer in recent years, but it too remains in the instructional area.

Regarding the reporting structure within the libraries, all of the librarians at the case colleges report directly to their library directors, except at Case College C. Due to the size of its staff, the library at Case College C is slightly more hierarchical, i.e., a few

of its librarians report to other librarians. Since reporting structures are fairly flat at the libraries, they do not have formal organizational charts. For instance at Case College C, library positions and departmental areas are evident in a table located on the library's website, but a formal chart is not available.

Although the organizational structures have remained stable over the last 10 to 15 years, libraries at the case colleges have struggled with the placement of automation/technology responsibilities. They have assigned technology job tasks to existing personnel where possible. In some instances, new personnel were hired to ensure needed competencies were available. Libraries at Case Colleges A, B, and D distribute technology duties among personnel in different areas of their libraries. The library at Case College C, which is the largest library in the study, created its own automation department in the mid 1990s, so technology job tasks are concentrated in that area.

Libraries at all of the case colleges have had evolving relationships with IT during the past 10 to 15 years. The library at Case College A currently shares responsibility for technology with IT—to the point that it is the first responder for faculty and classroom requests. The library at Case College B has its own server and is able to handle most technology matters internally. It works with IT on hardware issues and technology budget items. The library at Case College C has an automation department with in-house servers and with technicians dedicated to library systems. Recently, however, circumstances have changed due to budget constraints on campus, and the automation department has lost personnel, one of whom was transferred to the IT area. In addition, some functions of the department have moved to IT. The library at

Case College D has worked diligently to develop a congenial relationship with IT, which is located in the same building, and it depends upon the IT department to assist with library technology.

Themes related to the impact of technology on services. The main themes related to the impact of technology on library services are (a) that online subscription databases have been replacing print subscriptions to periodicals at the case college libraries, and (b) that new hardware and new software in the libraries have made multiple forms of technology available for students and faculty. An emerging theme focuses on the interest the libraries are exhibiting in adopting social media and mobile devices.

The addition of online subscription databases that are largely replacing in-house print magazine, journal, and newspaper subscriptions is a theme related to the impact of technology on services at all of the libraries in this study. As databases have expanded to include electronic books, in-house print books are also being replaced. To some extent, accreditation standards, established by the Southern Association of Colleges and Schools, have been a driving force behind the purchase of online subscription databases. According to the standards, parity of access to materials, resources, and services is required for distance education students. Access to those databases impacts every aspect of service, including web page development, reference assistance, technical help, research skills instruction, and staff training. Since a library's virtual presence, via its website, is now as important as its physical presence, the databases at libraries in this study are viewed as essential for facilitating access to credible resources.

Another theme in the services area that pertains to all of the case college libraries relates to the availability of new software and hardware during the last 10 to 15 years.

All of the libraries have in-house computer labs, with varying numbers of computers, as well as some form of laptops for students to check out for in-house usage. Every library has the Microsoft Office Suite and specialized software for specific programs. The library at Case College C, the largest library in the study, has HD widescreen televisions for public viewing; an ID system for making student/staff IDs; and multiple copiers and printers, one of which makes banners and signs. The libraries at Case Colleges C and D have videotaping capabilities that enable instructors to capture lecture presentations and librarians to videotape research instruction sessions.

As new services and new technologies are added, the libraries are discontinuing older technologies. Participants at every library list microform equipment and materials; CD-ROM towers; VCRs; DVDs; and the card catalog as discontinued items and services or as items that are decreasing in importance as online databases replace them. Although still used, audiovisual material and equipment are increasingly being replaced by online streaming media databases such as Films on Demand.

A third topic is an emerging theme at the libraries. It relates to social media and mobile devices, both of which are popular among college students. Various participants at all of the libraries exhibit interest in social media and mobile devices, but only one participant, employed at Case College C, mentions these services in any depth. His/her library has a mobile website, including a mobile link for the online catalog, and the library is contemplating using social media, such as Facebook. As the campus with the largest library, Case College C has personnel and expertise available that the smaller libraries lack. Catching up and keeping up with technology are the focus for libraries at Case Colleges A, B, and D, so experimentation with newer technologies is limited.

Another new service, which is a form of social media that is being used by the libraries at Case Colleges C and D, is chat reference. This service allows online reference questions to be answered synchronously in an instant message/chat format. Case College D limits its usage of chat reference because it lacks available personnel to monitor the service. All of the libraries, including the libraries at Case Colleges A and B, offer an email "Ask a Librarian" reference service. This service is less labor intensive than the chat reference service, so it is a feasible alternative for the smaller libraries.

Themes related to the impact of technology on the ability to help meet the educational mission. Themes related to the impact of technology on the ability of case college libraries to assist in meeting their college's educational mission repeat themes to some extent that are discussed in the services section of this cross-case analysis. For instance, the benefit of having readily accessible online subscription databases is a topic that every participant at every library in the study views as one of the most advantageous aspects of library technology for students. Also mentioned are the benefits of having a computer lab in the library with technical assistants who are available to help students. Research skills instruction; reference assistance in-house and online; supplementary links and materials for online Blackboard courses; interlibrary loan services; information on library websites; tutorials explaining the research process; and laptops for check out are also topics that are discussed in the services section of this cross-case analysis and that apply to this section on helping to meet the institution's educational mission.

A theme specifically related to the impact of library technology and how it assists in meeting the educational mission of the colleges in this study concerns positive faculty perceptions of the libraries and the extent to which they use library resources on their

campuses. A couple of aspects regarding this theme include: (a) faculty participation on library committees, and (b) usage of the library by high enrollment areas.

Three libraries in the study have faculty committees to advise library directors on matters related to the library. Case College D has a learning resources committee instead of a faculty committee; however, a participant at that college states that the library canvasses faculty for their input on major decisions, particularly decisions on database purchases. In spite of faculty participation on library committees, a participant at Case College B states that "there are a lot of faculty that just don't feel like they need the library," and a participant at Case College C notes that "there has been very little concern or questions from the instructional areas about needing help" with technology for distance learners. According to public documents reviewed by the researcher, all of the library directors, including the director at Case College C, serve on multiple committees at their colleges, so visibility via committee work on campus is an avenue for directors to network with faculty and to share information on relevant library technology.

High enrollment areas that use library technology services and resources to support the curriculum include English, speech, business, and especially health sciences, according to participants in the study. The following list of services and resources for health sciences students at case college libraries demonstrates the extent to which the libraries assist in fulfilling their college's educational mission. Case College A offers medical databases and has a designated space in the library set aside for allied health students. Research assistance is also available for faculty needing resources for the nursing program's simulation lab. Nursing students who have rigid schedules that do not

allow them to come to campus at Case College B rely on online databases to complete assignments. Computers in the library's computer lab at Case College C have specialized nursing application software installed on them. The library at Case College D offers videos, databases, and reference assistance for nursing students.

The services, resources, and facilities offered to health sciences students demonstrate ways in which library technology assists case colleges in fulfilling their educational mission by expanding access to information and supporting the curriculum. Additional resources and services are described by participants for other discipline areas as well.

Themes related to the impact of technology on capital and operational budgets. The following themes emerged concerning the impact of technology on library budgets at the case colleges: (a) capital expenditures at the libraries have been limited during the last 10 to 15 years; (b) funding for technology is complicated by the availability of different funding sources; and (c) the need to fund technology has impacted all aspects of operational budgets.

During the last 10 to 15 years, capital expenditures at the libraries have focused on renovating or repurposing existing library spaces. Additional instructional classroom space and/or computer lab areas were added to the libraries at Case Colleges A, B, and C. Case College D built a new library in the 1990s that included an instructional classroom and a computer lab. Rewiring of the buildings and/or adding electrical outlets at the libraries at Case Colleges A, B, and C were needed in order to handle additional technology. The library at Case College D expended funds to rewire a former index table area to accommodate ever increasing numbers of computers and other technology.

Operational budgets have been focused on funding equipment and supplies necessary for adding new technology. A participant at Case College C observes that the library's equipment budget is spent primarily on purchasing computers. All of the libraries at the case colleges have a rotating system for replacing computers every three to five years.

Participants, especially library directors, at every case college list the complicated and often confusing ways in which various technology related items are funded at their libraries. For instance, the library at Case College A has received technology funding from grant programs such as TIF, the Texas Infrastructure Fund; TexShare, a resource sharing program funded by the Texas State Library with state funds and LSTA funds, which are Library Services Technology Act (federal) funds; IT departmental funds; maintenance departmental funds; library funds; and also funds from the library's vice president's office. A director at one of the case colleges explains that TIF grants paid for initial computer purchases at virtually every library in Texas during the late 1990s, and grants continued funding computer purchases until the program ended in the early 2000s.

The library at Case College B has an equally complicated system for managing technology purchases due to its many funding sources. Technology related items are funded with a library foundation budget, grant funds, TexShare funds, a Friends of the Library fund, the college's general fund, and the library's services and supplies budget, periodicals budget, book budget, etc. The college's general fund may only be used for student related purchases, and a technology committee has responsibility for making decisions regarding technology purchases for the library and for other areas on campus.

Three of the case colleges have technology committees that are responsible for some aspect of their library's technology purchases. At Case College B, the deans, the library director, and the instructional council are members of that committee.

Funding for technology has impacted all areas of the library budget, according to participants at the case college libraries. For instance, participants indicate that salary funds have either shifted or increased as technical personnel have been hired. Services and supplies budgets have expanded to handle service contracts for integrated library systems; maintenance contracts for technology equipment; fees for cataloging services and other technology related services; and printing costs and supplies for computer printers.

Funding for hard copy print materials has been decreasing, while funding for online databases has been increasing. In some instances, libraries in the study have had to be creative in their approach for purchasing needed databases. For example, the library at Case College D includes database expenditures in the periodicals budget, and views online access as just another form of delivery. Budget transfers are also commonly used to pay for databases. For example, the library at Case College A has transferred funds from the book account and the AV account to the software account to purchase needed databases. A participant at the library observes that he/she has seen a steady increase in funds that are being used for technology, especially for databases that are requested by faculty. A participant at Case College C notes that the library's budget at his/her college has increased to fund additional databases, as well. A participant at Case College B, however, thinks that funding is just shifting from purchasing print

resources to purchasing online resources—and consequently, that library funding has remained relatively stable.

Themes related to the impact of technology on personnel. Library personnel at the case colleges have been impacted by technology in the following areas: (a) changes in the necessary qualifications of employees; (b) relationships among library personnel and between the library and IT; and (c) the importance of understanding the library and job tasks associated with technology. The first two items are themes, and the last item is an observation.

Participants at all of the case colleges mention the need for library personnel to have adequate technology skills and competencies; although, they also state that job titles and job descriptions have not changed significantly during the last 10 to 15 years. Titles and descriptions that have changed are related to positions that deal almost exclusively with technology, e.g., an automation librarian position at Case College C or a systems librarian position at Case College B. Other positions have incorporated needed technology skill sets into existing job descriptions.

Participants at Case Colleges A and C note that computer literacy is not age related, but participants at all of the colleges mention personnel who have retired during the last 10 to 15 years after experiencing difficulties with computers and technology. Regardless of age, employees who were innovators and early adopters of technology have been leaders in experimenting and learning about technology. Essentially they are the library gurus to whom everyone turns for assistance when needed. An innovator and early adopter of technology at Case College A is not only a leader at the library, but he/she also assists IT and faculty with technology issues. An early adopter, or

technology guru, at Case College B was hired by the college's vice president of instruction almost a decade ago to bring the library up to date with technology. The librarian who heads the automation department at Case College C is the library's recognized technology leader. Case College D's library has been grooming two technically savvy employees to assume leadership roles in the library. One recently earned a master's degree in library science, and the other is completing a bachelor's degree. Directors at all of the libraries are knowledgeable about technology, and they are comfortable supervising personnel who have special technology skills and competencies.

Libraries at the case colleges have been emphasizing the higher level competencies that are associated with new technologies among members of their clerical/support staff. The intent is to enhance the effectiveness of support staff in completing job tasks and, also, in assisting librarians with student requests. The latter is increasingly important as budgets tighten, and libraries face the possibility of losing positions. Case College C's library has support staff on hand to answer reference and technology questions. Libraries at Case Colleges A, B, and D utilize circulation desk personnel to assist students with information and technology needs. In-house training to enhance skills is provided for clerical/support staff at the case colleges.

Training and increased communication have resulted in a culture of good will at the case college libraries, which is the second theme regarding personnel. Participants in the study are positive about relations among library personnel. A participant at Case College D states that "we're like this big happy family." Relations are more formal at Case College B's library where the researcher observed support staff addressing

librarians and the director as Mr., Mrs., Ms.; however, participants state that library personnel work well together and that they meet to discuss issues a couple of times each semester. A participant at Case College A notes that technology has forced everyone to work together, but each person has his or her "own specialty." A Case College C participant likes the collaboration and communication that is evident as library personnel "relate in a different way now than we did before."

Relations between library personnel and IT department staff are another aspect of this second theme. Although relations are now largely cooperative, every library has a story to tell about a time when relations with their IT department were less than cordial. For instance, a situation developed several years ago at Case College B in which IT declined to back up critical library systems for approximately three months because they had no input concerning the system. Case College A's library website suffered when IT was slow to maintain its pages. Case College C resolved issues with IT only after forming its own automation department and maintaining its own servers. The library at Case College D continues working diligently to maintain a partnership with the IT department. To that end, the directors in each area share information during regularly scheduled lunches.

Lastly, although just an observation, it is noteworthy that academic officers responsible for libraries at two case colleges exhibit a lack of understanding of library technology or of the job tasks associated with that technology. One of the officers is noticeably uncomfortable about his/her lack of knowledge, and the other individual appears unaware that there are knowledge gaps. Academic officers at the other case colleges are well informed and supportive of the technology efforts at their libraries.

Themes related to the impact of technology on the allocation of human resources. The main theme that appeared frequently regarding the impact of technology on the allocation of human resources is whether the number of employees is adequate or not. There are two aspects to this theme: (a) administrators seeking ways to reduce costs tend to view technology as a means for reducing the human aspects of operating a library, and (b) library personnel at the case colleges, especially directors, take the opposite view, citing students who need more assistance, rather than less, with databases, online catalogs, new equipment, and new software programs.

Due to the state's difficulties in balancing its budget, community colleges in Texas have been in a holding pattern with their own budgets. The libraries in this study are maintaining the status quo or losing employees as their colleges work to reduce expenditures. One library was informed the day before interviews commenced that it was losing three positions. After the site visit, additional employees were "laid off."

The current situation is not representative of past years, however. During the last 10 to 15 years, three case college libraries added at least one employee to handle system, automation, and/or website responsibilities. Case College A's library added a technician and upgraded a support staff position to a technical services librarian position. Case College B's library added a systems librarian and upgraded several positions to ensure it had an adequate, well trained staff. Case College C's library added technicians and a librarian when it created an automation department. Case College D's library did not add employees, but it did not lose employees until recently when a support staff position was placed on hold after an employee retired. Case Colleges C and D note that they

have experienced difficulty in finding qualified personnel, especially technicians, to hire when vacancies occur.

Themes related to the impact of technology on collections. The primary theme that emerged concerning the impact of technology on collections is the movement away from print resources and toward readily accessible electronic resources. Participants at every library mention the fact that both books and periodicals are being converted to a digital form. They state that periodical articles have been available in online subscription databases for the last 10 to 15 years, and they observe that ebooks are becoming more accessible in database collections, as well.

A participant at Case College C lists the following benefits of purchasing electronic resources: distance education students can access them off-campus; they can easily be updated and, thus, are more current; and they save space, so a reduced amount of shelving is needed. A participant at Case College D observes that the physical space in libraries will continue to change as more resources convert to electronic form. Another participant at Case College D notes that ebooks and audio books are increasingly capable of being downloaded to mobile devices. Interestingly, a participant at Case College B and a participant at Case College D both acknowledge the merits of adding electronic resources; however, they also admit that they prefer reading print books.

In addition to books and periodicals, participants list other materials that are being added to their collections in an online form. For instance a participant at Case College A describes a data storage server that allows faculty to place reserve items, such as course syllabi and documents, on reserve for their students—which means the in-

house reserve collection is slowly disappearing. A participant at Case College D states that approximately five years ago his/her library started replacing videos and DVDs with streaming videos as funding became available; however, he/she also states that DVDs are still being purchased in order to give students a choice of formats.

One of the more novel perspectives on the topic of collections comes from Case College D where a participant observes that the purchase of online materials has "freed" the library to focus on purchasing "just the best quality" of in-house materials. Books on literature, such as Harold Bloom's literary criticisms, and "name-recognizable titles" are cited as examples.

An emerging theme regarding the impact of technology on collections concerns the digitization of materials. To date, digitization projects have not been conducted on a large scale at the case colleges. However, the library at Case College B has secured foundation funds to purchase equipment for digitizing the town's local newspaper. The library is the only institution in its community that has archived the newspaper, so the digitization project is a valuable community service. Another library in the study, Case College D, is planning to digitize its local newspaper when funding is available. The library will outsource the project, since it does not have adequate staffing to complete the digitization project in-house.

Summary

This chapter has included a within-case analysis and a cross-case analysis of data collected for this research study. The within-case analysis examined themes within each case that related to the impact of technology on specific areas of the libraries. A few items that are unique to each case are included in Table 6.

Table 6

Items That Are Unique to Each Case

Case College	Unique Items
A	1. The computer lab located in the library at Case College A does not report to the library. The library's research skills classes are scheduled in the lab when it is available; however, other areas on campus have priority in reserving the lab. (The lab is scheduled to be relocated, and at that point, the library should have priority access.)
	2. The library shares responsibility for technology on campus with the IT department. The library is the first responder for faculty and classroom technology requests, and the IT department is the second, or backup, responder.
	3. The institution's public information office has primary responsibility for the library's website.
B	1. Case College B's library still has a card catalog; however, it is only used by technical services personnel and it is scheduled to be removed. Students use the library's online catalog.
	2. The wiring at the library is so inadequate that plugging in a coffee pot can cause a circuit to overload.
	3. The library's large computer lab area on the second floor is actually three labs: a library lab, an English/writing lab, and a math lab. The English and math labs are scheduled to be relocated to other buildings, which will create considerable space for the library.
C	1. The library at Case College C is the central location on campus for making student, faculty, and staff IDs. Equipment and personnel for making the IDs are located at the library's circulation desk in the foyer of the library.
	2. The library at Case College C is contemplating using Facebook as a social media tool to communicate with students.
	3. Case College C's library is located in a building with more than five floors. All of the floors, with the exception of a training center that is being closed, are under the purview of the library director.
D	1. The director responsible for Case College D's information technology (IT) department attended a Texas Library Association Conference to learn more about library technology.
	2. The library's reference librarian, who holds a master's degree in library science, is not considered a "professional" in the college's personnel classification system.
	3. The library has opted to "grow its own" employees in order to gain the technology skills and competencies needed for key positions. Additional education and training opportunities are encouraged for all employees.

The cross-case analysis examined topics across all cases to determine differences and commonalities that related to the impact of technology on specific areas of the libraries. Table 7 summarizes some of the major themes that were found in the study. To be considered a theme, topics had to meet one of the following criteria: (a) the topic had to be discussed in-depth by a participant or participants at a minimum of three of the four case colleges; (b) the topic had to be mentioned in interviews with participants over and over again; or (c) the topic had to be relevant to all of the institutions. A couple of items in the table are designated emerging themes. Emerging themes are topics that were mentioned several times, but only one or two institutions discussed them in any depth. They are topics that should be watched for future developments.

The next and final chapter in the study, Chapter 5, will present a discussion of the study's major findings and the implications of those findings for practitioners, i.e., libraries, library directors, and community colleges. Future areas for study will also be discussed.

Table 7

Summary of Themes in the Cross-Case Analysis

	Cases			
Research Categories/Themes	A	B	C	D
Physical Structure: Need to renovate buildings to accommodate new technologies				
• Three libraries need to update/upgrade facilities.	✓	✓	✓	
• Three libraries need additional wiring and/or electrical outlets.	✓	✓	✓	
• Three libraries need to add study rooms.	✓	✓		✓

Table 7 continues

Research Categories/Themes	Cases A	B	C	D
Physical Structure: Constant restructuring of existing space				
• Entire floors were repurposed. (Note that the library at Case College C is the only library in the study that has more than two floors.)			✓	
• Spaces were repurposed where the card catalog, microfilm cabinets/machines, index tables, and some shelving were located.	✓		✓	✓
• Three of the four libraries added or converted instructional classrooms into smart rooms.		✓	✓	✓
• The libraries created computer labs. (Note that not all of the labs report to the library.)	✓	✓	✓	✓
• The libraries plan to add or extend group learning spaces to create a learning commons environment.	✓	✓	✓	✓
Organizational Structure: Reporting structures not altered in any significant way				
• All but one of the libraries have reported to their college's chief academic officer since their institutions were established. (The library at Case College A reports to an academic officer that reports to a CAO.)		✓	✓	✓
• All of the librarians at the case colleges report directly to their directors except at Case College C. (Note that Case College C is the largest library in the study.)	✓	✓		✓
• Although structures are stable, the libraries have struggled with placement of automation/technology responsibilities.	✓	✓	✓	✓
Organizational Structure: Relations between the libraries and IT				
• Libraries at all of the case colleges have had evolving relationships with IT (Information Technology).	✓	✓	✓	✓
Services: Addition of online subscription databases that are largely replacing in-house magazines, journals, newspapers, and books				
• This change has impacted every aspect of library service, including web page development, reference assistance, technical help, research instruction, and staff training.	✓	✓	✓	✓
Services: Availability of new software and hardware				
• The libraries have in-house computer labs with computers and laptops for students to check out for in-house usage.	✓	✓	✓	✓
• Every library has the Microsoft Office Suite and specialized software.	✓	✓	✓	✓

Table 7 continues

Research Categories/Themes	Cases A	B	C	D
Services: Social media and mobile devices				
• All of the libraries exhibit interest in social media and mobile devices.	✓	✓	✓	✓
• Chat reference that allows online reference questions to be answered synchronously in an instant message/chat format is available at two libraries. (This is an emerging theme.)			✓	✓
• Email "Ask a Librarian" service allows off-campus access to reference and technology assistance.	✓	✓	✓	✓
Educational Mission: Repeats some of the themes discussed in the services section (e.g., databases, computer labs, research instruction, etc.)				
Educational Mission: Positive faculty perceptions of the libraries and the extent to which they use library resources on their campuses				
• Faculty participating on library committees (or related committees) advise library directors on matters concerning the library.	✓	✓	✓	✓
• Usage of the library by high enrollment areas includes health sciences programs.	✓	✓	✓	✓
Budgets: Limited capital expenditures during the last 10 to 15 years				
• Additional instructional classroom space and computer lab areas were added.	✓	✓	✓	✓
• Buildings were rewired to handle the additional technology. (Note that additional rewiring is needed. Also note that Case College D only needed minimal rewiring for converted index tables.)	✓	✓	✓	✓
Budgets: Complicated funding for technology due to the availability of different funding sources				
• Participants, especially library directors, list the complicated and often confusing ways in which various technology related items are funded at their libraries.	✓	✓	✓	✓
Budgets: Funding for technology that impacts all aspects of operational budgets				
• Funds have either shifted among different accounts or expanded to pay for technology.	✓	✓	✓	✓
• Funding for online databases has been increasing (even though some of the funds derive from shifting funds among different accounts).	✓	✓	✓	✓

Table 7 continues

Research Categories/Themes	Cases A	B	C	D
Personnel: Changes in the necessary qualifications of employees				
• There have been changes in the required skill sets of employees in that all positions must now have technology and computer skills. Job descriptions and job titles are relatively unchanged.	✓	✓	✓	✓
• Early adopters of technology who have the skill sets desired have become essential library leaders.	✓	✓	✓	✓
• Clerical support staff are increasingly being asked to assist librarians in answering student requests.	✓	✓	✓	✓
Personnel: Relationships among library personnel and between the library and IT				
• Relations among library personnel have improved.	✓	✓	✓	✓
• Relations between the libraries and IT departments continue to evolve after initial misunderstandings.	✓	✓	✓	✓
Allocation of human resources: Looking at the number of library employees and deciding if it is adequate or not				
• During the last 10 to 15 years, three case college libraries added at least one employee to handle system, automation, and/or website responsibilities.	✓	✓	✓	
• Library personnel at the case colleges perceive that additional personnel are needed due to technology, but are aware of current budget difficulties.	✓	✓	✓	✓
Collections: Movement away from print resources and toward readily accessible electronic resources				
• Books and periodical articles are available in online subscription databases and ebook collections.	✓	✓	✓	✓
• The digitization of materials is an interest, particularly the digitization of local newspapers at two of the case college libraries. (This is an emerging theme.)		✓		✓

Note. A check mark indicates the theme, or emerging theme, is relevant to the case.

Chapter 5

Discussion, Implications for Practice, and Future Study

Introduction

The previous chapter presented the findings for this study in two sections, a within-case analysis and a cross-case analysis, that are described by Creswell (2007) as a "typical format" for presenting qualitative research in a multiple case study (pp. 74-75). Chapter 5 continues Creswell's guide by including "assertions or an interpretation of the meaning of the case[s]" in the "final interpretive phase" of the study (p. 75).

Specifically, Chapter 5 discusses the major findings, which derive from the within-case analysis and the cross-case analysis, and the chapter relates those findings to the body of literature that is presented in Chapter 2 and to the framework for the study that is presented in Chapter 1, i.e., the Diffusion of Innovations Theory and the concept of librarianship as a profession. Chapter 5 also discusses the implications of those findings for practitioners, including the implications for libraries, library directors, and community colleges. The chapter concludes with suggestions for future studies and a final summary.

A restatement of the central research question that guided the study and the subquestions that provided supporting information for answering the central question is included below.

Central Research Question

How has the adoption of technology by community college libraries changed the library and the roles of people employed within the library?

Subquestions.

- How has the adoption of technology impacted the physical structure of the library? (RQ1)
- How has the adoption of technology impacted the organizational structure of the library? (RQ2)
- How has the adoption of technology impacted the services offered by the library? (RQ3)
- How has the adoption of technology impacted the ability of the library to help meet the institution's educational mission? (RQ4)
- How has the adoption of technology impacted the capital and operational budgets of the library? (RQ5)
- How has the adoption of technology impacted personnel employed in the library? (RQ6)
- How has the adoption of technology impacted the human resources allocated to the library? (RQ7)
- How has the adoption of technology impacted the collections in the library? (RQ8)

Discussion of Major Findings

Major findings that derived from the within-case analysis and the cross-case analysis are discussed in this section. A summary of the eight major findings is included below and an in-depth discussion of each of the findings follows the summary:

1. Even with the changes and technological advances that have occurred over the last 10 to 15 years, academic libraries (physical space, library personnel,

and services provided) are still vitally important for faculty and, by implication, for students at the case colleges.

2. The ongoing transition from in-house print resources to online digital resources has transformed library collections and library services at the case colleges.
3. Library employees at the case colleges have adapted to and been supportive of technological changes and innovations. Employees who could not adapt or were not amenable to change have moved on to other jobs or have retired.
4. Funds for library technology derive from multiple sources at the case colleges, and creativity has been required to ensure adequate funding is available. The libraries strive to offer technology based resources and services that students and faculty value, but they are expensive to maintain.
5. Physical space in buildings on case college campuses is a scarce commodity, so libraries have been optimizing usage of the space they have and attempting to ensure it is retained for library purposes.
6. Work relations among library employees and between libraries and information technology departments at case colleges have evolved as technology related resources and services have been added and as work processes have been automated.
7. Organizational structures at the case college libraries have remained flat, and the libraries are not planning to alter that structure.

8. Since the 1990s, libraries at the case colleges have been hiring individuals with higher levels of education and higher levels of technology related competencies and skill sets.

Finding one: Libraries still vitally important. Participants at the case colleges stress that even with the changes and technological advances that have occurred over the last 10 to 15 years, academic libraries (physical space, library personnel, and services provided) are still vitally important for faculty and, by implication, for students.

Although participants in the study reject the idea that technology has made academic libraries less important, the strength of their convictions vary according to the job positions they hold. Library directors, for instance, unanimously agree that academic libraries are needed now more than ever. They point to specific populations that depend upon the library, such as underprepared students, students who are not computer literate, students who want to work in groups or learning communities where they can receive support, and students who need research assistance or instruction on databases. Some students visit the library solely to use computers with a variety of software and rapid Internet access. These needs are in line with the study's review of the literature. O'Connor (2009) describes the library's primary objective as a responsibility to teach skills that students can carry with them to the next level of their education. Juchniewicz et al. (2007) and Roselle (2009) emphasize the literacy needs of students in developmental education classes and list ways in which library services and facilities assist those students. Harrington (2010) points to the low technology skills of students who struggle to "change fonts or double-space" papers (p. 14). Cejda (2007) discusses

the need for broadband connections in rural areas that lack Internet access and describes the library's role in addressing those needs.

Senior academic officers also reject the idea that libraries are less important, for they see the library as an essential service on their campuses. However, three of the academic officers participating in the study also perceive that personnel and possibly some services and resources could be scaled back, without harming the libraries, due to the existence of ebooks, article databases, and other electronic resources. Reductions in personnel and holds on filling existing positions are an indication of this perception.

Each case college library in the study strives to remain relevant by supporting the curriculum and by providing services that students, faculty, and other library users need. The libraries conduct surveys to measure satisfaction with services and resources; they work closely with faculty advisory committees and with faculty in general to ensure adequate services and resources are available; they emphasize technology training opportunities for different groups on campus; and they develop in-house and digital collections that ensure every subject discipline benefits from the resources. All of the library directors at the case colleges are leaders on their campuses, as evidenced by their participation on multiple committees, so they are able to inform faculty, students, and decision makers about services and resources that are available.

Since the libraries report to the instructional side of their colleges, they are in the communication chain with departmental directors and with classroom faculty. This structure is beneficial, according to Arnold (2010), who states that reporting to instruction is important because libraries "are central to student learning and classroom instruction" (p. 229). She observes that some academic libraries report to support

service areas or to information technology. All of the libraries at the case colleges, however, report directly to instruction. Three of the libraries report to their college's vice president of instruction, and one reports to an academic officer who reports to the vice president of instruction.

The case college libraries work diligently to be an integral part of instruction at their colleges. One participant stated that his/her library tries to keep faculty happy since that is the key to increasing library usage by students. Another participant emphasized his/her library's efforts to be involved in information literacy and general education competencies by providing resources and facilities that encourage students to learn and to make decisions. All of the libraries recognize the need to remain relevant and to add value as they expand access to information, services, and resources that support the curriculum and the educational mission of the college.

Finding two: Transition from print to digital. The ongoing transition from in-house print resources to online digital resources has transformed library collections and library services at the case colleges. The transition from print to digital formats is being accomplished primarily with databases and with individual subscriptions to online resources rather than with large scale in-house digitization projects that require time and effort, as well as expensive equipment, to accomplish the task. One case college library has received funds from its foundation to purchase equipment and to digitize the local newspaper. Another library is waiting for additional funding before it outsources the digitization of its archived local newspaper. One case college library considered digitizing parts of its collection, but decided copyright would be an issue for most of the items in the collection.

Online subscription databases with archived issues of periodicals accelerate the transition from bound volumes, microfiche, and microfilm to online magazines, journals, and newspapers. According to participants in the study, bound volumes of periodicals and cabinets filled with microforms are increasingly being withdrawn from the collection. The Southern Association of Colleges and Schools, a higher education accreditation agency, has encouraged the transition to digital forms because libraries are required to provide parity of access to research materials for distance learners/remote users. The increasing number of online courses will further encourage the need to have online resources that supplement and, in many cases, take the place of in-house materials in the library's physical facility.

There is disagreement among participants about how long print books will be available; the advisability of going digital or not; the readability of various ebook readers; and the titles that should be made available online. Comments concerning the value of adding ebooks and purchasing articles in databases include the space savings that result when ranges of shelves are moved out of the library; the financial savings that might result; the additional resources, especially periodical articles, that would be available in databases; and the shift in focus that would occur within libraries as the maintenance of paper collections becomes less important. The review of the literature includes similar perceptions. For instance, Morrison (as cited in Goetsch, 2008); Keiser (2010); and Warnken (2004) discuss a change in emphasis as libraries focus on users rather than collections. Shirley et al. (2010) note that space formerly used for ranges of shelving can be repurposed for other activities and events.

Although there are positive outcomes regarding the transition to a digital library, participants have concerns as well. Several issues were mentioned during interviews, including concerns about faculty perceptions, since some faculty continue showing a preference for hard copy paper resources. Other concerns were related to copyright issues, ownership/licensure issues, and responsibility issues in ensuring all subject areas on campus have online resources they can use in their programs.

The issues expressed by participants are in line with the literature reviewed for the study. Kolowich (2011) discusses the trend toward digitizing libraries, and Epstein (2008) sounds a cautionary note about thinking everything is going to be digitized. Darnton (2011) argues that it may take 50 years for libraries to become digital, and he is convinced there will still be a place for print resources. Mantel (2011) and Hoek (2011) discuss licensing and copyright issues relevant to ebook collections, and Shirley et al. (2010) present potential solutions to licensing and copyright issues—one of which is favorable to libraries and one that is being advanced by publishers.

Surprisingly, during the interviews, participants did not dwell on the impact a digital library would have on the library's website. Their focus appears to be on the process of transitioning to an online presence and the decisions that are required for that change process to go smoothly. Although the website is not a central theme, nearly every participant at all of the case colleges did mention research skills classes and the benefits they saw in having credible database articles and ebooks for students to access online via the library website. They indicated that online access to research materials has changed how the classes are taught, where the classes are taught, what is taught, and how it is marketed. Three libraries have smart classrooms where most of the research

skills sessions are taught, and the librarians at all of the case colleges are willing to go to campus classrooms to present research skills sessions when requested. In addition, they provide customized online tutorials that students may access in online courses or on the library website.

Participants also mentioned online media, especially streaming media, which is taking the place of audiovisual collections that are popular with faculty. The case college libraries are trying to balance the needs of faculty who want online forms of media with faculty who still use software and hardware that is becoming outmoded. Participants indicate that they work closely with faculty to obtain feedback on students' needs, and they are trying to ensure acquisitions and collections fit those needs.

Finding three: Personnel adapting to and supporting technology. Overall participants at the case colleges have adapted to and been supportive of technology in their libraries and at their institutions; although there appear to be differences in position/group levels of acceptance. It is clear from the interviews with participants that employees who could not adapt and who were unwilling to be supportive of technological innovation either resigned and moved on to other positions, or they retired. At one library, participants shared instances in which a former director could not conceal his disdain for technology and ultimately felt compelled to resign. Participants also mentioned support staff who experienced difficulties over the years and who eventually resigned when library technology overwhelmed them.

Participants' supportive comments regarding technology include statements about retooling and reinventing the library; enjoying working with new software and seeing what it can do; using technology to enhance services for students and faculty; and

providing needed electronic resources. Negative aspects of new technologies were also discussed during interviews, including a comment from one participant who rued the day that the library ever let "computers in the building." Although humorously stated, the comment indicates there has been some ambivalence on the part of employees about technology in the library.

Interestingly, the higher the position level of the participant, the more reluctance about technology was displayed during the interviews. For instance, academic officers to whom the library directors report were open about their knowledge or lack of knowledge concerning library technology. Two officers were obviously interested in their library's technological advances and could discuss library technology with relative ease. Another academic officer was obviously uncomfortable. In fact, he/she frequently indicated that the library director would be able to answer various questions better than he/she could. The participant appeared to be well versed in online course offerings and programs, but did not make connections regarding the library's relevance in supporting those courses and programs. The fourth academic officer was knowledgeable about technology in general, but was unable to discuss library related technology in any depth. For instance, the participant appeared to be unaware of the benefits of using online subscription databases, for the participant extolled the benefits of using Google, especially Google Scholar, and did not include databases in the discussion. The officer also mentioned an overall vision for the library—without realizing library personnel already had some of the concepts and ideas in place or had plans to implement them when funding was available. It was not clear if the library director had adequately

shared information about library offerings with the officer or if the officer was not receptive to hearing the message.

Library directors, on the other hand, appeared knowledgeable about the technology in their libraries. Three of the four directors were not entirely comfortable conversing about specific details, but they had a good grasp of what technology could do and how it was being used in their libraries. During interviews, the researcher was at times referred to librarians and technicians to obtain specific answers to technology related questions. One director, however, was knowledgeable about the minutest details related to technology. The other directors, who did not exhibit the same degree of confidence, appeared to be capable directors/managers who knew the strengths of their employees and, thus, preferred for the researcher to speak with employees who could provide accurate information.

The work of Rogers (2003) is included in the learning framework for this study. Applying the continuum of adopter categories that Rogers developed to indicate the degree to which individuals embrace technology, the researcher observed that the senior academic officers at the case colleges varied from early majority, who are deliberate in their approach to innovation, to late majority, who are skeptical of innovation and change. The researcher observed that library directors appeared to be either early adopters, who Rogers describes as able to deal with abstractions and change, or early majority, who are depicted as being more deliberate in their approach to innovation. In every library in this study there was at least one individual who could be termed an innovator, described as venturesome by Rogers, or an early adopter.

In the literature, Houghton-Jan (2007) appears to agree with Rogers' (2003) concept of innovators and early adopters for she describes technology guru types of library employees who lead the rest of the staff in advancing technology and innovation—and that was clearly the case in this study. It was evident from participant comments that the technology gurus at the case college libraries are innovators and early adopters who are knowledgeable, eager to share information, and enthusiastic about their work.

For employees who are not skilled with technology, Keiser (2010) suggests offering training opportunities that enhance skill sets and advance professionalism. Houghton-Jan (2007) describes competency plans and incentives for staff members who need to develop technology skills. All of the case college libraries indicated that they attempt to enhance competencies and skills by offering regularly scheduled technology related training sessions for their employees.

Finding four: Funding technology. Funds for library technology derive from multiple sources at the case colleges, and creativity has been required to ensure adequate funding is available. The libraries strive to offer technology based resources and services that students and faculty value, but they are expensive to maintain.

This finding on funding technology is particularly relevant at a time when the literature review shows that community colleges in Texas are being forced to cut budgets due to reduced funding from the state (Haurwitz, 2010; Legislative Budget Board, 2010; Paredes, 2010). The literature also describes the precarious position of community college libraries when their colleges respond to calls for budget cuts, since libraries are often the first areas to see reductions in funding (Arnold, 2010; Schlosser, 2011).

Libraries are considered support service areas, so they do not necessarily benefit when enrollment increases or new programs are created (Arnold, 2010).

Every participant interviewed at the four case colleges spoke of difficulties in planning for their library's future since funding levels were projected to decrease or to remain static. Participants were particularly anxious about the elimination of positions. Only one college, however, had suffered significant personnel reductions at the time of the interview.

Budget dilemmas in deciding funding priorities at the libraries derive in part from faculty and student expectations regarding technology. According to interviewees, especially library directors, the libraries are struggling on several fronts. They are competing with other instructional areas and with their IT departments for funds; they are struggling to keep up with constant technological changes in databases, software, and hardware; and they are attempting to purchase the right mix of databases to fulfill subject discipline needs.

Assistance from resource sharing consortiums such as TexShare provides a measure of security; however, TexShare is primarily a state funded program that is also at risk when state funding decreases. In spring 2011, when the interviews were conducted, at least one participant at every library expressed concern about projected cuts in databases due to reduced TexShare funding. For all but one of the libraries, databases funded by TexShare provide the core group of databases at the libraries.

In addition to TexShare, other funding sources for library technology include foundations, grants, friends groups, local organizations, and other departmental budgets on campus. Library directors indicate that creativity is required when tapping into

multiple sources of funding; transferring funds from different library accounts to pay for technology related items and services; and managing technology funds that do not reside in library accounts. The complicated process of funding technology related services, resources, and activities during a time when technology changes rapidly and sources of funding vary widely requires diligence in organizing and keeping track of allocations. One of the directors mentioned the importance of cultivating a good relationship with the head of the college's business office, especially when purchasing digital resources that have implications for ownership and hosting.

According to participants in the study, a regional accrediting agency, the Southern Association of Colleges and Schools (SACS), has been a driving force in ensuring libraries are adequately funded. For instance, SACS has emphasized parity of access for distance learners for several years. A focus on remote access has led the libraries to increase funding for subject specific databases and ebooks, and to develop websites that are tailored to the needs of distance learners.

The libraries in this study are experiencing pressure to maintain a high level of technology at a time when all areas of their respective campuses are vying for funds from diminishing institutional budgets. To compete for those funds, the libraries are having to demonstrate that they are an integral part of their colleges' educational process. A review of the literature demonstrates the connection libraries have to the educational mission of their institutions. For instance, O'Connor (2009) describes information literacy skills that libraries are teaching students; Davis (2008) relates collection development efforts to provide resources helpful for the workforce education

curriculum; and Roselle (2009) states that librarians are providing library instruction that is targeted to the needs of developmental education students.

Finding five: Optimizing library space. Physical space in buildings on the case college campuses is a scarce commodity, so libraries have been optimizing usage of the space they have and attempting to ensure it is retained for library purposes. The libraries see an opportunity to use space in new ways as collections contract and obsolete equipment is removed. This perspective is in line with the literature in which Walton (2009) suggests libraries should embrace technology and convert space into new interactive areas (p. 89).

There is variation in the planned usage of physical space at the case college libraries. Participants at every library noted problems they want to overcome, and all of the libraries have plans for renovations and reconfigurations when funding is available. The most frequently mentioned renovation is a desire to create a learning commons where students could work, collaborate, use various forms of technology, and receive assistance from library personnel as needed. The learning commons concept is described in the literature as a common shared space that shifts the focus from instruction to learning and includes the various aspects desired by the participants in the study (Bar & Tagg, as cited in Harloe & Williams, 2009; Franks, 2008; Tucker, 2007; Woodward, 2009).

One case college library stood out in its ability to use its current space effectively. The library director and the staff are innovative in solving space problems and in creating collaborative areas in spite of a lack of funding. The library uses plants to provide a welcoming atmosphere and to define spaces; signage that is uniform and

informative; areas where students are comfortable working in groups; a coffee bar that the staff maintains; and computers that are grouped in different locations around the library.

In addition to trying to optimize usage of space, the case college libraries are also attempting to retain, and in some instances reclaim, the space they have. Two of the libraries are trying to reclaim lab areas that have been reporting to other departments on campus; although the labs are located in the libraries. Developmental labs that use approximately one-fourth of the upstairs area of one of the libraries are scheduled to move to another location on campus, which will leave considerable space for the library to utilize. The other library has plans to retrieve its computer lab after the current occupants, who have been using the lab primarily for non-library related purposes, complete a scheduled move to another building on campus. By setting computer rooms apart from the main flow of the library, the libraries inadvertently gave other departments at their colleges an opportunity to acquire the space for their needs. Ramifications of losing control of the labs included a reduction in the number of computers available for library users, interference with scheduling research skills classes in at least one of the libraries, and to some extent loss of relevance and identity on campus.

Although library websites are not part of the physical space, they too may become an issue due to competing interests. For instance, their presence may interfere with perceptions and usage of the physical library. A participant at one of the case colleges wanted a balanced approach for both aspects of the library. The participant felt the physical library was not being emphasized as much as it should be. According to the

literature reviewed for this study, some researchers elevate a web presence over a physical presence or posit that the web presence is at least as important as the physical presence (Huwe, 2010; Simmons-Welburn et al., 2008). Other researchers are focused on ways to enhance the physical structure, including making library space more flexible so it can change configurations as needs dictate (Franks, 2008; Harloe & Williams, 2009; Stuart, 2009; Woodward, 2009). Jackson and Hahn (2011) suggest that libraries be careful when planning new spaces, however, because their research shows that students prefer a mix of "traditional and modern elements" in libraries. Students find the idea of a coffee bar and collaborative space enticing, for example, but they still want some traditional aspects of a library to be present (p. 437).

Finding six: Work relations evolving. Work relations among library employees and between libraries and information technology departments at the case colleges have evolved as technology related resources and services have been added and as work processes have been automated.

According to participants, relations among library employees are largely positive. Employees attribute the positive atmosphere to improved communication, collaboration, and training that develops skills and expertise. Although a few employees have struggled with technology over the years, participants perceive that current employees have the needed technology skill sets that their libraries require. This development is in line with Rogers' (2003) continuum of innovation model that is part of the framework for this study. Laggards are at one end of the continuum and are defined as "the last in a social system to adopt an innovation" (p. 284). For the most part, case college libraries

have eliminated employees, either through retirement or through resignation, who might be categorized as laggards.

Another part of the study's framework includes Asheim's (1978) concept of librarianship as a profession that stresses, among other things, the expertness and education of librarians. In the review of the literature, the concept of professionalism is described by Todaro (2010b) as a philosophy of librarianship that values professional attributes. Given the potential for conflict between professional librarians and support staff, who may not have those attributes, Fragola (2009) examined the amount of tension that exists between the two groups. In spite of the assumption that conflict would be evident, she found that professional librarians and support staff work well together, which corroborates the findings of this study on the impact of technology.

Fragola (2009) also looked at the roles of professional librarians and support staff to determine if their roles are clearly delineated. She found that the roles are not clearly delineated, and indeed, that they are somewhat blurry. However, roles do not appear to be an issue at the case college libraries. Even the paraprofessionals/support staff who are assisting with reference questions do not indicate that roles are a problem at their libraries.

Todaro (2010a) describes additional areas of potential conflict in a library, including territorialism, communication issues, coworker issues, and change resistance. Territorialism at the case colleges was mentioned by participants in the context of departments external to the library; communication was discussed as an area that improved due to new technologies; library coworker issues were not evident since participants indicated work relations among employees were largely positive; and

change resistance was not a major issue since individuals who were resistant to change are no longer employed at the libraries.

Regarding territorialism, the previous finding discussed lab space issues with other areas on campus. Another department external to the library, the IT department, has also been the source of some disharmony. Participants at the case college libraries described periods in their library's history in which IT personnel and library personnel were less than cordial due to different perceptions about missions, processes, reporting structures, budget issues, and overlapping duties. The main areas in which disagreement was evident centered on library websites and library servers, particularly who was responsible for them and who would control them. To some extent, struggles over personnel have also been an issue for the two departments. For instance, participants at one case college described IT's ongoing attempts to transfer an employee out of the library and into the IT department; although the effort has not been successful to date. Another case college was not as fortunate, however, for it lost an automation manager when the manager was moved to the IT department a few weeks after the researcher's on-site visit. Issues between the libraries and their IT departments have continued to evolve, however. Collegial lunches that one library director has with her college's IT director provide an example of ongoing efforts to enhance relations between the areas. In the literature, Branin (2009) and Rummler (2005) both caution libraries about the expanding role of information technology and the implications that expansion has for academic libraries.

Finding seven: Flat organizational structures. Several participants at the case college libraries indicated they have struggled with issues related to staffing. They

have been especially concerned about the distribution of technology related job tasks and responsibilities. During interviews, however, none of the library directors exhibited an interest in altering their library's organizational structure, which contradicts the review of literature for this study. Goetsch (2008), for instance, found that the organizational structure of academic libraries has been redefined by changes in technology, primarily due to a blurring of boundaries (p. 165). Warnken (2004) observed that "commensurate organizational changes" are needed as technology becomes more pervasive (p. 323).

For the most part, the organizational structures are flat, with librarians and staff reporting directly to the library director at the case college libraries. Only one library has a reporting structure in which librarians report to other librarians. According to the review of the literature, flat structures are indicative of a teams approach (Moran, 2010; Shoaf, 2011); although Phipps (2004) states that libraries have traditionally been hierarchical. The flat structures in place at the case college libraries may reflect a teams approach or they may be a consequence of the relatively small size of three of the libraries. However, since participants state that they work well together and that they are like a "big happy family," a flat structure that encourages a teams approach is probably valued.

The division of areas, or departments, within the libraries has not changed substantially over the last 10 to 15 years, according to participants who have worked at the libraries for an extended period. The structure is essentially the same structure that was in place before widespread usage of technology started changing processes and responsibilities. All of the case college libraries have a reference or public services area; a technical services/processing or acquisitions area; and a circulation or access services

area. Only one library has a stand-alone automation department, and that department is headed by an automation librarian who supervises several technicians. Maintaining the same structure while experiencing technological change is not part of the innovation process Rogers (2003) envisioned. His work, which contributes to the framework for this study, delineates a process by which organizations innovate. The third step, or stage, in the innovation process entails redefining and restructuring the organization to fit its needs (p. 421).

Case college libraries appear to be in flux concerning future directions for specific areas within their structure, especially the technical services department and the circulation department. The literature also reflects changing functions in those areas of the library. For instance Beck and Bonous-Smit (2008) state that "the trend is toward fewer support positions as operations in the technical services and in circulation are further automated" (p. 173). Technology has made some functions in those areas irrelevant. In the case of circulation departments at the case colleges, print management systems that accept and make change for library users who are printing or making copies have impacted job tasks and responsibilities. Only one of the libraries has this type of system to date, but the other libraries are planning to add the system when funds are available. Once the new technology is in place, employees at the circulation desk will be relieved of those responsibilities.

Every library in the study has a technical services department that has had experiences similar to those described with circulation departments. Technical services departments have been impacted by online catalogs and online cataloging services that have changed traditional processes. As work tasks and work flow changed, the

departments have been pared down or duties/positions have changed. In the case of one library in the study, the reduction resulted in the technical services department moving from a large work area to a smaller area so the automation department could move into its former space.

Beck and Bonous-Smit (2008) note that staffing patterns at the reference desk are also changing. Specifically, they found that there is "movement away from the reference desk and toward virtual services such as chat reference" (p. 171). Two case college libraries offer a chat reference, or instant messaging, service at their libraries; however, one of those libraries only offers the service on weekends. The participants did not indicate any movement away from staffing the reference desk due to a focus on virtual reference.

Concerning placement in the institutions' organizational structure, all of the libraries report to the instructional side of the college. Three of the libraries report directly to their college's vice president of instruction, and the fourth library reports to a senior academic officer. According to the review of the literature, libraries reporting to instruction are viewed as being more integral to the institution's educational mission, which is beneficial to the library's role of supporting the curriculum (Arnold, 2010).

Finding eight: Higher levels of education and competencies. Since the 1990s, individuals with higher levels of education and higher levels of technology related competencies and skill sets have been hired at case college libraries. Every interviewee at the case colleges mentioned the need for libraries to have personnel who are competent with technology, and they described ongoing training that is available for staff members at their libraries. This finding affirms both components of the framework for

this study, i.e., Asheim's (1978) concept of librarianship as a profession and Rogers' (2003) Diffusion of Innovations Theory. Asheim and Rogers emphasize the roles of people; although they look at those roles from a different perspective.

Asheim's (1978) concept of professionalism in the library field was articulated before technology commenced to change the roles of library employees in a significant way. However, his description of professionalism as it relates to librarians is still relevant and is still being discussed, as evidenced by Todaro (2010) in the review of the literature. According to Asheim, the following attributes that demonstrate professionalism are particularly relevant to librarians: (a) expertness in the field of librarianship, and (b) attendance in a program of preparation. The directors and librarians interviewed for this study hold Master's Degrees in Library or Information Science (M.L.S. or M.L.I.S.), and at least one librarian holds a second master's degree. Two librarians indicated they plan to pursue doctoral degrees.

An M.L.S. degree has traditionally been required to be considered an expert in the field of librarianship and has contributed to upholding the concept of professionalism. Increasingly, however, the literature indicates that library schools may not be keeping pace with the needs of libraries, for librarians must also have competencies and skills that will enable them to work effectively with existing and new technologies (Bell, 2009; Haycock & Garner, 2009; Long & Applegate, 2008). Goetsch (2008) states that her study of vacancy announcements found that librarians need "state-of-the-art technical skills," the "specialized expertise of library training," and "interpersonal/communication skills" (p. 160). Simmons-Welburn et al. (2008) suggest that librarians should upgrade their expertise and skills and should continue working to

fulfill the institution's mission rather than pursuing "traditional library functions" (pp. 132).

Rogers' (2003) Diffusion of Innovations Theory is more egalitarian in its approach than Asheim's concept of professionalism, for he has created a continuum of adopter categories that indicate the degree to which individuals embrace technology, and the categories are relevant to all employees. Interestingly, although level of education is not a consideration when applying the continuum to individuals, Rogers has found that an individual's socioeconomic status, including level of education, is higher in early adopters of innovation than in later adopters of innovation (p. 298).

An important aspect of Rogers' work is the structure it provides for categorizing employees' level of innovation within an organization such as a library. Rogers refers to people at one end of the continuum as innovators, and they are followed closely by early adopters. Successive categories include early majority, late majority, and laggard, which is the category at the other end of the continuum.

This type of model, with its levels of innovation, is relevant to all employees. At two case college libraries, the innovators/early adopters are support staff. At the other two case colleges, a director and a librarian are the innovators/early adopters. All of the innovators and early adopters in this study, whether professionals or paraprofessionals, are valued individuals at their institutions. Based on a review of the literature, Beck and Bonous-Smit (2008) verify that library paraprofessionals have experienced advancement on the job and that "college-educated paraprofessionals are viewed as being able to do the day-to-day work and are just as oriented to management in the digital future" as professionals (p. 175).

The literature also suggests, however, that libraries are employing "a higher percentage of high-level and professional staff" (Schlosser, 2011, p. 153), and that development is in line with positions that have been filled during the last few years at the case college libraries. To date, nearly all of the new hires at the libraries have been librarians, and they were required to be competent in technology.

The interviewees indicate that in filling both professional and paraprofessional positions more attention is being placed on the amount of technology expertise an individual possesses. This supports the findings of previous studies on Rogers' (2003) framework that were conducted in business (Alkhateeb et al., 2010; Hirunyawipada & Zolfagharian, 2005); government (Makse & Volden, 2011); and the military (Berger, 2011).

Participants at case college libraries also mention, however, that they have struggled during the last 10 to 15 years to find and hire employees with the appropriate skill levels needed for their positions. They have learned that when a key technology person leaves a position, it is often difficult to find a replacement. A participant at one of the case colleges shared an experience in which a member of the library's support staff resigned, and the library was forced to hire three people to take the employee's place due to the valuable skill sets of the former employee. In the literature regarding this issue, Hardesty et al. (2007) caution libraries to support the right person who is in the job and to refrain from hiring the wrong person when vacancies occur (p. 1).

Implications for Practice

Based on the findings of this study, implications have been formulated that might be of benefit to practitioners. The implications in this section of Chapter 5 are divided

into the following parts: implications for libraries, implications for library directors, and implications for community colleges.

Libraries.

- Libraries that have an effective system for managing technology funds will be able to monitor sources of income and expenditures, make year to year comparisons, and report accurate figures on institutional reports, library surveys, grant proposals, and other documents.
- Libraries that emphasize communication, collaboration, and training for all employees will cultivate good will and positive work relations among library personnel.
- Libraries that are an integral part of the education process will demonstrate their value by (a) informing students and faculty about new technology resources and services; (b) emphasizing networking opportunities with faculty; (c) garnering the support of decision makers at the institution; and (d) using survey instruments that measure the library's effectiveness in assisting to meet the institution's educational mission.
- Libraries that strive to fit the technology paradigm of the modern library will optimize the organizational structure of the library, including its reporting structure, departmental responsibilities, job descriptions, and position titles.
- Libraries that refrain from labeling their computer areas as "labs" and from placing computers in areas that are isolated from the rest of the library will be less likely to have the computer areas removed from the library's purview of responsibility.

- Libraries that support and keep technologically competent employees will not experience the expense and difficulty of finding replacements for the employees.

Library directors.

- Library directors that work to maintain good relations with the information technology department and the business office will engender cooperation that will assist the library in meeting its goals.
- Library directors that inform the academic officer to whom the library reports how and why to use the library's online subscription databases and other electronic resources will be more likely to gain the support of the officer and will empower the officer to market the resources to budgetary decision makers at the institution.
- Library directors who work with a faculty advisory committee will garner faculty support and will receive valuable feedback for improving library services and resources.
- Library directors that remove outmoded resources and equipment, such as card catalogs, microfilm machines, and outdated reference material, will have space to add needed areas for students, e.g., a learning commons, study areas, or computer workstations.
- Library directors that emphasize both the virtual library, via the library's website, and the physical library will provide a balanced array of resources and services for constituencies and will ensure the library remains relevant.

- Library directors that inform their employees about the importance of reaching students through faculty members who are satisfied with the library's resources and services will increase usage of the library.

Community colleges.

- Community colleges in which libraries report to the instructional side of the college will be relevant and accessible to classroom faculty and will ensure the library is part of the instructional process.
- Community colleges that clarify the role of the institution's information technology department as it relates to the library will improve relations between the two areas and will provide an environment that increases opportunities for collaboration.
- Community colleges that provide adequate support for maintaining library websites and for funding online resources will ensure the websites are functional and the resources are adequate for meeting the needs of students, particularly the needs of distance learners.
- Community colleges that continue funding and hiring library personnel with high levels of education and high levels of technology related competencies and skill sets will be able to meet the research and technology needs of their students and faculty.

Future Study

This study examined the impact of technology on eight specific areas of the community college library: physical structure, organizational structure, services, ability to help meet the institution's educational mission, capital and operational budgets,

personnel, allocation of human resources, and collections. Previous studies have looked at the impact of technology on library personnel, students, organizational culture, the future direction of the community college library, and other areas as indicated in the related studies section of the literature review in Chapter 2.

Since technology is not static, but is constantly changing, further research on the impact of technology could be conducted on any aspect of an academic library. For instance, further study might be warranted on the impact of technology on specific areas of library service. Reference departments are an area of library service that have experienced significant change as communication between library users and library personnel has shifted from face-to-face interactions to online interactions that utilize social media such as Facebook and chat reference/instant messaging. A desire for instant access to a reference librarian is increasingly the norm for students immersed in technology. Research questions regarding these online forms of communication might include: How have reference librarians adapted to reference services that require constant monitoring? How has the budget been impacted by changes in reference service? How effective are the new communication channels for students compared to traditional face-to-face reference transactions? How are faculty responding to online forms of communication with library personnel?

Further study might also be needed to determine student attitudes toward the library and, also, why some faculty "just don't feel like they need the library," as one participant at Case College B stated. Faculty attitudes toward the library influence and often determine student usage of library services and resources, so research that delves

into faculty attitudes toward existing services/resources and explores desired services/resources might be beneficial for practitioners.

Another area for further study might be an examination of the impact of technology on relations among employees within different types of academic libraries. This study found that technology is credited with improving relations within libraries at all of the case community colleges. However, community college libraries may be different from libraries at other types of institutions. A comparison of employee relations at community college libraries with employee relations at university libraries might reveal significant differences.

Another possibility for further study might be an examination of the role that the library's reporting structure has on its budget and on its human resource allocations. For instance, a study might look at how budget and human resource allocations for community college libraries that report to a vice president of instruction compare with community college libraries that report to a vice president of student services or to a vice president of information technology.

Library leadership has been studied, but the aspect discussed by Lubans (as cited in Shoaf, 2011) deserves further examination. Lubans says that leaders will at times be followers and followers will at times be leaders. He delineates the characteristics of good followers and refers to this "followership" concept as an essential aspect of a "productive organization" (p. 102). Research on the topic might examine how this dynamic works in a collaborative library setting and how it works in a more hierarchical library setting.

A comparison of the perceived ideal employee with the employee actually hired might also warrant further study. If academic libraries are having to "settle" because they cannot attract the candidate they want, how does that work out for the library? How does it work out for the employee? How does the rest of the library staff perceive the hiring? Does it affect morale, motivation, or worker relations?

Technology in libraries is such a broad area that there are ample research opportunities for exploration. This section has presented a few areas that might benefit from further research.

Summary

The main focus for this study has been to answer the central research question by examining high technology libraries at four community colleges in Texas to see how the adoption of technology by those libraries has changed the libraries and how it has changed the roles of people employed within those libraries. Based upon an analysis of data that were collected from interviews, observations, and public documents, the researcher found that technology has changed the libraries and it has changed the roles of employees who work in the libraries, but it has not impacted organizational structure in any significant way. It has changed some of the duties and responsibilities of employees, and it has changed the education and competencies needed to perform high tech job tasks. Position titles, however, have remained fairly consistent, with the exception of technicians and the employees designated to handle automation or web services. As technology has been added and as roles have changed, relations among personnel within the libraries have been positive; however, relations with departments on

campus, particularly information technology, have been less than cordial at times. Those relations, nonetheless, continue to improve.

In addition to findings related to the changing roles of people employed in the libraries, the within-case analysis and the cross-case analysis sections in Chapter 4 include findings relevant to the study's subquestions that inquired about the impact of technology on other areas of the four case college libraries. The study found, for instance, that the physical structure of the libraries has evolved as computers and other technology has been added, but further changes are needed. The technology budget has been a challenge due to the many funding sources that feed into technology purchases. Services have changed as reference desk service and research instruction have added a virtual component in the form of chat reference, online tutorials, and online class librarians.

Perhaps the most challenging changes, though, have taken place within library collections. Since the mid-1990s, every collection, with the possible exception of archival collections, has experienced significant change. Bound and paper issues of magazines, journals, and newspapers have been discarded and holdings have been pared down. Other outmoded venues for delivering periodical issues, such as microforms and CDs, have either disappeared or are disappearing. Online delivery of periodical articles in subscription databases has enabled libraries to gain needed space where collections were located and has enabled distant learners to access resources from off-campus sites. Increasingly, libraries are turning to ebooks to supplement, and in some cases to replace, paper/hard copy books. In-house reference collections are being de-emphasized as reference titles are being purchased for online access. Circulating collections are

increasingly being replaced as students exhibit interest in a digital format and as funds are available to purchase ebook collections.

Chapter 5 has included several major findings that derived from the study's within-case analysis and cross-case analysis. These findings are intended to be "assertions or an interpretation of the meaning" of the cases (Creswell, 2007, p. 75). The major findings cover the following topics: academic libraries are still vitally important for faculty and, by implication, for students; transitioning to online resources has transformed library collections; library employees have adapted to and been supportive of technology for the most part; technology funds derive from multiple sources, and locating those funds requires creativity; libraries are optimizing space and ensuring that it is retained for library purposes; work relations have evolved within the libraries and between the libraries and information technology departments; organizational structures have remained flat; and employees with higher levels of education and technology related competencies and skill sets are being hired. The findings are fairly consistent with the literature reviewed for the study in Chapter 2 and with the theory and concept that framed the study as discussed in Chapter 1. Where inconsistencies were evident, the researcher noted those instances and included possible explanations when appropriate.

Chapter 5 has also included implications that the major findings might have for libraries, library directors, and community colleges, and it has discussed several areas that might benefit from further study, including online reference communications, student and faculty attitudes toward library resources and services, relations within libraries, the role reporting structure plays on allocations, leading and following in different library settings, and hiring the ideal candidate.

This study is significant for it informs practitioners who are adopting technology about the pitfalls, processes, and benefits inherent in adding technology. The study is particularly significant for administrators and directors who are planning for change and who need reliable information for decision making. Issues at the case college libraries are relevant for all community college libraries that are striving to enhance their technology and maintain their relevance.

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Appendix A

UNL IRB Final Approval Letter

University of Nebraska Lincoln

September 27, 2011

Sharon Kenan
Department of Educational Administration
3045 Oak Ridge Rd Crawford, TX 76638

Brent Cejda
Department of Educational Administration
129 TEAC, UNL, 68588-0360

IRB Number:
Project ID: 11496
Project Title: Perceptions of Personnel at Selected Texas Community Colleges Regarding the Impact of Technology on Their Libraries

Dear Sharon:

The Institutional Review Board for the Protection of Human Subjects has completed its review of the Request for Change in Protocol submitted to the IRB.

1. It has been approved to change the title of your study. The new title is listed above.

2. It has been approved to extend the ending date of this project to 4/1/2012.

We wish to remind you that the principal investigator is responsible for reporting to this Board any of the following events within 48 hours of the event:
* Any serious event (including on-site and off-site adverse events, injuries, side effects, deaths, or other problems) which in the opinion of the local investigator was unanticipated, involved risk to subjects or others, and was possibly related to the research procedures;
* Any serious accidental or unintentional change to the IRB-approved protocol that involves risk or has the potential to recur;
* Any publication in the literature, safety monitoring report, interim result or other finding that indicates an unexpected change to the risk/benefit ratio of the research;
* Any breach in confidentiality or compromise in data privacy related to the subject or others; or
* Any complaint of a subject that indicates an unanticipated risk or that cannot be resolved by the research staff.

This letter constitutes official notification of the approval of the protocol change. You are therefore authorized to implement this change accordingly.

If you have any questions, please contact the IRB office at 472-6965.

Sincerely,

Becky R. Freeman, CIP
for the IRB

Appendix B

Introductory Letter Inviting Library Directors to Participate in the Study

Name
Organization
Address

Date

Dear _____[name of library director]:

As a doctoral candidate in educational administration at the University of Nebraska-Lincoln, I am conducting a study to understand and describe how the adoption of technology by community college libraries has changed the libraries and the roles of people employed at those libraries. Results should be of interest to leaders who are making decisions about technological innovations in community college libraries as the libraries work to provide essential services and resources that assist in fulfilling educational missions.

Your library is one of four high tech community college libraries in Texas that is being asked to participate in this qualitative multi-case research study. Selection of the libraries was based upon responses to technology related questions in the 2009 Texas Academic Library Survey. As the director of the library at _____[name of the college], your ideas regarding the impact of technology on various aspects of your library are important.

I would like to invite you to spend 60 to 90 minutes answering interview questions that will be captured on audio tape during a visit to your library. I will keep your identity and the identity of your institution confidential. A coding system will be used to conceal identities.

During the visit, you may be asked to provide access to a few public documents if the documents are not available online. I would also like to be a non-participant observer in various public areas, and I would like to include different perspectives in the study by interviewing a librarian, a member of your support staff, the chief academic officer to whom the library reports, and a faculty member (preferably a faculty member who teaches in a high enrollment area or in an area that stands out due to its rapid growth).

You are free to decide not to participate or to withdraw at any time without adversely affecting your relationship with the investigator, the University of Nebraska-Lincoln, or your institution. After the audio tapes of interviews are transcribed, you and each person that is interviewed will be able to review their transcripts for accuracy. In addition, as director of the library, you will have an opportunity to review and comment upon my draft findings during the final stages of the study.

You may contact me at (254) 299-8343 or my advisor and supervisory committee chair, Dr. Brent Cejda, at (402) 472-0989 at the University of Nebraska-Lincoln for further clarification or for answers to questions or concerns about the study. You may also

contact the Institutional Review Board at the University of Nebraska-Lincoln at (402) 472-6965.

If I may contact you by telephone about participating in this study, please sign and date in the area indicated below and return this letter in the stamped envelope that is enclosed. As a token of my appreciation for your time and effort, I have also enclosed a $10 gift card.

With sincere appreciation,
Sharon K. Kenan
University of Nebraska-Lincoln, Principal Investigator
McLennan Community College (Waco, Texas), Librarian, 254-299-8343 (office)

I agree for you to contact me about participating in this study:

_____ _____
Name Date

Appendix C

UNL IRB Informed Consent Form

Informed Consent to Participate in Research

Title of the Study: The Impact of Technological Innovations at High Tech Texas Community College Libraries

Person in Charge of Study: The principal investigator is Sharon Kenan, and the secondary investigator is Dr. Brent Cejda.

Sponsor of the Study: University of Nebraska-Lincoln

We invite you to take part in a research study being conducted at the University of Nebraska-Lincoln. It is important that you read and understand several general principles that apply to all who take part in this research study: (a) taking part in this study is entirely voluntary; (b) you may not benefit directly as a result of taking part in this study, but knowledge may be gained that might benefit others; (c) you are free to withdraw from the study at any time without affecting your relationship with the investigators or the University of Nebraska-Lincoln; and (d) leaving the study will not cause a penalty or loss of any benefits to which you are otherwise entitled.

Before you volunteer to take part in this research, the study must be explained to you and you must be given a chance to ask questions. You should discuss anything that you do not understand with the person who is explaining it to you, Sharon Kenan, before you agree to volunteer. Once all of your questions have been answered, you will need to sign this consent form, which gives us permission for you to participate. You will be given a copy of the signed consent form for your records. The nature of the study, the risks, inconveniences, discomforts and other important information about the study are discussed below.

1. What is the purpose of this study?

The purpose of this study is to learn about the impact technology has had on the physical structure, organizational structure, services, educational mission, budget, personnel, allocation of human resources, and collections of community college libraries in Texas over the past 15 years. This qualitative research study will explore how the adoption of technology has changed specific areas of four high tech community college libraries that are being asked to participate based upon survey data that they submitted to the Texas State Library and Archives Commission when completing the 2009 Texas Academic Library Survey.

2. Why are you being invited to take part in this research?

You are being invited to take part in this research study because the library at your institution has been selected for participation based upon its high level of technology as evidenced in 2009 Texas Academic Library Survey results. Several survey categories dealing with technology were ranked to determine the community college libraries that

were high tech. Your library ranked as one of the four high technology libraries selected for this study.

3. Are there reasons why you are not eligible to participate in this study?

The only restriction regarding eligibility is that subjects will be excluded from participating in this study if they are less than 19 years of age.

4. Where is the study going to take place?

Research will be conducted at four community college libraries that were selected for inclusion in the study. Your institution's part in the study will take place on-site at your community college. Additional research will take place at three other institutions that have been selected for inclusion based upon their high level of technology as evidenced in 2009 Texas Academic Library Survey results. Face-to-face interviews at your institution will take place in locations on campus that are convenient for the participants—for example in the library or in offices on campus.

5. How long will your participation in this study last?

The interview will be a one-time event, and it will take approximately 60 to 90 minutes to complete. Follow-up questions may be asked through August 31, 2011.

6. What will you be asked to do?

You will be asked to meet with the principal investigator, Sharon Kenan, in a one-time face-to-face interview at your college in a place that is convenient for you. If you agree, the interview will be audio taped, and it will take 60 to 90 minutes to complete. Follow-up questions could possibly be asked via email or telephone through August 31, 2011.

The on-site visit for this study will begin during the afternoon of day one when the principal investigator visits your library to observe various public areas of your college's library as a non-participant observer. Assistance will not be needed during this observation period. Day two will be devoted to interviews with participants at your institution. Day three will be used to conclude interviews or other unfinished business and to review public documents.

The only thing you will be asked to do is to meet with the principal investigator for an interview, and you may also be asked for public documents that are not available in the library or on the library's web pages. Public documents that need to be reviewed by the principal investigator are the college's master plan, the college's most recent reaccreditation study/report, library statistical reports, student and faculty library surveys, library budget, library and college organizational charts, and the library's strategic or long range plan. Copying/printing costs will be paid by the principal investigator.

7. If you agree to be audio taped during the interview, please initial the statement below to indicate agreement. If you do not agree to be audio taped during the interview, please leave the space blank.

_____ Initial if you agree to be audio taped during the interview.

8. What are the possible risks or discomforts?

To the best of my knowledge, the things you will be doing will have no more risk of harm than you would experience in everyday life.

9. What are the potential benefits of study participation?

There is no guarantee that you will receive any benefit from taking part in this study. However, you may find the information learned to be helpful for planning purposes or to provide a retrospective view of the impact technology has had on your library's personnel, services, resources, and facilities. In addition, the information derived from this study may be useful for other libraries that are in the process of making technology related decisions concerning various aspects of their libraries.

10. Will you receive any rewards or compensation for study participation?

You have received a $10.00 gift card with the introductory letter as a token of my appreciation—whether or not you participate in the study. There will be no compensation for participating in this research.

11. What will happen if you decide not to continue in this study?

Participation in this study is voluntary. You may refuse to participate or may withdraw at any time without harming your relationship with the researchers, the University of Nebraska-Lincoln, or your institution—or in any other way receiving a penalty or loss of benefits to which you are otherwise entitled.

12. Who will have access to the information that you provide as a part of this study? How will study information be kept confidential?

Data derived from the study will be used for a doctoral dissertation and may be made available for the general public in the form of presentations, articles, and books. However, the names of participants and institutions will be masked using a coding system to ensure information obtained during interviews remains confidential. In addition, data/information derived from public documents or observations will not be connected to individual participants or to individual institutions. It is possible that a diligent researcher could backtrack information retrieved from public documents and, thus, could possibly identify institutions and participants in the study. However, it would require a determined effort for an individual to do so. The data/information from

public documents is important to include as descriptive detail about each case and as context for studying the impact of technology on the library.

Electronic data will be stored in computer files in password protected computers. Portable storage devices, such as flash drives, and hard copy/print data will be stored in a locked cabinet in the principal investigator's office. Only the principal investigator and a transcriptionist will have access to transcripts of in-person interviews. The transcriptionist will be required to sign a confidentiality statement and to certify that CITI (Collaborative Institutional Training Initiative) Limited Research Worker training in Human Research Protections has been completed.

13. Will there be any further follow-up?

Follow-up questions may be needed for clarification or for additional information. If follow-up information is needed, participants will be contacted by email or by telephone.

14. Who should you contact regarding this study?

You may ask any questions concerning this research and have those questions answered before agreeing to participate in or during the study. You may call the principal investigator at any time, Sharon Kenan at (254) 299-8343, or the secondary investigator/advisor, Dr. Brent Cejda at (402) 472-0989.

Please contact the University of Nebraska-Lincoln Institutional Review Board at (402) 472-6965 for the following reasons:

- you wish to speak with someone other than the researcher to obtain answers to questions about your rights as a research participant;
- to voice concerns or complaints about the research;
- to provide input concerning the research process;
- in the event the researcher could not be reached.

You are voluntarily making a decision whether or not to participate in this research study. Your signature certifies that you have decided to participate after having read and understood the information presented. You will be given a copy of this consent form to keep.

_____ _____

Signature of person agreeing to take part in the study Date

_____

Printed name of person agreeing to take part in the study

Appendix D

Interview Protocol

Interview Protocol: [position of interviewee]
Site of Interview: [name of college]
Date:
Time of Interview:
Interviewer: Sharon Kenan
Interviewee Code Number: [code for college and position]
The interviewee has signed the consent form prior to the interview: Yes ___ No___

Thank you for consenting to this interview. It will be helpful for my study on the impact of technology at high tech community college libraries in Texas. I will be taking notes and recording what we say today since it is important for the transcript to be accurate. After the audio recording is transcribed, you will be given an opportunity to review the transcript for accuracy.

This interview is one of 20 that will be conducted at 4 community colleges. Your identity and the identity of your institution will remain confidential. Please feel free to share your views and opinions as I ask several open-ended questions during this 60 to 90 minute interview. I may ask some follow-up questions today to ensure different aspects of the questions are covered. This will help me make comparisons when I analyze the responses of interviewees at the institutions I am studying. Are you ready to begin?

Research Question (RQ1): How has the adoption of technology impacted the physical structure of the library?

Interview Questions Related to RQ1:

Describe changes that have occurred in the library's physical structure during the last 10 to 15 years due to the adoption of technology. [probing questions: inquire about changes in the use of space allocated to the library and about library services that might be provided in multiple areas on campus, e.g. in conjunction with learning centers—also explain that physical structure could refer to a building, interior space, office layout, repurposing of space, renovated structure, etc.] [Academic Officer; Director; Librarian; Support Staff; Faculty]

Describe changes in the library's physical structure that are being planned due to the adoption of technology. [Academic Officer; Director; Librarian; Support Staff]

Research Question (RQ2): How has the adoption of technology impacted the organizational structure of the library?

Interview Questions Related to RQ2:

Describe changes that have occurred in the library's organizational structure during the last 10 to 15 years due to the adoption of technology. [probing question: inquire about changes in the position to whom the library reports] [Academic Officer; Director; Librarian; Support Staff]

Describe changes in the library's organizational structure that are being planned due to the adoption of technology. [Academic Officer; Director; Librarian; Support Staff]

Research Question (RQ3): How has the adoption of technology impacted the services offered by the library?

Interview Questions Related to RQ3:

Describe services that the library has added in the last 10 to 15 years due to the adoption of technology. [probing question: inquire about services for students, faculty, the community, professional/support/administrative staff] [Academic Officer; Director; Librarian; Support Staff; Faculty]

Describe services that the library has discontinued in the last 10 to 15 years due to the adoption of technology. [Academic Officer; Director; Librarian; Support Staff; Faculty]

Describe new library services that are being planned due to the adoption of technology. [Academic Officer; Director; Librarian; Support Staff; Faculty]

Research Question (RQ4): How has the adoption of technology impacted the ability of the library to help meet the institution's educational mission?

Interview Questions Related to RQ4:

How have technological innovations at the library during the last 10 to 15 years helped high enrollment areas on campus fulfill the institution's educational mission? For example, what technological services, resources, or assistance are being provided by the library that help the areas educate their students? [researcher to explain that the term "areas" is open ended, meaning it could refer to divisions, programs, departments, disciplines, etc.--probing questions: inquire about library instruction on electronic resources, online tutorials, research assistance with databases, embedded librarians in Blackboard courses, information literacy efforts, email/chat reference service, impact on the types of assignments being made, usage of the library by students, and how relevant the library is considering predictions in the literature that technology is making libraries obsolete] [Academic Officer; Director; Librarian; Support Staff; Faculty]

Research Question (RQ5): How has the adoption of technology impacted the capital and operational budgets of the library?

Interview Questions Related to RQ5:

Describe how the library's capital budget has changed in the last 10 to 15 years due to the adoption of technology. [probing question: ask if any technology funds/budgets are outside the purview of the library, e.g., in the IT department's budget] [Academic Officer; Director; Librarian; Support Staff]

Describe how the library's operational budget has changed in the last 10 to 15 years due to the adoption of technology. [Academic Officer; Director; Librarian; Support Staff]

Describe budgetary changes that are being planned due to the adoption of technology. [Academic Officer; Director; Librarian; Support Staff]

Research Question (RQ6): How has the adoption of technology impacted personnel employed in the library?

Interview Questions Related to RQ6:

Describe how the adoption of technology in the last 10 to 15 years has impacted positions in the library, including the competencies/skills needed for those positions. [probing questions: inquire about changes in job duties, changes in job titles, can changes in professional development/continuing education needs] [Academic Officer; Director; Librarian; Support Staff; Faculty]

Describe how the adoption of technology in the last 10 to 15 years has impacted relations among library personnel. [Academic Officer; Director; Librarian; Support Staff]

Describe how library personnel have adapted to changes related to the adoption of technology in the last 10 to 15 years. [probing question: inquire about innovators, laggards, etc.—per Rogers (2003)] [Academic Officer; Director; Librarian; Support Staff; Faculty]

Research Question (RQ7): How has the adoption of technology impacted the human resources allocated to the library?

Interview Questions Related to RQ7:

Describe how the number of librarians has increased or decreased in the last 10 to 15 years due to the adoption of technology. [probing questions: inquire about reassignments, attrition, new positions, reasons for changes (e.g., academic program changes that are due to technology] [Academic Officer; Director; Librarian; Support Staff]

Describe how the number of support staff at the library has increased or decreased in the last 10 to 15 years due to the adoption of technology. [probing questions: inquire about reassignments, attrition, new positions, reasons for changes] [Academic Officer; Director; Librarian; Support Staff]

Describe changes in the allocation of human resources that are being planned due to the adoption of technology. [Academic Officer; Director; Librarian; Support Staff]

Research Question (RQ8): How has the adoption of technology impacted the collections in the library?

Interview Questions Related to RQ8:

Describe the library's collections and how they have been impacted in the last 10 to 15 years by the adoption of technology. [probing questions: inquire about reference, circulation, special/archives, serials, and reserves collections] [Academic Officer; Director; Librarian; Support Staff; Faculty]

Describe changes in the library's collections that are being planned due to the adoption of technology. [probing question: ask about the future of the online catalog] [Academic Officer; Director; Librarian; Support Staff]

Thank you for spending this time with me today. As stated earlier, I will be providing you with a copy of the transcript of this interview, after it is transcribed, so you can

review it for accuracy. I would ask that you do that review as quickly as possible after you receive it. I may also be calling or emailing you with follow-up questions.

It has been a pleasure meeting you and visiting with you. Thanks so much for your assistance with my study.

Appendix E

Transcriptionist Confidentiality Statement

I _____ (name of transcriptionist) agree to hold all information contained on audio recorded tapes and in interviews received from Sharon Kenan, primary investigator for *The Impact of Technological Innovations at High Tech Texas Community College Libraries*, in confidence with regard to the individual and institutions involved in the research study. I understand that to violate this agreement would constitute a serious and unethical infringement on the informant's right to privacy.

I also certify that I have completed the CITI Limited Research Worker training in Human

Research Protections.

_____ _____

Signature of Transcriptionist Date

_____ _____

Signature of Principle Investigator Date

Appendix F

Non-Participant Observation Protocol

Observation Protocol: Library
Site of Observation: [name of college]
Date:
Time of Observation:
Observer: Sharon Kenan
Observer Code: [code for case college]
Library Director signed consent form that included observation request:
Yes___ No___

Function of Observation:
Creswell (2009) suggests using an observational protocol for recording information during on-site visits that includes descriptive and reflective notes (pp. 182-182). The researcher, as a "nonparticipant" observer (Creswell, 2007, p. 139) during site visits at the participating libraries in this study, wrote descriptive and reflective fieldnotes for items listed below. The observations verified each participating library's high technology designation and provided details about the libraries. Usage of this protocol ensured sufficient comparable observations were made at each participating library. Bogdan and Biklen (2007) state that "the idea is to stimulate critical thinking about what you see and to become more than a recording machine" (p. 163); so, the researcher recorded all pertinent insights and observations that assisted in verifying levels of technology and in describing the libraries.

Observation Protocol:

Descriptive Notes	Reflective Notes
Online subscription databases	
Off-campus access to databases	
Availability of electronic books	
Open access computer area(s) in library	
Librarian(s) imbedded in online courses (e.g., Blackboard)	
Copy center in library for students and/or for faculty	
Instructional design support area for students/faculty	
Instructional "smart" classroom for library instruction	
Online tutorials	
Online federated, multi-search capability	

Descriptive Notes (continued)	Reflective Notes (continued)
Online reference service	
Online subject guides to web sources, databases, books	
Journal search capability (e.g., TDNet/Serials Solutions)	
Personnel available to assist students with technology	
Librarians available to assist students with databases	
Microsoft Office on computers in library	
Off-campus access to a college network drive	
Capability for digitizing materials in the library	
Web pages maintained by the library	

Appendix G

Public Document Review Protocol

Review Protocol: Library
Site of Observation: [name of college]
Date:
Reviewer: Sharon Kenan
Reviewer Code: [code for case college]
Library Director signed consent form that included document review request:
Yes___ No___

Function of Public Document Review Protocol: Information that corroborated the library survey data that were used to rank libraries by technology level was not always available in an observable form during the on-site visits; therefore, the researcher verified high technology designations using available documents/information collected at participating libraries and on college/library websites.

Public Documents:

Library related sections in most recent campus master plan/facilities master plan

Library section in most recent SACS compliance report

Annual library statistical reports

Recent student/faculty library surveys

Current library budget

Current/archived library organizational charts

Current college organizational chart

Current library strategic/long range plan

Current mission of college

Current mission of library