A BEHAVIORAL ANALYSIS OF TWO SPACES IN KANSAS STATE UNIVERSITY'S HALE LIBRARY BASED ON PSYCHOLOGIST ROGER BARKER'S BEHAVIOR SETTING THEORY

by

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Abstract

This thesis uses behavioral mapping to analyze two contrasting spaces in Kansas State University's Hale Library. One of the spaces is meant for computer use; and the other for general library use, including study-group work. The conceptual approach chosen to describe and analyze these two library spaces is the behavior-setting theory developed by psychologist Roger Barker, who defines behavior settings as independent units of space, with temporal and spatial boundaries, that have "great coercive power over the behaviors that occur within them" (Barker, 1968, p. 17). The behavioral observations for the two Hale Library spaces were analyzed and compared with findings from other studies of library usage and behaviors.

In the first chapter of the thesis, I introduce my study topic and discuss recent developments in libraries. In the second chapter, I provide a broad overview of library history and library use. I also overview behavior-setting theory and present examples of research on behavior settings and libraries. In the third chapter, I discuss research methods for this thesis, starting with how library spaces can be described as behavior settings. I then discuss specific methodological procedures involved in the behavioral study of activities in the two library spaces. In the fourth chapter, I discuss the two spaces studied in Hale Library, first, describing their physical features and then discussing their behavior-setting attributes. In the fifth chapter, I present my behavioral observations and compare and contrast the two Hale Library spaces in terms of user behaviors and as behavior settings. In the sixth and final chapter of this thesis, I compare my research results with other library research and offer my speculative ideas on the future of the academic library.

The overarching theme of this thesis is evaluating how recent digital technologies have affected libraries, and how traditional library spaces and spaces designated for digital technology can be integrated in future libraries.

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Dedication

To Dad and Mom

Chapter 1 - Background and Introduction

Libraries as spaces have changed in character from the days of the very first library or "bibliotheca" in ancient Egypt's Alexandria (MacLeod, 2005, p. 1). They have been transformed through such forces as changing world culture, the shifting contents that they hold, and the varying usage patterns that have come forth. Thus, the physical form of the library has changed over its centuries of existence.

Over the last two decades, libraries have had to realize that digital technology has arrived. There are no means to escape this fact, whether we accept it or not. What does this technological shift mean to libraries? Are we going to lose the architecture or the sense of place that we used to have in libraries? Change is inevitable. The existence of any 'place' seems to depend upon whether it can evolve to the demands of an era or not. If it fails to do so, a place could be deemed obsolete and unwanted. So, both parties (libraries and technology) need to contribute and become responsive to each other. That is the only way forward. Not much care has been given to the sense of place and person-space interaction in libraries, and how technology has affected them. One aim of this thesis is to give attention to this topic.

The academic library as an information-warehouse model is clearly outdated. Traditional libraries focused more on storing books and manuscripts, with little space to spare as study areas. More recently, libraries have evolved to provide a greater focus on a variety of study spaces catering to different needs. Libraries have had to accommodate shifting patron needs and changes in information media. With the digitization of information resources, however, the need for physical spaces in a library has been questioned (Matthews et al., 2013, p. 204; Ross & Sennyey, 2008, pp. 149-50). There have been suggestions that traditional study spaces should be replaced by computer workstations where digital resources can be accessed (Thomas, 2000, p. 408). Experts are divided in their opinions about the need for different spaces in the future academic library. While the overarching theme of this thesis is library as place and how it has been affected by the current technological evolution, the focus will be on how library spaces can be studied and compared. The main intention of this thesis is looking at ways as to how two distinct study spaces in a library can be described and evaluated.

The method chosen to analyze the interaction between library users and library space is the behavior-setting theory developed by psychologist Roger Barker (Wicker, 1984, p. 26). The

theory is very helpful in properly describing a space and the behaviors that take place there. The major aim of this thesis is to examine two different kinds of spaces in a library – one meant for using computers, and the other for general library use. Once I've justified my selection of these two spaces, I describe their spatial qualities and record observed behaviors over a range of time. I then use these observations to compare and contrast the two library spaces and to understand how their respective patron behaviors and activities are related to the environmental qualities of the spaces. The conclusion that I hope to reach is that there are observed differences in the types of behaviors in a computer setting and in a normal library setting which are very much related to their physical characteristics and spatial qualities. This will help me describe how technology has affected library spaces and library user behaviors.

Specifically, in this thesis, I study two spaces in Hale Library at Kansas State University, Manhattan, Kansas. To accomplish this aim, I first provide a broad overview of library history and library use. This is the purpose of the second chapter of this thesis, which discusses libraries and library history, behavior settings and analysis, and examples of research on behavior settings and libraries. In the third chapter, I discuss research methods for this thesis, starting with how library spaces can be described as behavior settings. I then discuss specific methodological procedures involved in the behavioral study of activities at the two library spaces. In the fourth chapter, I discuss the two spaces studied in Hale Library, first describing their physical features and then discussing their behavior-setting attributes. In the fifth chapter, I present my behavioral observations and compare and contrast the two Hale Library spaces in terms of patron behaviors and as behavior settings. In the sixth and final chapter of this thesis, I consolidate the literature and offer my speculative ideas on the future of the academic library.

The target audience for this thesis is librarians and library designers, who are looking for ways to evaluate the performance of library spaces to design spaces that can better serve library users in the future. It is an extension over past studies on library usage and could also be used by researchers as a basis for comparing and contrasting library spaces. This thesis makes use of Barker's behavior setting theory for the description of library spaces. By studying different library spaces using this theory, one can learn about user preferences for different designs, and use this information for improving future library space designs.

Having provided an introduction to this thesis, I next provide, in chapter 2, a brief history of libraries, followed by a literature review of behavior settings and library research.

Chapter 2 - Literature Review – Libraries and Behavior Settings

Though some work has been accomplished, there is minimal research available on library behaviors and experiences, especially for academic libraries. Sommer (1966, p. 234-48), for example, pointed out that library research is generally concerned with "how many people come in and how many books are checked out" but not with "what goes on during the reader's stay in the library." A 1997 study at the University of Wollongong, New South Wales, Australia (Organ and Jantti, 1997) studied seating preferences in different parts of the library and used the data as a justification to replace less preferred spaces with book stacks. This Australian study, however, wasn't concerned with the reasons for varying preferences of those spaces.

The present thesis studies and compares two different behavior settings within Hale library – first, a computer station cluster on the library's second floor; and, second, a study table cluster on the same floor. To do a behavior setting study of these spaces in Hale library, I must be able to adequately describe these spaces and their user behaviors. This requirement leads me to the body of literature on libraries – their history and present situation. Without a historical study, it will be difficult to understand the behavioral aspects of libraries and the importance of library seating. To describe the library sub-spaces from a behavior-setting perspective, I must be familiar with that body of literature too. So, an understanding of behavior settings, their defining attributes, and techniques is required.

In this chapter, I review the literatures on library history, behavior settings, and research available on library usage and behaviors. I begin with a brief history of libraries.

Brief History of the Library

Before discussing the history of the library, its definition should be established and we should distinguish it from other forms of archives. Harris (1995, p. 3) defines "library" as –

> a collection of graphic materials arranged for relatively easy use, cared for by an individual or individuals familiar with that arrangement, and accessible to at least a limited number of persons.

We should understand, however, that any distinction between libraries proper and other archives is a relatively modern concept. Historians often consider religious and governmental archives as forms of libraries when doing a historical study of libraries (Harris, 1995).

Harris has identified certain conditions that fostered the development of libraries – namely social, economic, and political. So, any society with a prosperous economy, stable and literate population, large urban areas, and an encouraging government would help develop libraries. He goes on to say that there are different ideologies behind the development of libraries as well. They were either a symbol of power or control. Whoever controlled the literary collection rose to power and hence this power was restricted to a select group of people. Libraries were also built to sustain memory, for libraries are the buildings that housed historical, religious, and governmental accounts. Thus, the identity of a nation or society is retained by library collections. There was also an ideology of "commodifying" libraries whereby the written and printed materials in a library had certain values. Libraries were also supported by the state so that they could act as a production house for "scholarly, scientific, and cultural commodities" (Harris, 1995, p. 7).

The earliest forms of libraries were religious collections, governmental collections, business records, and genealogical records. The first two forms could come together when the religious leaders also headed the government, and the second two could be a single collection where family and business were handled together. The advent of libraries is often attributed to religious collections, but in fact, all these forms led to the progress of libraries. All such collections required some sort of secure building where access could be controlled (Harris, 1995).

Ancient to Medieval Period

The Western world's first library might have been located in Egypt or Mesopotamia, since these two civilizations have many preserved writings and collections. Historical chronicles and palace records were kept during this time between 2500 B.C. and 500 B.C. During the Assyrian era in the Mesopotamian valley (ca. 1500 – 625 B.C.), literature and record-keeping reached a high point. In particular, it was the king Assurbanipal who developed the libraries of the Assyrian era. He liked keeping records of all types and on a variety of subjects. The collections during this time included mostly religious texts in addition to historical and

governmental records, works on science, information on neighboring countries, and mythological texts. This library was open to scholars (Harris, 1995, pp. 17-24).

In Egypt, records were preserved in special rooms in temples and palaces. But evidence suggesting the existence of libraries is scarce. Temple collections were the predominant form of archives, to which literary and scientific texts were later added. Both Egypt and Mesopotamia had private collections during the peak of their civilizations; these collections housed genealogy, business records, travel accounts, and literature (Harris, 1995, pp. 27-35).

In regard to Greek libraries, it is now known that archives and collections existed years before the classical period in Greece (6^{th} century B.C. – 2^{nd} century B.C.), thanks to excavations in the 20^{th} century (Harris, 1995, p. 37). Special rooms were found in the ruins of both ancient Greek palaces and private homes. Much of the information on Greek library history is vague, but what is known is that there were a few libraries that were open to public like Aristotle's library and others at Heraclea and the Aegean islands (Harris, 1995, pp. 40-41). There have also been mentions of a public library in Athens that held original theatrical texts where people could read and copy them (Harris, 1995, p. 42).

However, the largest and best known library of the Greek empire was the one in Alexandria, Egypt. It was part of a large group of buildings consisting of museums, lecture halls, study halls, dining rooms, gardens, and an astronomical observatory. This library was home to scholars of all fields. One of the major aims of these scholars was preserving, revising, and adding to earlier texts. This library boasted a long list of librarians who were distinguished scholars in various fields. It also attracted scholars from all over the world and was the intellectual center for around two hundred years until the reign of Ptolemy VIII (Harris, 1995, pp. 44-46). This library is generally considered as the pioneer of modern libraries in the western world, though other ancient libraries were also important. For example, around 200 B.C., there was a library at Pergamum in ancient Greece which was developed by different rulers and was supposed to be second in size only to the Alexandria library (Harris, 1995, p. 47). There was also another well-developed library in Athens. Both these libraries were open to scholars. Private libraries were also common in the houses of scholars, political leaders and wealthy collectors. Librarians and libraries were considered very important in creating and preserving culture (Harris, 1995, p. 51).

Although there was said to be much development in libraries during the Greek era, very little is actually known. Harris (1995, p. 51) argues that this lack of knowledge could have been because most of the records were lost but more probably because libraries were considered so essential to their society that historians took them for granted and didn't think it was important to mention them.

If we turn to ancient Rome, we find that libraries there may have started because of the need for collecting historical records and laws. There were also temples with their own collections. There was also a trend of Roman conquerors bringing back library collections as war souvenirs, and these were the most notable collections during the early period. Many wealthy scholars also had their own archives. Although Julius Caesar did plan to build a public library, it wasn't until the efforts of Augustus that the Romans built their own libraries around 30 B.C (Harris, 1995, p. 57). The greatest Roman library is said to have been the Ulpian Library with 30,000 volumes (Harris, 1995, p. 58). The custom of building public libraries remained even as the power of the Roman Empire waned. Readers weren't usually allowed to borrow books, but there were fixed hours when they could read them within the library building. The Romans arranged and separated books by subject, and this effort marks the start of library cataloging, which included both classified and bibliographical listings (Harris, 1995, p. 65). The Roman libraries were eventually replaced by Christian libraries. Although some Christian religious leaders were accepting of literary and scientific texts, there were many instances of such collections being destroyed (Harris, 1995, pp. 61-62). With subsequent invasions and unrest, libraries and learning almost died out during the 5th and 6th centuries (Harris, 1995, p. 66).

During the Byzantine era, there was a preference for Greek over Latin works in the city of Constantinople. But Emperor Constantine collected all kind of writings, including Christian texts (Harris, 1995, pp. 71-72). His successor, Emperor Julian, was adamant on destroying Christian texts in his attempt at overthrowing the Christian religion. He favored classical literature instead (Harris, 1995, p. 72). For centuries, the libraries suffered due to the conflict between the rulers and religious leaders. Monastic libraries were developed as early as 500 A.D. as monastic life flourished in the Eastern empire. Each monastery was encouraged to develop its own collection. Libraries and learning in general were reborn in the late first millennium when public and private libraries were built. But this all came to an end with the fall of the Byzantine regime around the 12th and 13th centuries (Harris, 1995, pp. 76-77). Constantinople was mostly

destroyed, but the invaders realized the value of the library collections and portions of the collections were sold or traded, while the rest was destroyed (Harris, 1995, p. 76). Constantinople is important to Western civilization because it was responsible for preserving classical literature in this way.

The Byzantine regime was followed by the Moslem regime when much of the literature, especially classical works like those of Aristotle and Plato, were preserved even after the invasion around 1453 (Harris, 1995, p. 76). Many works were translated to Arabic, because the written word was important in the Moslem world. The most reproduced book was the Koran, and it was considered essential that all Moslems memorize the book and make it available to others as well (Harris, 1995, p. 78). Reproduction of books was made easier due to the import of paper from China, which became easily available and cheaper than parchment or papyrus (Harris, 1995, p. 77). Literary works were relegated to archives in favor of religious texts. Royal libraries were usually comprised of works on Moslem religion but also included works on science, history, philosophy, and literature. They were open to "serious students and scholars" (Harris, 1995, p. 78). The Moslem regime had literary centers in Damascus, Baghdad, and Cairo at different times. These libraries had large and varied contents and were usually open to public. Private libraries were noted for their size and elegance (Harris, 1995, pp. 78-81). Here again, the wealthy population was the most literate, and scholarship was recognized as a distinguished career (Harris, 1995, p. 81).

Moslem libraries typically had comprehensive subject catalogs in separate rooms or closets. Apart from that, they had reading rooms and halls that were used for meetings, discussions, and debates. Lighting of library buildings was highly developed in private and public libraries. The use of colors and binding of books was also given much thought. Libraries were often considered a profit-making business during this time (Harris, 1995, pp. 82-83). Moslem libraries suffered the same fate as their predecessors, but the difference was that the content was mostly destroyed during the civil wars and the Christian crusades from the late 12th century to the late 15th century (Harris, 1995, pp. 84-86).

Monastic libraries are also considered important in the preservation of literature in the Western world. During a long era of chaos in Europe in the first millennium, monasteries served as safe-houses for books that would have been destroyed otherwise. The monastery "libraries" greatly varied in size. Monasteries spread far and wide in Europe and with them spread the

libraries. Studying and reproducing books were taken as part of monastic life and were actually mentioned in the "Rules of St. Benedict", an early monastery scripture of the 6th century AD (Harris, 1995, p. 91). As the act of reading and copying these books was taken as a spiritual act, the trend spread throughout monasteries in Europe.

The average monastic library contained a small number of volumes – mainly the Bible, religious works, and a few other volumes on Latin classics and grammar. Books were stored in closets called "armaria" (Harris, 1995, p. 99), which were eventually replaced by small rooms. Because of this relatively small size, interlibrary exchange was practiced as a means of support between libraries. Books were loaned not just for reading but also for copying (Harris, 1995, p. 100).

Although monasticism had its ups and downs in Europe over the course of a thousand years, the monasteries held the fort for western learning and literary culture right up until the 16th century when religious and political changes came about across Europe. Fortunately, many of the books from these monastic libraries survived thanks to the invention of printing (Harris, 1995, pp. 103-104).

Development of Modern Libraries in the Western World

The roots of the university (universitas is Latin for "an organized guild or corporation") in Europe were started by "guilds" formed by teachers and students (Harris, 1995, p. 108). Although it can be argued that universities actually started from monasteries, the teachings and content diversified from mainly theological study. This form of university developed into an organized institution, but universities didn't have a library of their own for many years – personal libraries of the teachers instead serving the purpose. But this did give rise to a number of booksellers around the universities and student groups then started collecting the volumes required (Harris, 1995, p. 109). Therefore, colleges within the university had their separate libraries. Central libraries weren't a major concern in any institution. The earliest institutionalized university libraries were formed at the University of Paris and the University of Oxford. They were mainly helped by personal donations from royals and noblemen (Harris, 1995, pp. 110-111). Around Europe, there were more than 75 universities before 1500; and every one had some sort of libraries serving them (Harris, 1995, p. 112). They all had a small number of books and were similar to monastic libraries in their physical characteristics.

Modern libraries owe much to the invention of printing. In the 16th century alone, an estimated one hundred million copies of books were printed in Europe alone (Harris, 1995, p. 131). This publishing abundance gave great power to the written word and there was no more a shortage of graphic resources and means of communication. National libraries are also important to the history of libraries after 1500 as countries wanted to preserve their heritage found in books and manuscripts. These libraries were preserved even through times of depression and war because of a growing feel of nationalism and hence provided a sense of permanence and security (Harris, 1995, p. 132).

Looking at the history of libraries until the twentieth century, one finds that written collections moved back and forth between religious libraries, national or royal libraries, private archives, and public libraries. It is also important to note that the concept of public libraries is also relatively modern; because different people's perception of "public" was very diverse. These perceptions could range from simply meaning "not private", to being a public or national property, to being open to all public and "funded and administered as a public trust" (Harris, 1995, p. 148). Public libraries were considered important by governments to spread selective information and propaganda or simply send a democratic message by allowing free access of knowledge. Harris (1995, p. 149) differentiates public libraries from national and private libraries that were open to public. He specifically defines a public library as "the general library that is not only publicly owned and tax-supported, but also open to any citizen who desires to use it."

Public library development up until the 1900s was very slow, but they did exist then in the form of public reference libraries. They were usually poorly housed and many of them lost their collections to war and conflict. In France and Britain, these libraries included book clubs and rental libraries or bookstores for popular reading. These were followed by "subscription libraries" – a book club formed by well-off readers in a community (Harris, 1995, p. 150-152). Eventually a few of these libraries in Europe became public libraries as different legislative acts were passed. Librarians and reading rooms weren't given much importance in the beginning, making these libraries more like book museums. By the early twentieth century, most countries reached a consensus that a public library service was important (Harris, 1995, p. 157).

In the United States, early settlers kept a habit of carrying a bible with them. But work and labor were considered more important than literacy and education (Harris, 1995, p. 164).

Colonial Americans however had private libraries with religious books forming the majority of the collection. Very few public libraries existed and even in those few, the collections only numbered a few hundred. Bookstores were opened in the heavily settled regions in the east coast. In the 17th century, colleges were established and they all had their individual collections. After the Revolutionary War, Americans benefitted from books confiscated from the colonialists and donations from philanthropists. College libraries were always struggling for financial support and collections. Often, a professor from the college had to perform the role of the librarian with no extra compensation for the work (Harris, 1995, pp. 173-179). Readers' guilds were soon formed in the late 18th century to serve readers who found the college libraries not useful or interesting (Harris, 1995, p. 181).

Public libraries in the US were preceded by early efforts in the late 17th century at church libraries open to the public. A Reverend Thomas Bray can be credited for establishing around seventy libraries around this time. His efforts led to the passage of library laws in many colonies and other parish libraries being built (Harris, 1995, pp. 182-183). This was a promising start for these libraries, but after Reverend Bray's demise, they were overlooked and most of them disappeared. After the colonies stabilized, people got interested in books as a means of recreation and study. To address this demand, Benjamin Franklin came up with the idea of a "social library." When he and his friends were faced with a lack of books for his "Junto" (a group of intellectuals who discussed and debated matters such as morals, politics, philosophy), they decided to collect all their books in a common library so each person had access to all books belonging to Junto members (Harris, 1995, pp. 183-184). This concept led to the formation of a subscription library, the Library Company of Philadelphia, which inspired many other such libraries throughout the colonies. Harris (1995, p. 185) classifies them as social libraries. Franklin's library had shareholders and subscribers who paid an annual sum to the library. An aristocratic form of this social library was the "athenaeum," which emphasized magazine and scholarly newspaper in its content, which usually had very high share values. An early 19th century library development was the establishment of "mechanics" libraries throughout the industrialized cities of America, which held books related to mechanical skills and science. They were supported by wealthy businessmen who believed in using the common people (Harris, 1995, pp. 185-186).

Libraries at this time, with their limited budget, tried to keep books related to classic fiction and the best non-fiction. There was a separate strand of circulating libraries that catered to people interested in books of romance and popular fiction. They were usually run by bookstores or print shops (Harris, 1995, p. 187). They were purely commercial and very popular in the half century after the Revolution. Many influential leaders ridiculed these "libraries," saying they filled the common people's minds with "trash." These critics advocated the need for libraries that held carefully selected collections as "antidotes" to the circulating libraries (Harris, 1995, p. 188).

All social libraries were simply organized and housed in public buildings. They had fixed opening hours and were usually cared for by attendants who weren't proper "librarians." But these libraries were still deemed adequate to fulfill the reading needs in the country. Since they were all funded by voluntary support, they often suffered at times of economic crises in the 19th century when many communities lost their libraries (Harris, 1995, pp. 186-187). Many people by then thought libraries were essential components of communities and eventually pushed through the idea of supporting libraries with public tax funds. Thus, the resulting public library model adopted Franklin's model of the Library Company of Philadelphia (Harris, 1995, p. 187). School district libraries, special libraries, and government libraries also helped the development of the public library in the US.

In Europe there wasn't a regular pattern of library development in the early 20th century due to the First World War and ensuing drastic political and social changes (Harris, 1995, p. 208). As mentioned earlier, the most prominent libraries in Europe were the national libraries. Although they also suffered because of war, there was a greater concern for these libraries due to their importance. A typical example is the Bibliotheque Nationale in France, which saw an increase in bookstocks and financial support after each World War. This facility has now been developed into Europe's major library resource (Harris, 1995, pp. 208-209). The British Museum Library also saw similar growth in the 20th century and is known for its unique administrative organization. The national libraries in the Soviet Union and Germany also had notable collections (Harris, 1995, pp. 210-211).

Public libraries were popular in Europe even before the onset of the First World War as books were considered harmless forms of recreation. Books were also considered efficient in socio-political control, and free access to information was considered significant for the success

of democratic governments (Harris, 1995, p. 218). Public libraries in France suffered during World War I and went through a rebuilding phase which included experiments with children's libraries and other public circulating libraries. But by World War II, there wasn't a proper public library system and the general conception was that libraries were meant for serious research only (Harris, 1995, p. 219). Since then, there has been a change in attitude, and a separate office concerned with public libraries was established in France after World War II. Children's libraries, youth libraries, and media centers have been added to existing libraries and some of them also have meeting halls. However, Harris (1995) is keen to note the lack of efficiency in the French public library system caused by untrained librarians, low salaries, and a lack of understanding of efficient library service. Since the 1990s, there has been a growing sense of importance and potential of public libraries in France (Harris, 1995, p. 220).

Andrew Carnegie, the American industrialist, is noted for having provided buildings for many municipal libraries in the UK, with the buildings "sometimes better than the collections they housed" (Harris, 1995, p. 154). Public libraries in the UK have endured the World Wars and the economic depression and in fact grown and diversified after these issues. The National Central Library in London was founded in 1916 to provide books for students of all ages. The Carnegie Trust provided the library with a new building in 1933. Eventually, it was merged into the newly formed British Library in 1972 (Harris, 1995, pp. 220-221). According to Harris (1995, p. 221), each person in Britain has access to library services and thirty percent of the population are registered library users.

In Germany and Russia, there was generally a divide between the major research libraries and popular libraries. Libraries and books were used as tools for propaganda dissemination. Both countries, however, had libraries throughout their territories. Libraries in both countries suffered heavy damage during the Second World War (Harris, 1995, pp. 222-224). Germany went through a rebuilding process after the war, and since 1990, the eastern region is trying to keep up with developments in the west (Harris, 1995, p. 223). In Russia, censorship and filtration of books was prevalent for many years after the war. After the collapse of the Soviet Union in 1991, censorship was eliminated and libraries became truly open to the public (Harris, 1995, p. 225).

Rapid industrialization in the US brought disruptive elements with it, most notably poorly educated immigrants. This was also thought to be destabilizing social institutions like the church and the family. A formal educational institution was believed to have the power to save the

Republic from such disruptive elements. After the nascent working men's movement of the 1820s, publicly supported education was seen as the best way to ensure the political authority of the people (Harris, 1995, pp. 242-43). This role of enlightening the people was first truly described in a report by the Trustees of the Boston Public Library in 1852. It emphasized the need for free education for the masses and how it helps to maintain a social order (Harris, 1995, p. 243).

There were a few small efforts to build publicly supported libraries in the first half of the 19th century. Modern library movement in the US was boosted by the passage of state laws enabling local governments to exempt taxes. The Boston Public Library was the pioneer in the movement and other libraries followed suit. The early years of the library saw a focus on proper administration and the collection of books. There was soon a change in focus and the library aimed to popularize public library service. At this state of infancy, many buildings were being built with the help of donations from rich benefactors. Late 19th century saw developments that greatly shaped the public library scene - the formation of the American Library Association, the publication of the report on public libraries, and the philanthropy of Andrew Carnegie. He donated substantial amounts of money for the construction of around 2500 library buildings (Harris, 1995, p. 246). Carnegie was a believer in the power of free libraries in improving the general population.

Other significant developments of late 19th and early 20th century were the establishment of branches, acceptance of women and children as legitimate patrons, use of open stacks, and an increase in service hours (Harris, 1995, p. 247). This gives a strong indication that a liberal approach was being adopted in public libraries. Some people saw the library as an “authoritarian or missionary” tool. For instance, John Winsor, the first President of the American Library Association, stated that it was a “great engine” that could be used to direct the common people to either “good or evil” (Harris, 1995, p. 247). Around the turn of the century, the library was touted as the remedy for all social evils. Most notably, librarians developed programs for the “Americanization of the immigrants.” They believed that an unemployed person would be better off with a book in a library than sitting idle elsewhere (Harris, 1995, p. 248). With the advent of Nazi and Fascist movements in Europe, the public library was regarded as the “sole guardian of the people’s right to know.” This represented a departure from the earlier authoritarian model of

librarianship and introduced the library's role in providing an unbiased set of information for the people to make their own decisions (Harris, 1995, p. 248).

Late 20th century saw an aggressive approach in reaching the masses with public library use slowly waning. Librarians came up with different programs to improve their services. The lower class population, who previously made little use of library resources, were encouraged to use public libraries. This showed a commitment towards providing library services to all classes of the US population, rather than just the intellectual few (Harris, 1995, pp. 248-49). This philosophy has been adopted since then in the design and development of public libraries.

After having gained an understanding of how libraries came about, we can now turn our attentions towards the behavior setting perspective which I have chosen as a theoretical platform to perform my analysis of the two spaces. The behavior setting theory was conceptualized by Barker in the 1940's, and it has been subsequently developed by Barker and his colleagues, including Wright and Wicker. Although there are other contributors to this theory, I mainly focus on the literature authored by these environmental psychologists to form a theoretical platform for this thesis. I discuss how this theory was developed and how it helps a researcher develop a behavioral understanding of a place. I also present a few examples of behavior setting studies that have been done in the past.

Behavior Settings – An Introduction

Barker conceived the idea of behavior settings in the 1940's and the concept was developed by Barker and Wright in 1947 when they set up the Midwest Psychological Field Station in Oskaloosa, Kansas (Wicker, 1984, p. 26). Barker (1968, p. 17) defines behavior settings as "stable, extra-individual units with great coercive power over the behavior that occurs within them." They are natural processes of regular occurrence that aren't created by experimenters for research purposes. A behavior setting has two attributes – structural and dynamic. Structurally, it consists of standing patterns of behavior and milieu. Dynamically, the behavior and milieu parts of a behavior setting have a certain degree of interdependence with each other that is greater than their interdependence with parts of other similar behavior settings. The milieu, the scene for the behaviors, is independent of any occurrences in the setting. The milieu is what binds the behavior patterns within time and space, and it is "synomorphic" to the behavior. Barker defines the word "synomorphic" as "similar in structure." He also defines the

word “synomorphs” as “things and occurrences that have both physical and behavioral attributes” in a setting. Thus, a behavior setting is nothing but a collection of synomorphs. He also goes on to say that the synomorphs of one setting have a defined interdependence that is greater than the interdependence they have with synomorphs of another setting (Barker, 1968, pp. 18-19).

According to Gump (1974, pp. 267-70), there are three different factors in any behavior setting. Non-behavioral factors are the objects and space in the setting as well as the specific time period for any occurrence or behavior in that setting. Standing behavior patterns are the independent behaviors that occur there, e.g. a lecturer teaching in a classroom where all students are listening and taking notes. These behaviors are all previously defined for any setting type. Finally, there is the interaction between these two previous factors. The non-behavioral factors form the stage where behavior patterns are observed. Gump (1974, p. 269) states that these factors, in fact, mold behavior within settings. There is congruence between the first two factors as the space and time period settings are usually the right fit for general behaviors there, e.g. chairs in a classroom all face the lecturer’s writing board or projector screen, which in turn is placed appropriately so that it is clearly visible to all students sitting on those chairs. An individual’s behavior in a setting is hugely influenced by the established behavior pattern, as one learns this over time. Research conducted by Barker and his colleagues (1968) has concluded that behavior settings and their characteristics play a major role in the behavior patterns of occupants of all ages (Wicker, 1974, p. 601). People tend to imitate what others do in a setting in many cases. Behaviors of newcomers into a setting are usually omitted from observations because they can’t be used to form a regular behavior pattern. Behavior settings are also equipped with mechanisms to deal with unwanted behaviors, and behaviors are often enforced by authority.

Why a behavior setting encourages a certain behavior pattern from its users has been discussed by behavioral psychologists in the past and many theories have been proposed. Users may learn the proper behavior because of positive and negative reinforcing factors in the system, or from observational learning which has been noted as an important tool in non-familiar settings (Wicker, 1974, pp. 603-606). Barker (1968) proposed a feedback model in which he argues that occupants take satisfaction from the settings they occupy and are constantly involved in maintaining the condition of the settings. Thus, they maintain their behavior if they consider that

is adequate or appropriate and will reach an operational state. But they will alter their behavior if they judge their behavior to be disruptive and continue these alterations until an acceptable state has been reached. Barker also suggests a social exchange theory where occupants select settings that are appropriate to their own characteristics, and settings in turn select proper occupants and filter out unwanted users (Wicker, 1974, pp. 607-610). Wicker (1974) suggests that there needs to be further research on this question, and also that researchers may focus on the characteristics of a setting that provide physical and social cues to evoke certain behaviors from its occupants or users.

Goal directed actions in a behavior setting have been referred to as behavior episodes. They may be initiated, facilitated, and ended by either the ecological environment or the psychological environment[1]. Behavior is always dictated by the psychological system, but for ecological system behaviors, the psychological system is suppressed by the controls of the ecological environment. Barker gives examples of a classroom, where "listening to the teacher," "looking for pencil," "staring at the ceiling," and "writing in the workbook" are all behavior episodes. For a classroom behavior setting, the episodes "listening to the teacher" and "writing in the workbook" are more influenced by the ecological system while still being dictated by the student's psychological system, whereas the episodes "looking for pencil" and "staring at the ceiling" are actions independent of the classroom setting and are determined by the psychological system (Barker, 1987, pp. 1415-1417).

Behavior objects are objects that are involved in a behavior setting, both human and non-human. Observably, they are the intersection points between the ecological environment and the psychological environment. Barker (1987) acknowledges behavior objects to be the points of intersection between the ecological environment and the psychological environment. Behavior extends from these objects in both directions. Behavior objects differ in their ability to influence an individual's behavior depending upon their character and the behavior setting. Barker and his colleagues were only concerned with their contribution to the ecological environment (Barker, 1987, pp. 1417-1418).

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[1] Environmental psychology encompasses two sciences, one of which is concerned with the ecological environment, and the other concerned with the psychological environment (Barker, 1987, p. 1415).

In the following sections, I present two examples of how a behavior setting can be identified and studied to gain a better understanding of any place. This understanding can be used to improve the performance of a setting, if necessary.

Barker's Description of a Basketball Game in Midwest, Kansas

Barker studied one of the high school basketball games, which were regularly held in Midwest, Kansas. The game was held in a court of a defined size and two teams played four 8-minute quarters. Thus, the setting had spatial and temporal boundaries. He observed and described the rules that were followed in the game, which effectively made up the program of the setting. He noted that the rules had different regulatory functions that ensured a fair running of the program. The setting had both human as well as non-human behavior objects – the sets of players, the coaches, the umpires, and the audience on one side and the ball, the goal rings, and the seats on the other side. All the behavior objects have different roles in the setting. All occupants of the setting have different power positions or levels of authority within the setting – the umpires, the coaches, the players, and the spectators (Barker, 1968, pp. 94-95).

Barker noted that photographing the setting was an appropriate method for recording the setting's occurrences. Looking at an appropriate photograph, he noted that we could understand the standing patterns and the milieu. One could also observe the synomorphy between the two – the players are all concerned with the ball, passing it, and getting it into the goal rings, or stopping an opponent passing it or scoring. The audience is facing the court. Parts of this setting are interchangeable, as seen in the photograph. The players can be substituted with other players sitting on the bench. The spatial boundary, the court and the hall can be established in the picture (Barker, 1968, pp. 96-97).

Barker studied different behavior settings like the basketball game in Midwest to identify the variety of behavior patterns and environments in the town. He also studied the percentage of the local population involved in each behavior setting and behavior pattern. He also used the number, occurrence, and duration of behavior patterns to determine the extent of environmental characteristics of different settings (Barker, 1968, pp. 107-109).

Wicker's Analysis of Allison's Japanese Hostess Club Ethnography

Allan Wicker did an analysis of a Japanese hostess club based on an ethnography by Allison and he mentioned two perspectives of behavior setting environments in his 2011 article –

the traditional perspective proposed by Barker and Wright, and the contemporary conception that has expanded on the traditional perspective. The contemporary perspective considers individual and group sense-making of settings as their knowledge and beliefs develop. It also considers the settings in their larger contexts. He illustrates these perspectives with reference to Anne Allison's experience at a Japanese hostess club in Tokyo, Japan, as a hostess and observer in 1994.

Wicker compared Allison's description of the club with the defining features of a behavior setting. The Bijo hostess club had a spatial boundary and certain operational hours. The club had both human and inanimate behavior objects. There were the setting occupants, the people, who had different roles and duties in the setting's operation. The patrons were members and customers and there were different types of staff employed at the club. The inanimate behavior objects were the tables, chairs, a piano, bar, liquor bottles, and others which occupied specific positions in the setting. The arrangement was such that the regular procedures could be carried out comfortably. In other words, there was a fit between the objects and the activities that ensued there. Wicker calls this pattern of activities the program of the setting. The program defines the different roles of a setting's occupants. The hostess club employed a manager, a chief hostess (called a "Mama"), a group of hostesses, and a musician. All these employees had specific duties defined by the club's program (Wicker, 2011, pp. 3-4).

The hostess club, as a behavior setting, had a self-regulatory system which ensured the proper running of the club. This system evaluated the occurrences and responded if a corrective measure needed to be taken. Undesired interaction between a hostess and customers were watched and rectified by the chief hostess, the Mama. Hostesses and the Mama exchanged gestures between each other to notify of such activity and the Mama orchestrated the actions of all hostesses as she saw fit. The behavior objects and functions of the club had an interdependent nature about them (Wicker, 2011, p. 5).

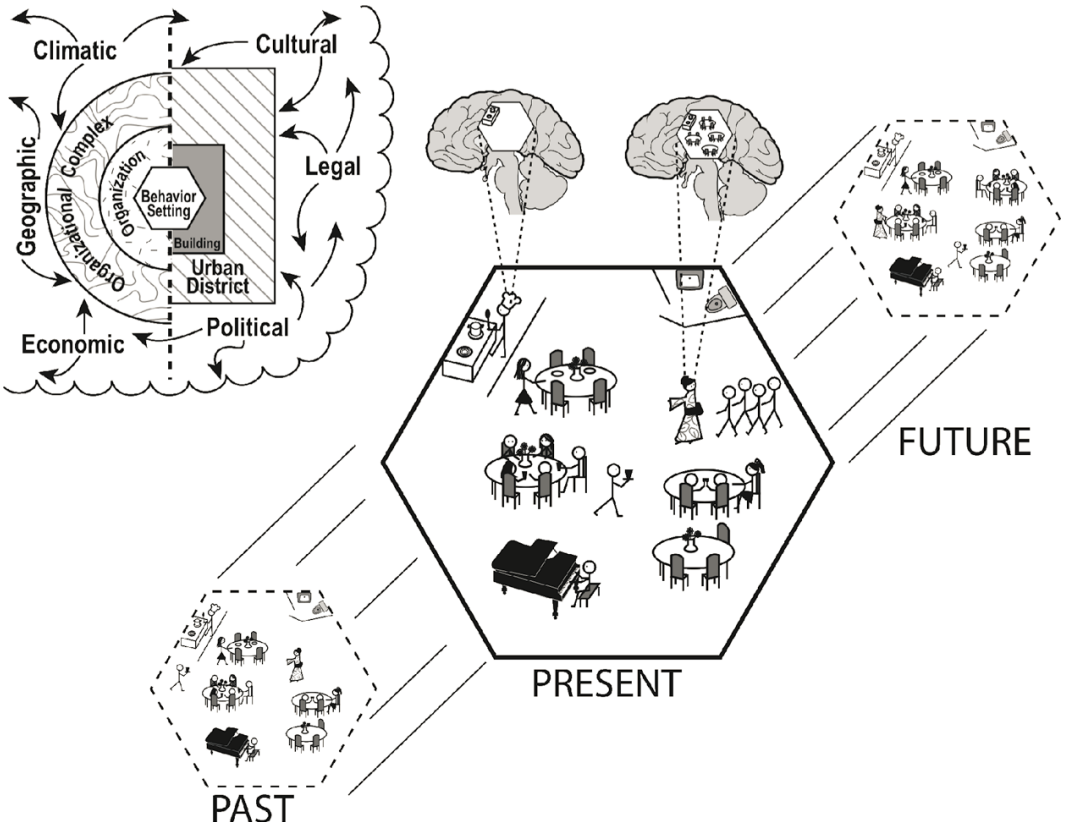


Figure 2.1 Representation of the key aspects of traditional and contemporary perspectives as seen in the Bijo hostess club. Image copyright Wicker 2011 (Wicker, 2011, p. 10).

Wicker has also considered the contemporary behavioral perspective in his analysis. He brings to attention the different processes that occur in a setting before a setting reaches a stable state. As the occupants' knowledge increases and as their beliefs evolve, the setting also evolves with them. The staff of a setting, like the Bijo hostess club, mitigates issues and makes corrections to the program and those corrections become established processes over time. Then, there is also the social and physical context of the setting. The context is also very important when we look at any setting. The Bijo hostess club had different settings surrounding it that influenced it. This gives greater depth to our understanding of the club. For instance, it was part of a complex that also included a bar and its neighborhood had a variety of shops, restaurants, and discos. Many processes seen at the club make more sense when you consider the context (Wicker, 2011, p. 9).

Wicker's analysis is a good example of a behavior setting analysis of a setting's narrative without the researcher actually experiencing the setting themselves. Wicker calls for the need of

adding the occupants' experiences to the knowledge of behavior settings that the traditional and contemporary perspectives can afford.

Having had a general understanding of libraries, behavior settings, and their applications, we can now focus on a library case study relevant to this thesis.

Library Case Study from Finland

One study especially relevant to the current research is Matthews et al.'s (2013, pp. 167-70) up-to-date evaluation of space and use of libraries because of the many changes in library use and innovations, especially digital technologies. While there are massive changes occurring in libraries, Matthews et al. (2009) suggest that it is now appropriate to assess how these changes are unfolding, and whether they make for better libraries. University libraries especially need to address this issue with greater urgency because of their role in increasing a university's ability to attract students. Matthews et al. (2013, p. 169) states that students have started viewing themselves as customers in regard to the different resources universities offer, including library services and functions. More and more universities have found a need to evaluate their libraries and work to be competitive with libraries at other institutions (Matthews et al., 2013, p. 169).

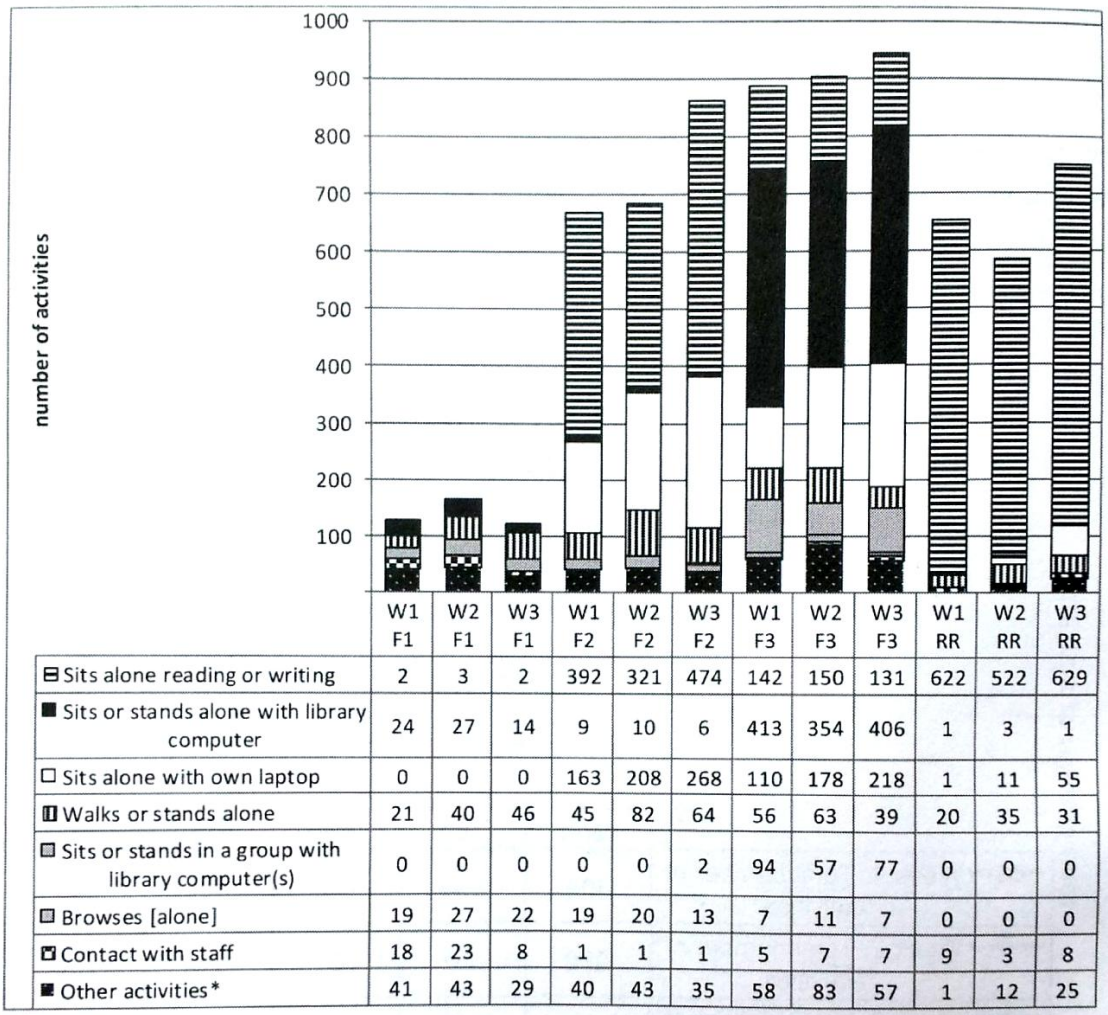
Matthews et al. divide library evaluation techniques into two broad methods: quantitative and qualitative. Quantitative methods are popular with librarians and follow a linear progression from data collection to results. They are easier to put into action because they provide measurable evidence, but as Bryant (2009, p. 9) suggests, they lack richness or depth and are sometimes inadequate in studying how libraries support or undermine learning experiences, which are often better studied through qualitative research (Afzal, 2006, pp. 22-23). Afzal points to the need for focusing qualitative research on the library user or the patron. He suggests tools such as interviews, case studies, and behavioral observation for these kinds of qualitative studies (ibid.).

Matthews et al. (2013) further emphasize that libraries are moving away from the traditional concept of acting as a repository of information and moving toward complex environments where the focal point is the patron and how the patron uses library resources. This change in focus has posed serious questions concerning libraries' physical spaces (Brindley, 2006, pp. 484-495). To emphasize this point, Matthews presents a case study of the main library building at Finland's Tampere University. This structure, built in 2006, accommodates modern

standards of library use. The researchers, however, wanted to find out how the building was functioning and how its patrons used the physical spaces.

Researchers chose monitoring as the method of observation, where trained observers tour the study spaces regularly and record user behavior via behavioral mapping. In this research, the observers were directed to follow fixed routes along the study spaces, equipped with floor plans and standardized maps. Matthews et al. (2013, pp. 173-74) explain that the method was advantageous because library staff could act as observers and register observations easily by following instructions on the standardized forms. Observations were carried out on weekdays over a period of three weeks. There were four monitoring sessions each day – 9:00am, noon, 3:00pm, and 6:00pm – in four different locations in the Tampere library. Thirty-four volunteers were involved in the observations in total, and they were all staff of the main library. To record users' activities, fifteen categories were established, which included "sits alone reading or writing (without computer)," "sits or stands alone with library computer," "sits alone with own laptop," "contact with staff," "talks on mobile phone or sends SMS," "sits in a group with own laptop," and so on (Matthews et al., 2013, pp. 174-77). In addition to these observations, face-to-face surveys were also done in group work rooms.

The findings of this research revealed that the most common activity in the Tampere library was "sits alone reading or writing," followed by "sits or stands alone with library computer" and "sits alone with own laptop." Use of computers accounted for about 35% of observed activities over three weeks. Other activities represented a small percentage of the total number of activities. The researchers also studied group activity versus individual activity, and the percentage of group activity, around 7%, was lower than expected. An example of a summary table-graph developed for this study is presented in table-graph 2.1. This table-graph became important for presenting data in the current study, as will be shown in chapter 5.



	W1 F1	W2 F1	W3 F1	W1 F2	W2 F2	W3 F2	W1 F3	W2 F3	W3 F3	W1 RR	W2 RR	W3 RR
Sits alone reading or writing	2	3	2	392	321	474	142	150	131	622	522	629
Sits or stands alone with library computer	24	27	14	9	10	6	413	354	406	1	3	1
Sits alone with own laptop	0	0	0	163	208	268	110	178	218	1	11	55
Walks or stands alone	21	40	46	45	82	64	56	63	39	20	35	31
Sits or stands in a group with library computer(s)	0	0	0	0	0	2	94	57	77	0	0	0
Browses [alone]	19	27	22	19	20	13	7	11	7	0	0	0
Contact with staff	18	23	8	1	1	1	5	7	7	9	3	8
Other activities*	41	43	29	40	43	35	58	83	57	1	12	25
Total n	125	163	121	669	685	863	885	903	942	654	586	749

Key: F1=1st Floor, F2=2nd Floor, F3=3rd Floor, RR=Reading Room

Table-graph 2.1 Comparison of number of users involved in different activities in four different locations at the University of Tampere Main Library, Tampere, Finland. Table-graph copyright Matthews et al. 2013 (Matthews et al., 2013, p. 180).

In their study of the Tampere library, Matthews et al. (2013) concluded that the library was most used for completing university assignments that required little group work. The authors explained that this finding related to the fact that the teaching method at the University of Tampere is still not collaboration-oriented but instead still encourages individual work. The research also presented strong evidence for the library's being used as a study space and the increased use of computers and other digital devices. Since many library resources are now available through virtual networks, students at the University of Tampere rarely have to browse book stacks or contact library staff. Overall, the researchers conclude that the Tampere library is

still an important part of academic learning because it provides students with "both a real and a virtual learning environment" (Matthews et al., 2013, pp. 183-84).

This chapter has discussed the literature related to the history of libraries, behavior settings, and library use research. We have looked at how behavior-setting studies and library-use studies are conducted. In the next chapter, I first focus on how parts of a library can be identified as behavior settings and how they can be studied. I then move on to identifying two different spaces within the library as the two study zones, which will take us to the methods and timeframe within which this study will be done.

Chapter 3 - Research Methodology

The previous chapter has outlined the foundational theories that will be used to formulate a research methodology for this thesis. The main aim of this thesis is to identify two different spaces within Hale Library – one with computer stations and another with general seating, and analyze the differences in their physical state and user behavior. We can find a lot of variation in the types of behavior that can be observed in a particular environment. The purpose of a behavior setting study, however, is to find generalities within these behaviors so that a meaningful observation and conclusion can be made. Behavior settings have certain defined purposes and they affect the behaviors of individuals within them (Gump, 1974, pp. 268-69).

To identify the two spaces required for the study, a range of possible spaces was enlisted. These were then compared with the defining attributes of behavior settings as mentioned by Barker (1968, pp. 18-23) as well as Gump (1974, pp. 268-69). These spaces needed to have spatial and temporal boundaries. They would also need to have a defined standing pattern of behavior and an independent milieu. Finally, we need to consider the behavior-milieu synomorphy. Another important consideration when making a decision on the choice of spaces was the presence of one or more vantage points from where I could observe users' behaviors in a stationary seated position. Lastly of course, one of the spaces needed to have computer stations and the other one needed to have general library seating. After the two spaces were identified, the behavioral observations could be started. A behavioral mapping system has been used here as it seems most appropriate in recording multiple behaviors.

The two spaces that have been selected are both on the second floor – one is the main computer station cluster to the left of the hall entrance, and another is the seating cluster in a circular arrangement at the eastern end of the main hall (henceforth referred to simply as computer cluster and circular seating respectively). Both of these spaces were found to be well-defined and had a number of possible observation points (see figure 3.1).

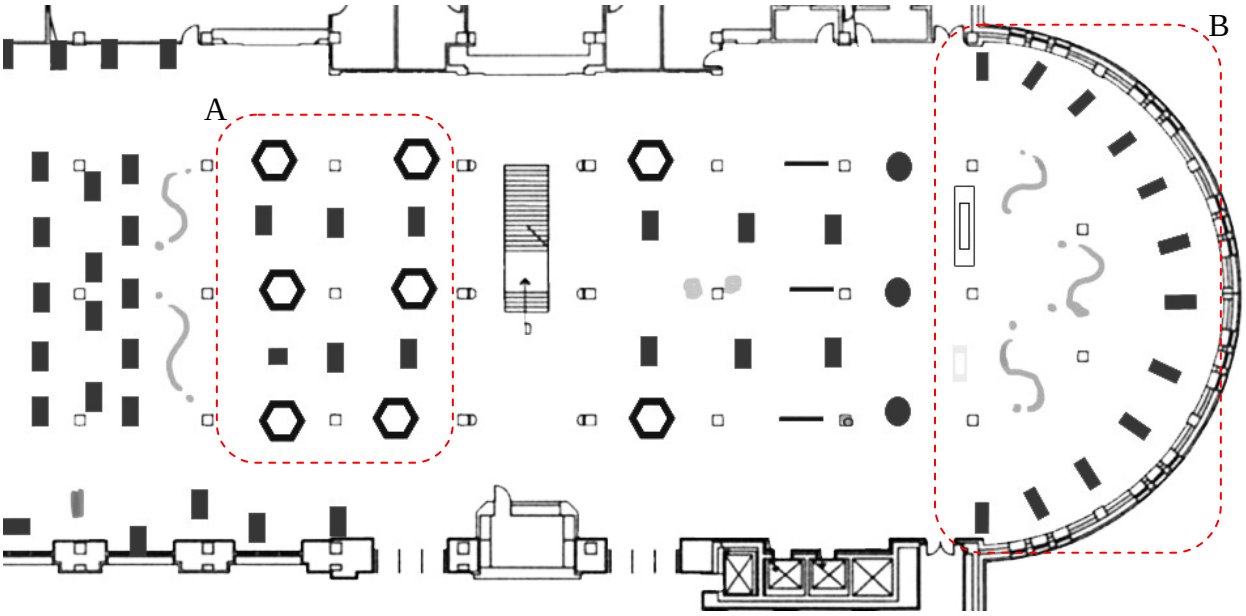


Figure 3.1 Hale library second floor plan showing the two research spaces – space A is the computer-carrel cluster and space B is the curved-wall seating area. Image copyright K-State Libraries 2013 (Source: Author's modification of a drawing provided by Hale Library, Morse Department of Special Collections)

Zeisel (1981, p. 112) has mentioned different qualities, methods, and agenda of observing environment behavior. The qualities of different methods define the level of intrusion on the part of the observer. My observation will be a dynamic one and my vantage points will be chosen so as to make me a secret outsider. A dynamic observation is one where we consider behavior episodes and chain reactions, where certain actions lead to other actions. In a dynamic observation, we also have to be aware of repetitive behavior, in Barker's words standing patterns. Observers have to understand what behaviors are related to each other. Being in an observation station or a vantage point, as Zeisel calls it, as a secret outsider is sufficient enough for my observation. It will also not influence the behaviors of library users during the observations (Zeisel, 1981, pp. 114-17). Zeisel considers it convenient to record activities in maps and floor plans in a behavior observation setting, and also to get a sense of how that setting is being used as a whole (1981, pp. 122-23).

Pilot Study

A pilot study in the two Hale Library spaces was conducted in July, 2013. General observations of spaces in the library were recorded during this study. These helped me in better describing these two spaces and the kinds of behaviors that could be seen there in addition to

identifying possible observation stations or vantage points. The pilot study also included detailed observations of the selected spaces, which helped me formulate the coding system for behavioral mapping. Different behavior patterns were generalized and accommodated in the coding system.

Firstly, base maps of the two spaces were drawn. These maps showed the standing patterns of the spaces – the seating spaces, computer stations, book stacks, and corridors. The computer cluster had 6 desks with 6 computer stations each. A number of possible observation stations were identified for this cluster (see figure 3.2). They had different ranges of views from a seated position. The cluster had two curved couches on one side, which were used as observation stations, and all other sides were flanked by passageways (see figure 3.2). There were a number of desks behind the couches, which provided the best seated positions for observations because of their slight elevation.

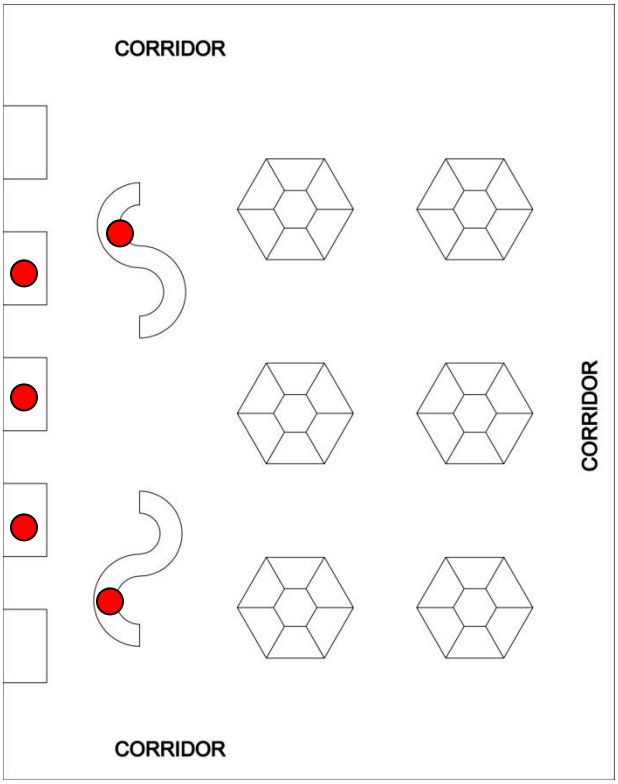


Figure 3.2 Plan of the computer carrel cluster (space A) showing possible observation stations. (Source: Drawing by author).

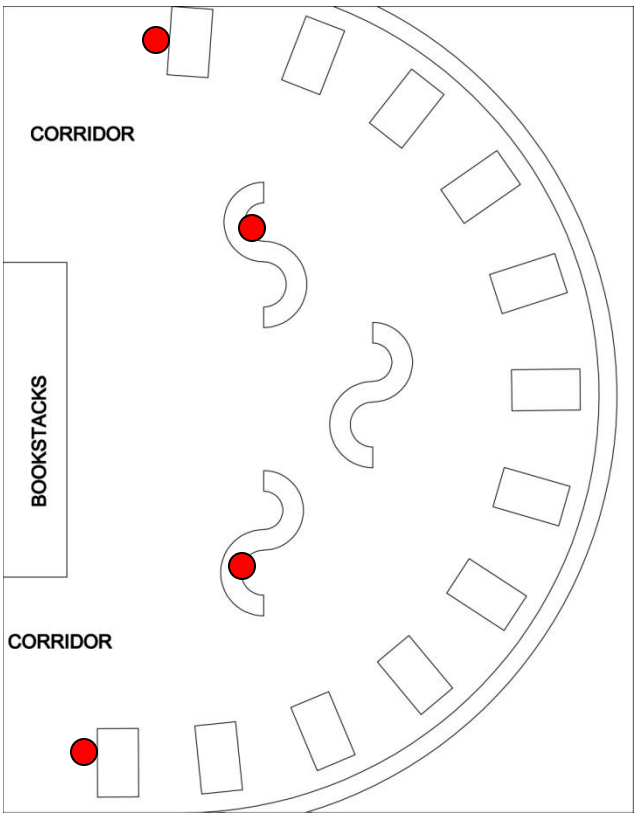


Figure 3.3 Plan of the circular wall seating cluster (space B) showing possible observation stations. (Source: Drawing by author).

The circular seating area had 12 study tables along the curved exterior wall. Each table had four chairs, though often chairs were rearranged so that some tables had more than four and some had less than four. There were two curved couches on the other side of the cluster followed by book stacks and computer stations. Different possible observation stations had been identified for this cluster too (see fig 3.3).

A number of arbitrary behaviors were included in the initial coding system. During the pilot study, major behaviors of people using the two spaces were recorded in 10 minute intervals in the base maps. The coding system was constantly improved and newly observed behaviors were accommodated. The pilot observations were done at different one hour periods during weekdays in the months of June and July. It was observed that these spaces were mainly used from 10:30 am in the morning to 4:30 pm in the afternoon. The final observation periods were set within this time frame.

Methodological Procedures for Observations

The research observations were carried out in two weeks from October 7th, 2013, to October 18th, 2013. The observations times were set at from 10:30 am to 12:30 pm, and from 2:30 pm to 4:30 pm. During the pilot study, it was found that there is a greater presence of patrons at this range of time at the library.

People's actions were recorded in a letter sized base plan. Observations were made from available stations in 10 minute intervals. The following coding system was followed to record users' behaviors (figure 3.5). Apart from recording behaviors of the occupants, this coding system also accommodates the sex and age range that they fall in. This system could also record repetitive users, mixed behaviors, and behaviors of a group of users.

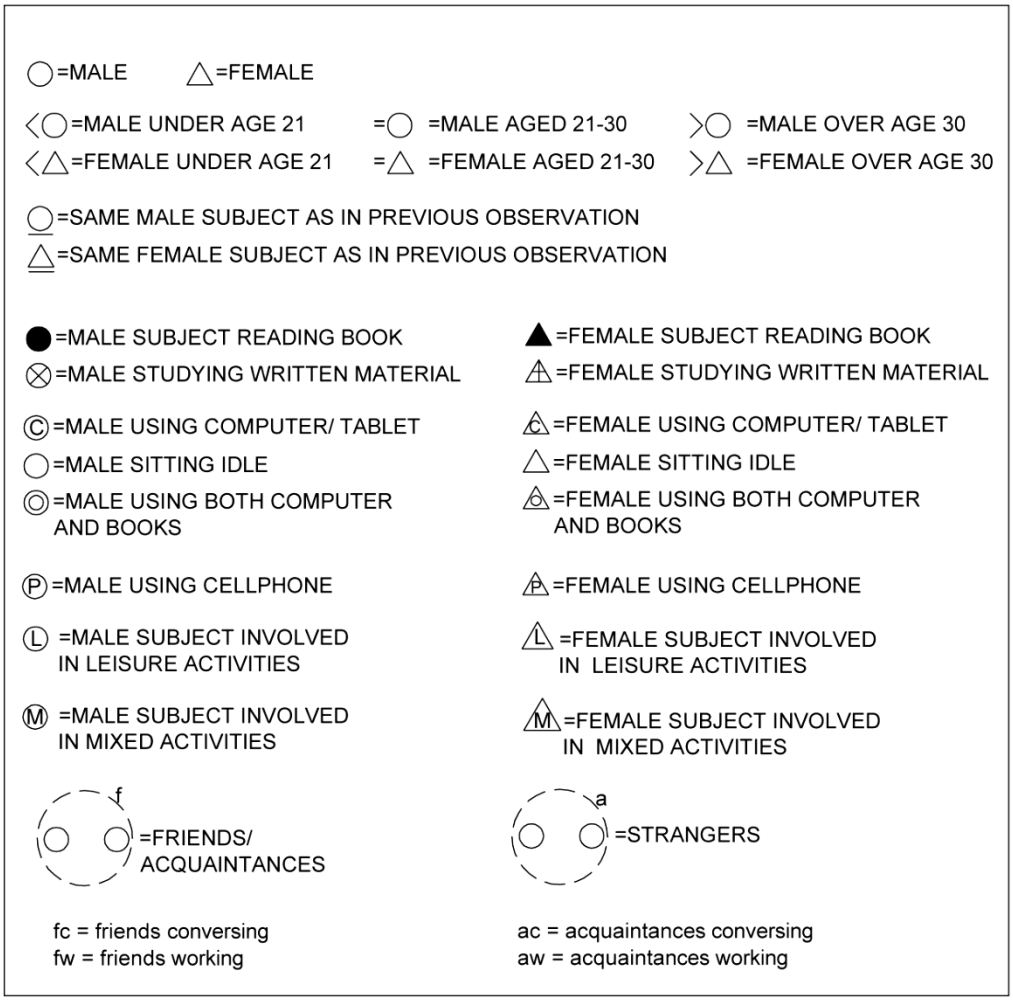


Figure 3.4 Coding system used for final observations

Chapter 4 - Description of the Two Behavior Settings in the Context of Hale Library

Hale Library is the main library building at Kansas State University, located in Manhattan, Kansas. When Kansas State University (then Kansas State Agricultural College) was first established in 1863, the university library held its collections in different campus buildings and the collections were relocated several times as the library's collections grew constantly. Finally in 1927, as shown Fig. 4.1, the main campus library was built at its current location on the university's north quadrangle (K-State Libraries, 2013, n.p.).

Figure 4.1 The original Farrell Library; view from west (Source: http://www.lib.k-state.edu/depts/spec/flyers/library-history.html. Last Accessed: 04-12-2012).

In 1955, a stack addition was constructed and dedicated as the Farrell Library in honor of former University President Francis D. Farrell (Fig. 4.2). Further additions and remodellings were done in 1970 and 1987 to alleviate overcrowding, before a major remodelling project was completed in 1997 to bring the library to the present postmodern structure (Figs. 4.3 and 4.4).

Figure 4.2 Stacks-area addition of 1955 (Source: http://ksulib.typepad.com/talking/2007/12/k-state-keepsak.html. Last Accessed: 12-10-2013).

Figure 4.3 1970 Farrell-Library addition (Source: http://ksulib.typepad.com/talking/2007/12/k-state-keepsak.html. Last Accessed: 12-10-2013).

As shown in Figs. 4.4 and 4.5, the 1995-97 renovation, built in Postmodern style drawing on the earlier Collegiate-Gothic and Romanesque-Revival traditions, envelopes the earlier additions. On October 5, 1997, this new building was dedicated as Hale Library, in honor of Joe and Joyce Hale, who provided the major financial support for the project (K-State Libraries, 2013).

Figure 4.4 1997 renovation, south façade in Postmodern "Romanesque-Revival style" (Source: http://ksulib.typepad.com/talking/2007/12/k-state-keepsak.html. Last Accessed: 12-10-2013).

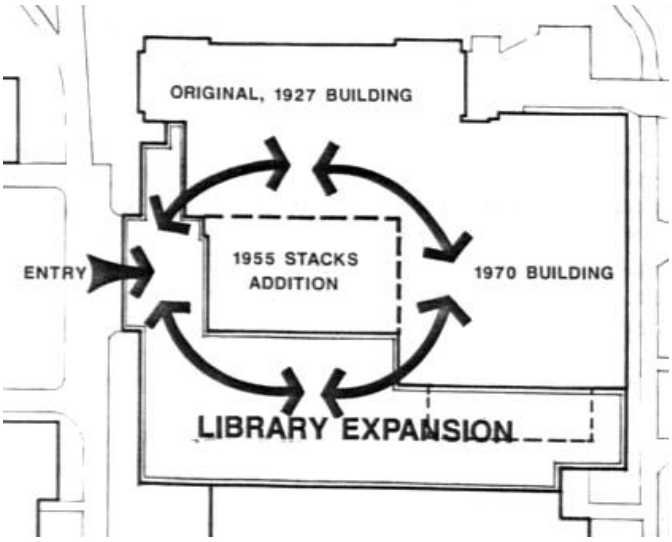


Figure 4.5 Schematic plan of the library expansion in 1995-97 (Source: Peckham Guyton Albers & Viets, Inc., 1991).

The building today is a five-storey structure. All four lower floors house library resources accessible to students on a daily basis like book stacks, computers, study spaces, and other services. The fifth floor houses administration and a special-collections department. The second floor is the main-entry floor, where the two spaces studied in this thesis are located.

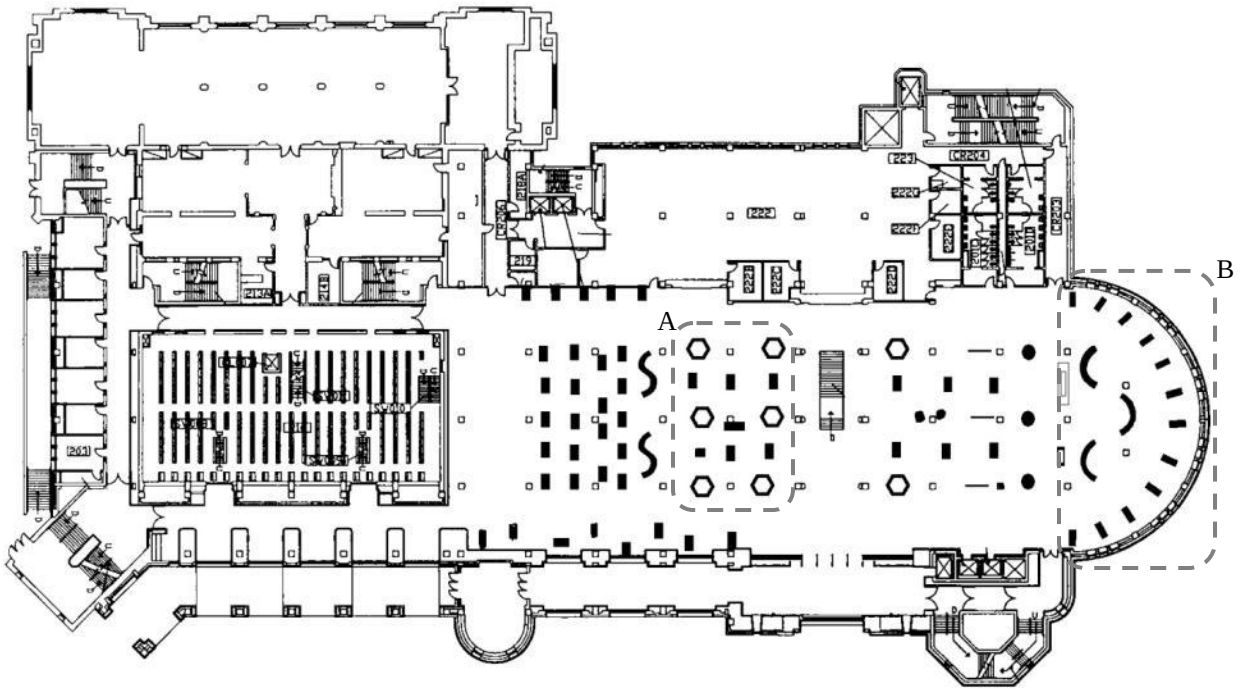
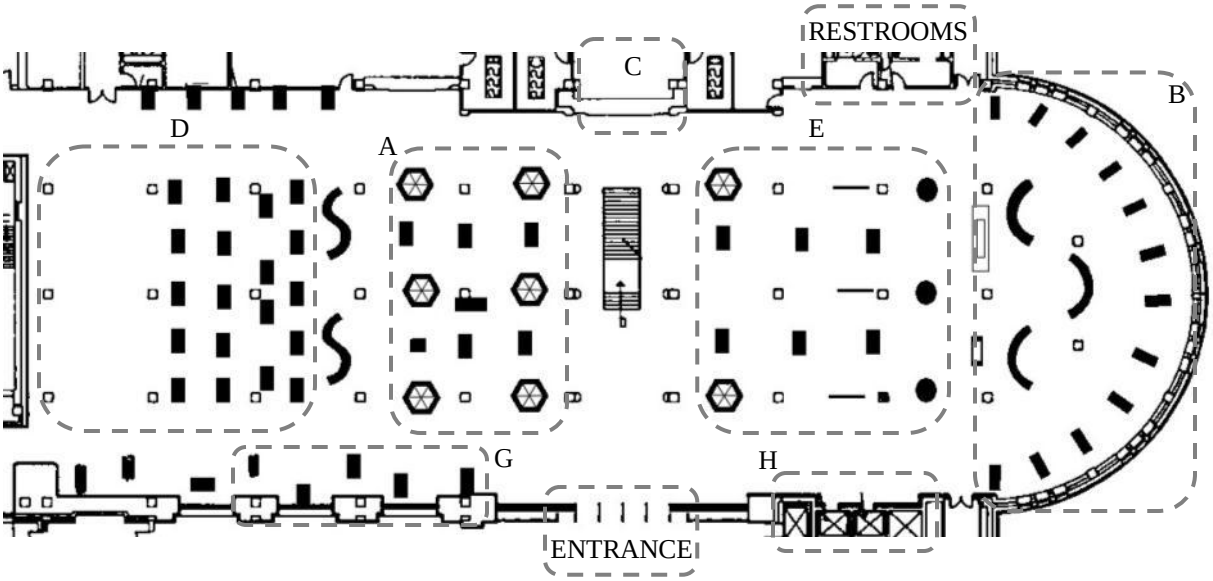


Figure 4.6 Second-floor plan highlighting the two spaces, A and B, studied in this research (Source: Author's modification of a drawing provided by Hale Library, Morse Department of Special Collections).

Physical Description of the Two Hale Library Spaces

Hale Library was open 24 hours during the observation periods, Monday to Friday. Librarians were available from 8:00 am to 10:00 pm from Monday to Thursday, and 8:00 am to 6:00 pm on Friday. As shown in Fig 4.6, the two spaces studied in this thesis are on the second floor of Hale Library. Space A is a computer-carrel cluster to the left as one enters the library through the second-floor entry. Space B is a general-seating table cluster at the far right of the second-floor entry. As shown in Fig. 4.7, the open hall of the second floor also has a group study area (space D), front desk (space C), library help desk (space C), study booths (space G), and restrooms (Fig 4.7).



A – Computer Carrel Cluster
B – General Seating Table Cluster
C – Library Front Desk
D – Group Study Area
E – Computer Carrels and Study tables
F – Soft Seating Area
G- Study Booths
H - Elevators

N

Figure 4.7 The main hall on the second floor (Source: Author's modification of a drawing provided by Hale Library, Morse Department of Special Collections)

If one studies Fig. 4.7, he or she notes that the computer-carrel cluster, which was the first behavior setting studied (space A), has the library front desk to the northeast, study booths to the south, a group study area to the west, and staircase to the first floor to the east. The second space studied, the curved-wall seating cluster (space B), is located along Hale's east curved wall. This space has a soft-seating area to the west, and computer carrels and study tables beyond (E). Since most of the second floor is an open hall, all spaces, including the two spaces studied here, are visually connected.

Because it is located next to the group study area, space A, the computer carrel cluster, is vulnerable to noise. Space A has circulation pathways on three of its sides; there are two soft seating furniture areas to the west. As indicated earlier, space A is situated close to Hale's second-floor entrance. Hence, there is a constant flow of library users very close to the computer carrel cluster. There is also a print station at the center of the cluster (Fig. 4.10). This printer is used by library patrons on the second floor who often use the computers in the computer-carrel cluster to access the printer.

Figure 4.8 Computer carrel cluster from North-West (Source: Photograph by author).

Figure 4.9 A single computer carrel (Source: Photograph by author).

As illustrated in Figs. 4.8 and 4.9, the computer carrels of space A are wooden and have movable chairs on rollers. Each computer station has a platform where a computer screen, a keyboard, and a mouse are placed. As shown in Fig. 4.11, the computer stations in the computer-carrels are sized so that one person can work on each computer. These stations aren't provided with power outlets for personal devices. As seen in the photograph of Fig. 4.9, the primary function of the computer station is computer use. These carrels are not appropriate for two or more people working in groups, as the partitions between adjacent stations discourage interaction (Figs. 4.8 and 4.9). As shown in the photograph of Fig. 4.12, there is a lack of space for other functions like writing by hand, reading written documents, or interacting with peers. Unintentionally, the design of these carrels discourages most other learning activities other than computer use.

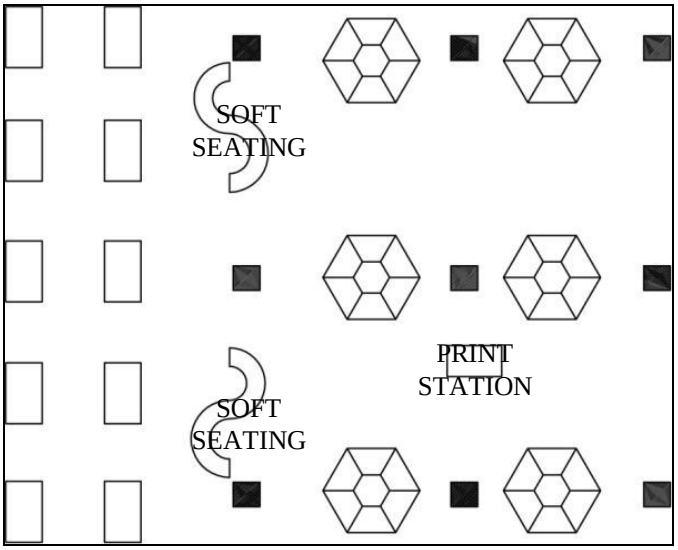


Figure 4.10 Plan of space A showing the computer-carrel cluster (Source: Drawing by Author).

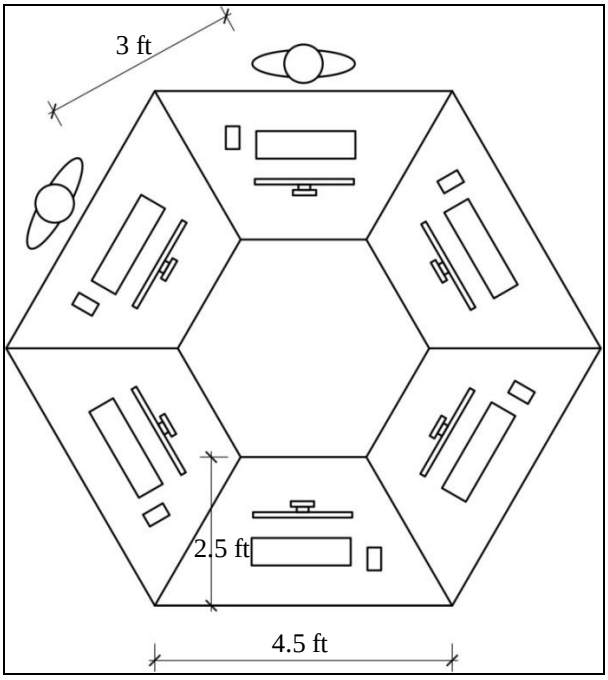


Figure 4.11 Plan showing a single computer-carrel in Space A

(Source: Drawing by Author).

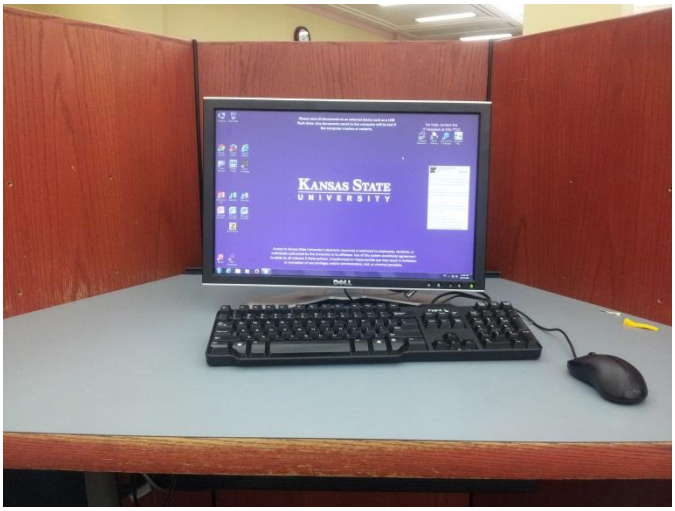


Figure 4.12 Photograph showing how a user's view is restricted at a computer station in Space A (Source: Photograph by Author).

Users sitting at adjacent computer stations in space A are at a distance of no more than three feet from each other (Fig. 4.11), but the presence of the partition breaks the visual link and gives users a sense of privacy and seclusion. As shown in Fig. 4.12, the partitions restrict the visual range of the user sitting at a computer station. The arrangement of the computer carrels in a circular pattern does suggest, in its formal geometry, a sociopetal situation, where users can readily interact interpersonally. But the partitions between each computer station don't allow for direct physical or visual interaction. All users are focused on their computer screens, and the partitions block linkage between carrels. This arrangement makes the overall character of the cluster sociofugal – in other words, users are largely separated from each other visually and socially. What could be a sociopetal situation otherwise is instead a sociofugal situation.

As shown in Figs. 4.13-4.16, the second behavior setting studied is the curved-wall seating cluster, space B, which consists of twelve study tables. These tables vary in size and have four or six chairs each. As the following analysis will demonstrate in more detail, these large tables encourage group seating and interaction. This cluster is arranged along the curved wall at the east end of the main hall. Soft-curved furniture has been placed to its west. This area is isolated from the rest of the main hall as it is located farthest from the second floor's main hub centered on the check-out desk (Fig. 4.7). As a result, this area is much quieter than the rest of the main hall, including the computer-carrel cluster. As shown in Fig. 4.13, space B is exposed to

much natural light coming in through the windows, and little artificial lighting is required to illuminate the area during the daytime.

Figure 4.13 Curved wall seating cluster in space B from South-West (Source: Photograph by Author).

As seen in Figs. 4.13 and 4.16, the tables and chairs in space B are wooden and movable, so that users can arrange themselves according to their needs. Most of the tables have access to power outlets, where users can plug in personal devices like laptops, cellphones, and other electronic devices. Since the tables are empty, this allows for a variety of activities like use of personal computers, reading written documents, writing by hand, and interacting with peers. Space B is less vulnerable to noise as it is farthest from the group study area in the main hall, as seen in Fig. 4.7. It does, however, have the soft-seating area adjacent to it where users often spend leisurely time. Beyond the soft-seating area, there are study tables and computer carrels. The study tables here are sometimes moved to accommodate small exhibitions mounted by Hale Library staff.

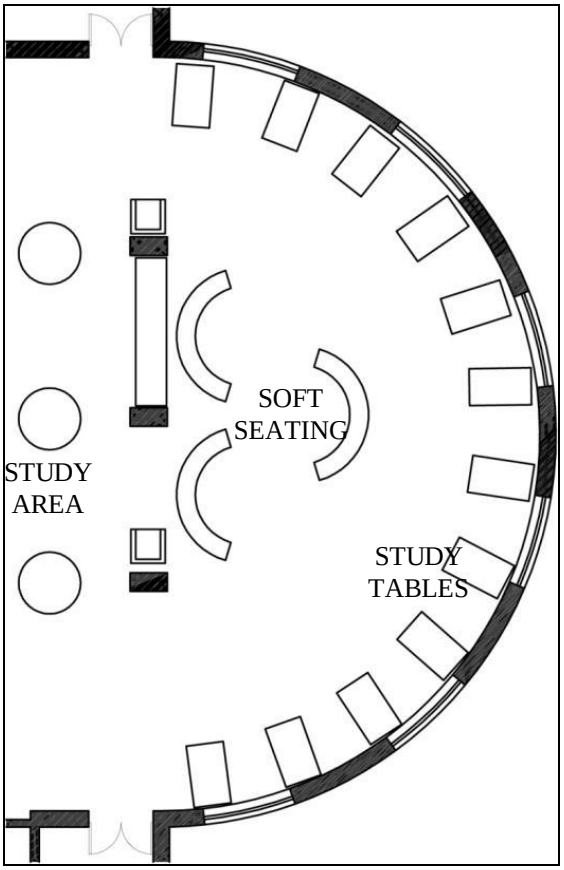


Figure 4.14 Plan showing curved-wall seating cluster in space B. (Source: Drawing by Author).

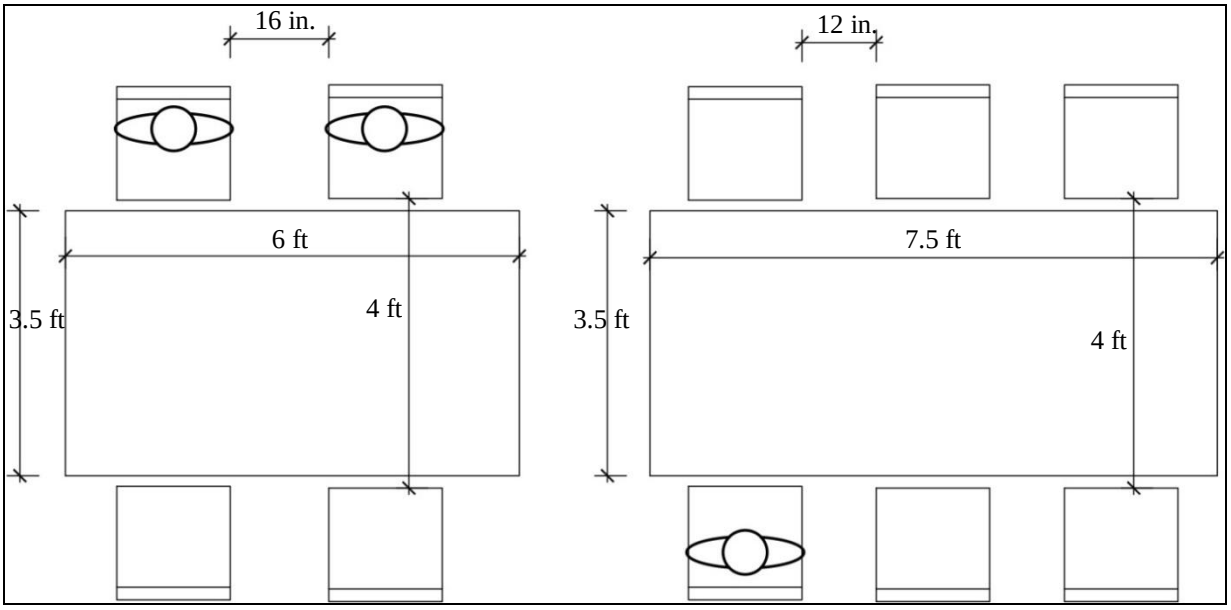


Figure 4.15 Seating tables at Space B showing the two table sizes and typical approximate distances (Source: Drawn by Author).

Figure 4.16 A typical table setting at Space B (Source: Photograph by author).

Overall, space B has a sociopetal arrangement, in that it allows users to interact easily, both visually and socially. Many tables have nearby windows so they are visually linked to the outside (Fig. 4.13). The table arrangement along a curve means that users sitting at any table have visual access to other tables and other users. At a single table, users are typically sitting at a distance of a foot from each other (Fig. 4.15), though they could be at a distance of four feet or more if they sit across each other. Thus, users can be seated appropriately depending upon their relation to another user sitting at the same table.

Space A and Space B as milieus

Having described the physical condition of spaces A and B and their contexts, we can now consider the two spaces as they incorporate the milieus of the two behavior settings. As explained in Chapter 2, Barker (1968, pp. 18-19) states that a behavior setting has two attributes – structural and dynamic. Structurally, a behavior setting has its standing patterns of behavior and milieu. The milieu is the scene of a setting, and is independent from the occurrences there. Dynamically, the behavior and milieu of the setting have a degree of interdependence greater that their interdependence with parts of other similar settings. Therefore, he proposes that a behavior setting encourages certain types of behaviors from its occupants, partly because of features of the milieu. He also refers to behavior objects, which may be human or non-human, that are involved in a setting (Barker, 1987, p. 1415).

In regard to space A, the computer-carrel cluster, the computers, workstations, and chairs form the milieu of the setting. The students, library staff, and security guards are the setting

occupants. Behavior objects include the chairs, computers, and materials that library users bring with them. The regular activities that the students are involved in during observations, e.g. using a computer, doing homework, reading written materials, writing by hand, interacting with a peer, and so forth, can be regarded as the standing pattern of behaviors. As shown in Fig. 4.7, the library front desk, main entry, study booths, soft-seating areas, and the group study space form the setting's socio-physical context. If we turn to space B, we note that the tables and chairs against the curved wall form the milieu. The students, the library staff, and the security guards are the occupants. Besides the furnishings, materials and devices that the library users bring are behavior objects. The standing patterns of behavior are the activities that the students are involved in and any interventions by library staff or security. The socio-physical context of space B is formed by the soft-seating areas, the restrooms, the study areas, and the visual connection to the outside through the windows there (Fig. 4.7).

Barker's behavior-setting theory suggests that there is a "synomorphy" between the milieu of a setting and its standing patterns (Barker, 1968, p. 18). Barker (1968, p.19) defines synomorphy as a state of being similar in structure, and he defines synomorphs as "things and occurrences that have both physical and behavioral attributes" in a setting. In the context of my study, the design and arrangement of the computer-carrels in space A and the curved-wall seating tables in space B should have some role in the kinds of behaviors that are observed in these two spaces. Behavior settings also have systems in place to ensure that the standing patterns of behavior are maintained. Because of the dynamics of any behavior setting, unwanted behaviors are suppressed and even corrected. In my study context, there is a range of behaviors that would be deemed appropriate or tolerable for study spaces at a library. Being involved in academic activities like reading a book, writing and assignment, or working on a computer are all appropriate behaviors. Texting on a cellphone, talking to a peer in a soft voice, or listening to music on headphones would be tolerable behaviors. But untolerable behaviors like talking loudly on a cellphone, watching a video in a loud volume, or reading out loud would all be unwanted behaviors that would not be tolerated for long.

Having presented spaces A and B in terms of their milieu qualities, we can now give attention to the behavioral observations for these two study sites. This is the aim of Chapter 5.

Chapter 5 - Behavioral Observations and Behavior Setting Analysis of Spaces A and B

Having looked at spaces A and B as milieus of the two library behavior settings, we can now examine the behaviors that were observed in the two spaces. Behavioral observations were recorded by the author for ten days between October 7th, 2013, and October 18th, 2013. Behaviors were coded on maps of the two spaces at 10-minute intervals in each two-hour period from 10:30am to 12:30pm, and 2:30 pm to 4:30 pm. The first set of observations were recorded in space A from Monday, October 7th – Friday, October 11th, 2013. A second of observations were recorded in space B from Monday, October 14th – Friday, October 18th, 2013. These behavioral observations revealed the different kinds of activities of library patrons using the two spaces.

This chapter introduces the methods of behavioral analysis for spaces A and B, and then provides results for both spaces in terms of three specific themes:

- Analysis of predominant activities in the two spaces;
- Analysis of average number of users involved in different activities in the two spaces;
- Analysis of spaces A and B as behavior-setting milieus.

Method of Analysis of Behaviors in Spaces A and B

During the observations of spaces A and B, a range of behaviors was seen. Students were involved in many activities that could be deemed to be productive or non-productive in terms of academic effort. The coding system presented in chapter 4 was used to record observations, and all observed behaviors were categorized in terms of the following activities:

- Sitting idle alone (appearing to nap, daydream, etc.);
- Reading written documents, i.e. books, handouts, or others;
- Writing by hand;
- Using library computer;
- Using own computer or tablet;
- Writing by hand (also using computer);
- Talking or texting on cellphone;

- Sitting or interacting in a group.

Activities like reading on a computer, watching videos on a computer, or typing on a computer were categorized under the simplified labels of "using library computer" or "using own computer or tablet" because of the observational difficulty in ascertaining the exact activity a student was involved in and whether it was productive or non-productive. Activities like reading a book or any other physically-printed document were categorized under "reading written documents." Students were also seen working on their homework or working on papers. Such activities, if done by writing by hand, were categorized under "writing by hand." Students using library computers were categorized under "using library computer" and students using their own computers or tablets were categorized under "using own computer or tablet." Some students would, however, be using a computer and also be writing by hand. This activity was categorized as "writing by hand (also using computer)." Students using cellphones to talk or text were categorized as "talking or texting on cellphone." Two or more students sitting in a group talking or working together were categorized as "sitting or interacting in a group." Students who seemed to be daydreaming, listening to music while daydreaming, or watching other students were categorized under "sitting idle."

To simplify analysis, the average number of users involved in these activities for every two-hour period was calculated. This was done by summing the number of users involved in a particular activity at each observation period, and dividing the sum by the total number of observation periods. This summary provides a general picture of the activities in which most users are involved. For example, consider the observation period of 2:30 pm to 4:30 pm on October 14th, 2013 as illustrated by table 5.1. The average for the activity "writing by hand" is calculated by summing the number of observed users at each observation period in half-hour intervals, i.e. 1+1+1+4+1=8. This sum is divided by the number of observations recorded in half-hour intervals, i.e., 5. Therefore, the average is 8/5 = 1.6. The averages for all activities are summarized in tables – for example, table 5.2 – which illustrates the average number of users involved in different activities for Monday, October 14th, 2:30pm – 4:30pm in space A. The averages provide a more focused picture of the distribution of activities among the library users in the two spaces.

October 14th, 2013	Time				
Activity	2:30 PM	3:00 PM	3:30 PM	4:00 PM	4:30 PM
Sitting idle alone	0	0	0	0	0
Reading written documents	0	0	2	0	2
Writing by hand	1	1	1	4	1
Using a library computer	11	9	9	9	9
Using own computer or tablet	0	0	0	0	0
Writing by hand (also using computer)	1	2	0	1	1
Talking or texting on cellphone	2	0	2	1	1
Sitting or interacting in a group	6	10	4	0	0

Table 5.1 Number of users involved in different activities in space A at each observation period: Monday, October 14th, 2013, 2:30pm to 4:30pm

Activity	Average no. of users
Sitting idle alone	0
Reading written documents	0.8
Writing by hand	1.6
Using a library computer	9.4
Using own computer or tablet	0
Writing by hand (also using computer)	1
Texting or talking on cellphone	1.2
Sitting or interacting in a group	4

Table 5.2 Average number of users involved in different activities at space A: Monday, October 14th, 2013, 2:30pm to 4:30pm

To get a better sense of the actual number of patrons using spaces A and B (for example, during the observation period on October 14th, 2013, 2:30pm to 4:30pm as illustrated in tables 5.1 and 5.2 for space A), we need to realize that, much of the time, users were observed to be involved in more than one activity during their stay. For example, one notes that in table 5.2, the same user in space A was observed to be "writing by hand (without computer)" at one observation period but then was "using a library computer" or "reading written document" during a later observation period. To distinguish average activity involvement (table 5.2) from predominant activities, I constructed another set of tables for all observation periods, as exemplified by table 5.3.

Looking at table 5.1, we might assume that the nine people "using a library computer" at 4:30pm are the same nine people "using a library computer" at 4:00pm. But in many, if not all cases, this would be an incorrect inference. Some of the patrons using the space at 4:30pm weren't the same patrons using the space at 4:00pm. These earlier patrons might have left the space, moved on to other activities, and thus were replaced by new users. Users remaining in the space were identified and recorded at every observation period. So, if a user was "writing by hand (also using a computer)" at 2:30pm, "using a library computer" from 3:00pm to 4:00pm, and "talking or texting on cellphone" at 4:30pm, he or she was categorized under the activity that he or she was most involved in time-wise, i.e., "using a library computer." All users were tracked in this way for the entire observation period of 2:30pm – 4:30pm and categorized under the activities in which they were observed spending the most time.

Although the average numbers in table 5.2 provide a helpful picture of the number of users involved in different activities, table 5.3 adds to our knowledge of users' activities. Because of users remaining in the space, we would have an incomplete understanding of the actual number of users using space A during the full observation period. This data helps interpretation in two ways: first, we have a more complete picture of a user's predominant use of space A; and, second, this data helps to identify daily and weekday variations.

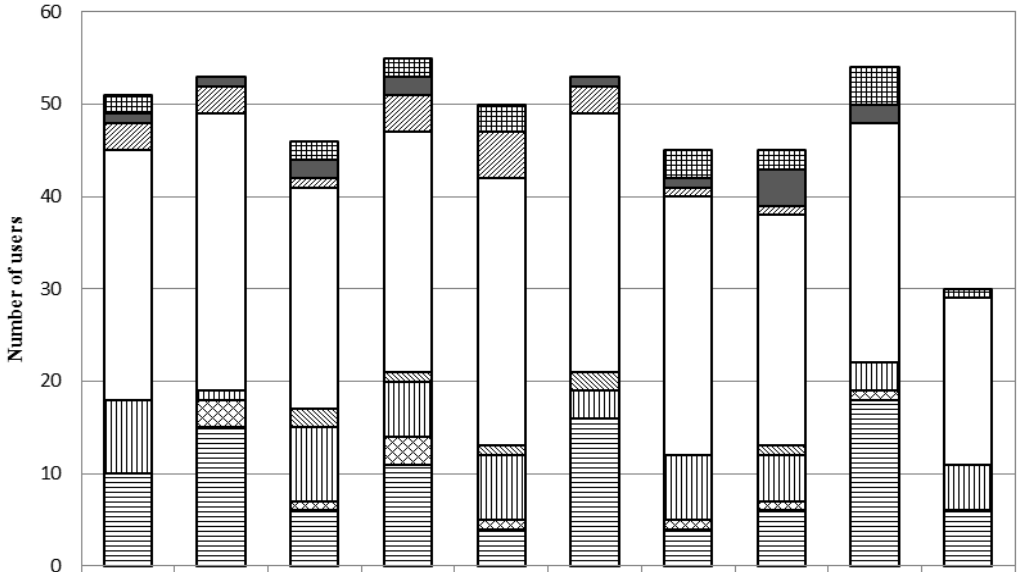
Predominant activity	**Number of users**
Sitting idle alone	0
Reading written documents	1
Writing by hand	3
Using a library computer	30
Using own computer or tablet	0
Writing by hand (also using computer)	1
Texting or talking on cellphone	3
Sitting or interacting in a group	15

Table 5.3 Number of users and the activities they were most involved in during their time in space A: Monday, October 14th, 2013, 2:30pm to 4:30pm

In the following behavioral analysis of spaces A and B, I begin by considering predominant activities in each space and then look at average number of users and behavior-setting mileu characteristics. This outline is used to study both A and B. After this analysis of spaces A and B separately, I then compare and contrast these two spaces. This comparison and contrast is provided in chapter 6.

Analysis of Predominant Activities in Space A

Having described the method for the analysis of observations for spaces A and B, we now consider all observation periods for space A, recorded between Monday, October 14th, 2013 and Friday, October 18th, 2013. To this end, data for all observation periods were compiled in a single table – for example, numbers of users involved in different predominant activities have been compiled together in table-graph 5.1. Then, the numbers of users for each activity were expressed as separately hatched bars on top of each observation period.



	Oct 14th, 10:30am-12:30pm	Oct 14th, 2:30pm-4:30pm	Oct 15th, 10:30am-12:30pm	Oct 15th, 2:30pm-4:30pm	Oct 16th, 10:30am-12:30pm	Oct 16th, 2:30pm-4:30pm	Oct 17th, 10:30am-12:30pm	Oct 17th, 2:30-4:30pm	Oct 18th, 10:30am-12:30pm	Oct 18th, 2:30-4:30pm
Sitting idle alone	2	0	2	2	3	0	3	2	4	1
Reading written documents	1	1	2	2	0	1	1	4	2	0
Writing by hand	3	3	1	4	5	3	1	1	0	0
Using a library computer	27	30	24	26	29	28	28	25	26	18
Using own computer or tablet	0	0	2	1	1	2	0	1	0	0
Writing by hand (also using computer)	8	1	8	6	7	3	7	5	3	5
Texting or talking on a cellphone	0	3	1	3	1	0	1	1	1	0
Sitting or interacting in a group	10	15	6	11	4	16	4	6	18	6
Total	**51**	**53**	**46**	**55**	**50**	**53**	**45**	**45**	**54**	**30**

Table-graph 5.1 Comparison of predominant activities and number of users in space A: Monday, October 14th, 2013 – Friday, October 18th, 2013

Looking at table-graph 5.1, one notes that in all morning observations periods, there was a small number of users "sitting idle alone" in space A (1-4 users). These patrons were probably waiting for their peers or spending leisure time away from schoolwork. We also note that there was a smaller number of users "sitting idle alone" during the afternoon observation periods (2:30pm – 4:30pm) as compared to the mornings (10:30am – 12:30pm), and none in the afternoons on October 14th and 16th, perhaps because patrons are more active with university assignments during the afternoon. The daily totals (summing mornings and afternoons) are also comparable over the course of the week, but indicate a small increase of 3 users from Monday, October 14th (2 users) to Friday, October 18th (5 users).

There was also a small number of users (1-4) "reading written documents." These observations indicate that, while this space is essentially meant for users intending to access library computers, it is also popular with patrons studying written documents or working on assignments without using the library computers. The number of students "reading written documents" is lowest (2 users) on Monday, October 14th and Friday, October 18th, and at its peak (5 users) on Thursday, October 17th. "Writing by hand" is another activity that was recorded in space A on all observation periods except Friday, October 18th. This number increased from morning to afternoon on Tuesday, October 15th, decreased on Wednesday, October 16th, and didn't change on other days of the week. The daily totals show an increase from Monday, October 14th to Wednesday, October 16th, and a steep decline from Wednesday, October 16th to Friday, October 18th. In short, there is a general decline in the number of users involved in all activities, and this might be because users are less likely to visit the library as the weekend approaches. A further conclusion is that the number of users "sitting idle alone" has increased for the same period, suggesting again that patrons perhaps are less active with university assignments during this period of the week.

The largest number of users in space A involved "using library computer" during all observation periods, with observational counts ranging from 18 to 30 users, as pointed out in table-graph 5.1. The number of patrons "using library computer" increased from mornings to afternoons on Monday and Tuesday and decreased from Wednesday to Friday. The least number of users for this activity (18 users) was observed on Friday, October 18th. As compared with the number of patrons for this activity on all other observation periods (24-30 patrons), this is an unusually low number perhaps because patrons left early for the weekend. The daily total

number of patrons remained more or less the same from Monday, October 14th to Wednesday, October 16th and decreased from Wednesday to Friday, October 18th. A very small number of patrons (1-2) were also seen using their own computers in space A during five of the ten observation periods. Due to this small number of patrons, the analysis of daily and weekly variations is not possible.

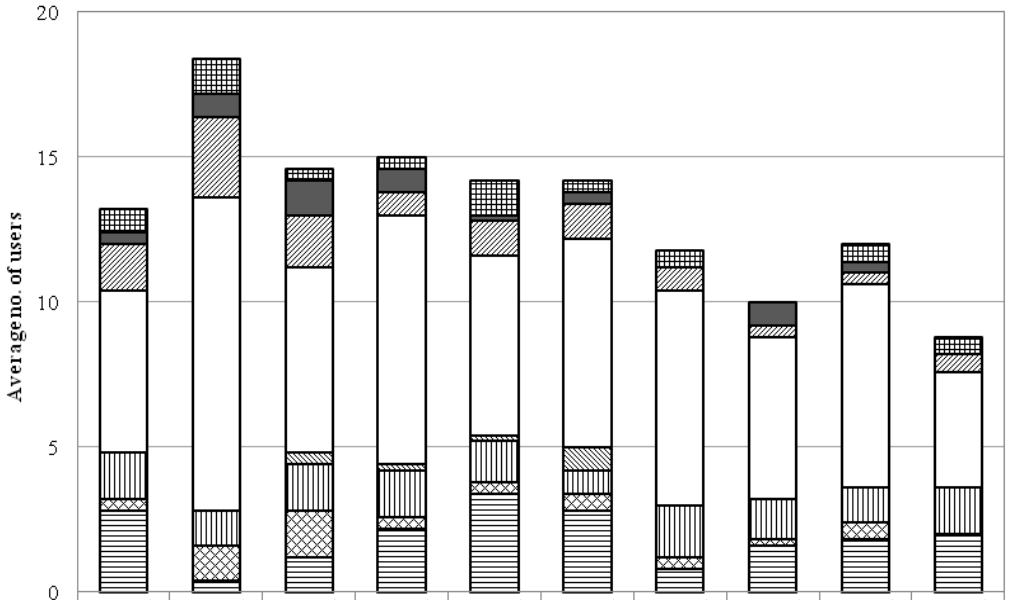
Patrons were also recorded making use of the library computer while working on university assignments, as suggested by the presence of a number of patrons (1-8) "writing by hand (also using computer)." This number generally decreased from mornings to afternoons, except for the observations on Friday, October 18th. The daily totals increased from Monday, October 14th to Tuesday, October 15th, and then gradually decreased on the following observation days, suggesting that patrons are most active "writing by hand (also using computer)" during the middle of the week. In addition, a small group of students (1-3 patrons) were also seen "talking or texting on cellphone." However, no general conclusions about their daily and weekly variations can be made, since totals are so small.

Table-graph 5.1 also demonstrates that space A was popular for patrons needing to interact in groups, regardless of whether they intended to use the library computers or not. This is perhaps because of the presence of the group study area to the west of space A. Patrons probably migrated to space A or used space A due to a lack of space in the group study area. In any case, a good number of patrons (4-16) were observed "sitting or interacting in a group." This number generally increased from mornings to afternoons except on Friday, October 18th, when there was a greater number of users in the morning. The daily totals show an increase of group interactions from Monday to Wednesday and a decrease from Wednesday to Friday.

Analysis of Average Number of Users in Space A

Having described the data for predominant activities for space A in table-graph 5.1, we can now consider table-graph 5.2, which shows a comparison of average number of users involved in different activities in space A. Looking at this table-graph, we can get a sense of the number of users involved in different activities at any given moment of a particular observation period. When data from table-graph 5.1 varies from corresponding data from table-graph 5.2, it means that users spent varying amounts of time in space A. Some users were only recorded during a single observation period, whereas other users were there during the entire two-hour

observation period. For instance, if there were only two people involved in "writing by hand" and they were observed performing that activity during all five observation periods, then the average number of users "writing by hand" is (2x5)/5=2. The total number of users predominantly involved in "writing by hand" will also be two. If, however, there were five users observed "writing by hand" during only one observation period out of five, the average will be (5x1)/5=1. But the total number of users involved predominantly in "writing by hand" will be five.



	Oct 14th, 10:30am-12:30pm	Oct 14th, 2:30pm-4:30pm	Oct 15th, 10:30am-12:30pm	Oct 15th, 2:30pm-4:30pm	Oct 16th, 10:30am-12:30pm	Oct 16th, 2:30pm-4:30pm	Oct 17th, 10:30am-12:30pm	Oct 17th, 2:30-4:30pm	Oct 18th, 10:30am-12:30pm	Oct 18th, 2:30-4:30pm
Sitting idle alone	0.8	1.2	0.4	0.4	1.2	0.4	0.6	0	0.6	0.6
Reading written documents	0.4	0.8	1.2	0.8	0.2	0.4	0	0.8	0.4	0
Writing by hand	1.6	2.8	1.8	0.8	1.2	1.2	0.8	0.4	0.4	0.6
Using a library computer	5.6	10.8	6.4	8.6	6.2	7.2	7.4	5.6	7	4
Using own computer or tablet	0	0	0.4	0.2	0.2	0.8	0	0	0	0
Writing by hand (also using computer)	1.6	1.2	1.6	1.6	1.4	0.8	1.8	1.4	1.2	1.6
Texting or talking on a cellphone	0.4	1.2	1.6	0.4	0.4	0.6	0.4	0.2	0.6	0
Sitting or interacting in a group	2.8	0.4	1.2	2.2	3.4	2.8	0.8	1.6	1.8	2
Total Averages	**13.2**	**18.4**	**14.6**	**15**	**14.2**	**14.2**	**11.8**	**10**	**12**	**8.8**

Table-graph 5.2 Comparison of average number of users involved in different activities space A: Monday, October 14th, 2013 – Friday, October 18th, 2013

In studying table-graph 5.2, one notes that the average number of users "sitting idle alone" increased from morning to afternoon on Monday, October 14th, but either decreased or remained the same for all other days of the week. This pattern parallels data for predominant activities presented in table-graph 5.1, where the number of users predominantly "sitting idle alone" also showed a decrease from mornings to afternoons. "Reading written documents" increased on Monday, October 14th, Wednesday, October 16th, and Thursday, October 17th. It decreased on Tuesday, October 15th and Friday, October 18th. This pattern again parallels the data in table-graph 5.1. "Writing by hand" increased from morning to afternoon on Monday, October 14th and Friday, October 18th, but decreased or remained the same on all other days. All these activities have average numbers that tapered off as Thursday and Friday approached.

In studying table-graph 5.2, one also notices that the average number of users for "using a library computer" increased from morning to afternoon Monday through Wednesday, and decreased on Thursday and Friday. Average numbers also showed a decrease from Monday, October 14th to Friday, October 18th. This is somewhat similar compared to the information in table-graph 5.1, considering the only difference is in the data for Wednesday, October 16th, when the total number of users has slightly decreased (from 29 to 28) but then average number of users has increased (6.2 to 7.2 users). The average number of users "using a library computer" is comparable throughout the week (4-10.8 users). This data reiterates conclusions made in the earlier section that space A is mostly used to access the library computers, and that users tend to decrease in number as the weekend approaches. As noted in the earlier section on predominant activities in space A, the average number of patrons for "using own computer or tablet" was too small for daily and weekly variation analysis.

Another point to be made about table-graph 5.2 is that the average number of users "writing by hand (also using computer)" is generally in consonance with data in table-graph 5.1. The averages have decreased from morning to afternoon on Monday, October 14th, Wednesday, October 16th, and Thursday, October 17th. The average didn't change from morning to afternoon on Tuesday, October 15th, but increased on Friday, October 18th. In comparing this data with table-graph 5.1, we can generally conclude that patrons are more likely to be working on university assignments and accessing the library computer during the mornings. In contrast with table-graph 5.1, which shows that the activity peaked on Wednesday, October 16th, there was no significant weekly variation for the average data of table-graph 5.2. As noted in the earlier

section, there were only a few patrons "talking or texting on cellphone," and their small number doesn't allow for daily and weekly analyses.

Finally, one notes in table-graph 5.2 that the average numbers for "sitting or interacting in a group" somewhat contradict the total numbers predominantly involved in the activity, as expressed in table-graph 5.1. Averages increased on Tuesday, October 15th, Thursday, October 17th, and Friday, October 18th, but decreased on Monday, October 14th and Wednesday, October 16th. Only daily variations for Tuesday and Thursday show similar patterns. This contradiction of data between table-graph 5.1 and 5.2 is presumably because of difference in time spent by patrons in the space.

Analysis of Space A as a Behavior-setting Milieu

Having discussed the recorded observations for space A, we next must consider space A as a milieu for a behavior setting, and the recorded observations as behaviors of the setting. As discussed in previous chapters, space A has the characteristics of a behavior setting. It has its behavior objects – both human (the patrons and library staff) and inanimate (the computers and seating furniture). As we will soon learn, there is also a "synomorphy" – an interdependence between the behaviors in the milieu and the features of the milieu. In other words, this setting encourages certain types of behaviors from its occupants. I also discuss the effects of the socio-physical context of space A on the types of behaviors that are observed.

To recall the description of space A as a behavior setting milieu, we note that space A is formed by the computer carrels, the computers, and chairs (fig 4.7). Apart from these, any materials brought by library patrons are also part of the behavior objects for space A. The patrons, library staff, and security guards are the setting occupants. It is clear from considering the features of the milieu that the standing pattern of behaviors would involve accessing the library computer, and so it has been proven in the observations, as demonstrated in the analysis of patrons in table-graphs 5.1 and 5.2. Patrons either "using library computer" or "writing by hand (also using computer)" outnumber patrons involved in other activities during all observation periods. Thus, the most observed behaviors are those that are encouraged by the features of the space A as a milieu.

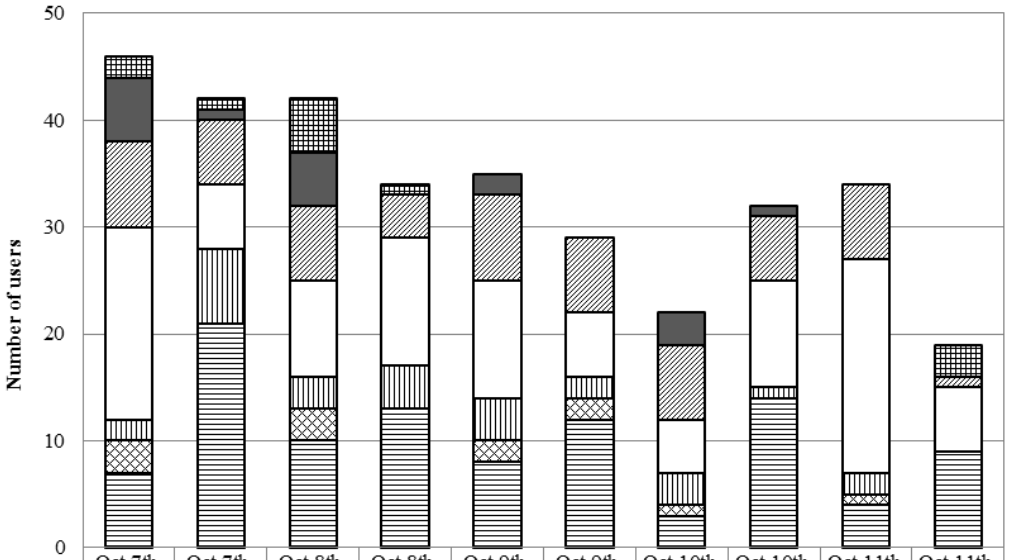
Apart from the standing pattern of behavior, certain other behaviors were also observed. For instance, the size and space of the workstations in the computer carrels discourage behaviors

like “reading written documents,” “writing by hand,” “using own computer or tablet,” and “sitting or interacting in a group.” But users were were still observed to be involved in these activities. Due to the limiting nature of the space, however, these activities were less often observed than computer use. We can also consider the effects of the physical context of space A to understand why some of these behaviors occurred. Most importantly, there was a significant number of users “sitting or interacting in a group” in space A. To recall the physical context of space A, it is surrounded by circulation pathways, the group study area, the print/copy station, and the library front desk. Patrons “sitting or interacting in a group” could have used the space after crossing paths in space A, migrating from the group study area, or using it because of lack of space at the group study area. The features of the milieu in space A and its physical context have thus had decisive effects on the kinds of behaviors that were observed there. This shows an interdependence (which Barker calls “synomorphy”) between the features and the observable behaviors, independent of other such spaces around space A.

Having analyzed space A as a behavior setting milieu, I now turn to space B, which works in a way considerably different from space A. I first discuss the comparison of predominant activities in space B, before moving on to the average numbers comparison and the discussion of space B as a behavior setting milieu.

Analysis of Predominant Activities in Space B

Having described the data for predominant activities, average numbers, and behavior-setting perspective in space A, we can now describe observational data for space B. All observational data have been compiled in table-graphs 5.3 and 5.4. I first discuss table-graph 5.3 and the predominant activities in space B, and then discuss the average number of users involved in different activities. The section ends with a discussion of space B as a behavior-setting milieu.



	Oct 7th, 10:30am-12:30pm	Oct 7th, 2:30pm-4:30pm	Oct 8th, 10:30am-12:30pm	Oct 8th, 2:30pm-4:30pm	Oct 9th, 10:30am-12:30pm	Oct 9th, 2:30pm-4:30pm	Oct 10th, 10:30am-12:30pm	Oct 10th, 2:30pm-4:30pm	Oct 11th, 10:30am-12:30pm	Oct 11th, 2:30pm-4:30pm
Sitting idle alone	2	1	5	1	0	0	0	0	0	3
Reading written documents	6	1	5	0	2	0	3	1	0	0
Writing by hand	8	6	7	4	8	7	7	6	7	1
Using own computer or tablet	18	6	9	12	11	6	5	10	20	6
Writing by hand (also using computer)	2	7	3	4	4	2	3	1	2	0
Texting or talking on a cellphone	3	0	3	0	2	2	1	0	1	0
Sitting or interacting in a group	7	21	10	13	8	12	3	14	4	9
Total	**46**	**42**	**42**	**34**	**35**	**29**	**22**	**32**	**34**	**19**

Table-graph 5.3 Comparison of predominant activities and number of users in space B: Monday, October 7th, 2013 – Friday, October 11th, 2013

We begin with table-graph 5.3, which provides a summary of space B's predominant users during the observation times of Monday, October 7th to Friday, October 11th. Looking at the table-graph, one notes that there was a small number of users "sitting idle alone" in space B (0-5 users). These numbers decreased from morning to afternoon on Monday, October 7th, and Tuesday, October 8th, and increased on Friday, October 11th. There were no users "sitting idle alone" on Wednesday, October 9th and Thursday, October 10th. These data indicate that users were involved in more productive activities during these days of the week. Users "sitting idle alone" could have been waiting for peers to arrive or spending leisure time away from university assignments. The decrease in non-productive activities could be because of increased-schoolwork demands during the afternoons. The increase on Friday, October 11th is probably because, with the arrival of the weekend, students felt less a need to work on university assignments for the week. No general trend in daily totals can be seen in table-graph 5.3 because of the small number of users.

The number of users "reading written documents" decreased from mornings to afternoons throughout the week except for Friday, when there weren't any users "reading written documents." This could be because of students studying for classes they had in the afternoons. The daily totals peaked on Monday, October 7th (7 users) and generally decreased toward Friday, when there were no users at all. Taking this into account, we can conclude that students were more involved in "reading written documents" at the start of the week and they tended to do it less as the weekend approached. The observations for "writing by hand" are somewhat similar to the observations for "reading written documents" as these activities are often interrelated. The number of users "writing by hand" decreased from mornings to afternoons on every day of the week, with Friday, October 11th showing a steep decline from 7 users to 1. Daily total numbers peaked on Wednesday, October 9th, but were more or less the same (11-15 users) from Monday, October 7th to Thursday, October 10th. Friday, October 11th saw the least number of users "writing by hand" (8). This small number and the decline from morning to afternoon was probably again because the week was almost over.

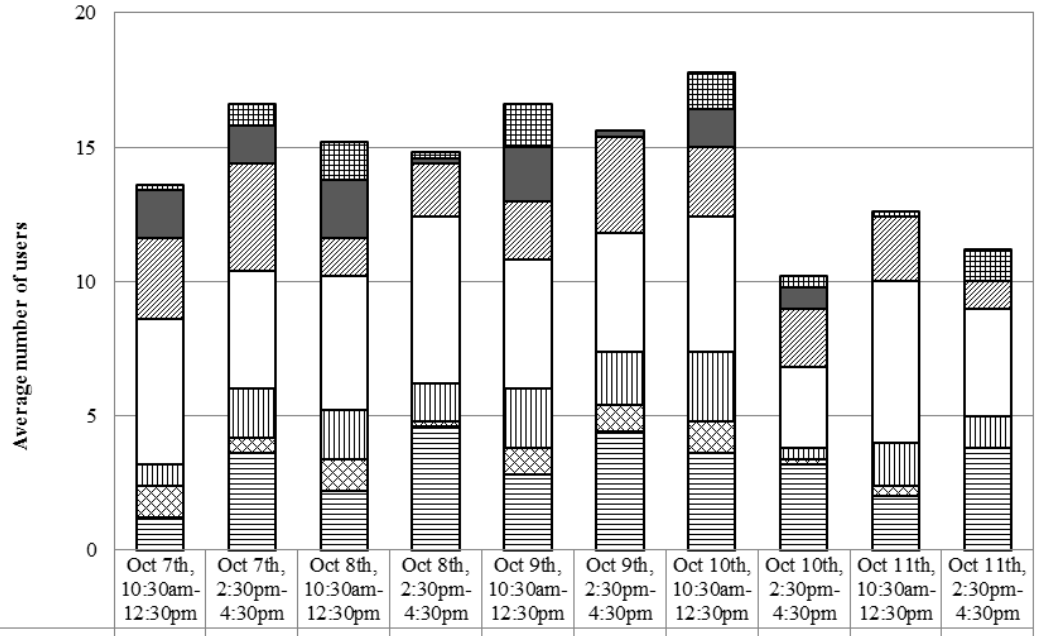
A large number of patrons were observed "using own computer or tablet" in space B (6-20 users). Their number decreased from mornings to afternoons on Monday, October 7th, Wednesday, October 9th, and Friday, October 11th, but increased on Tuesday, October 8th, and Thursday, October 10th. Daily totals remained comparable throughout the week (15-26 users). This trend suggests a constant demand for space for patrons needing to use computers. Patrons were also observed "writing by hand (also using computer)." Their numbers increased from mornings to afternoons on Monday, October 7th and Tuesday, October 8th, but decreased from Wednesday, October 9th to Friday, October 11th. This pattern is somewhat consistent with the number of users "reading written documents" and "writing by hand," and further strengthens the point that students tend to be more involved in school work at the start of the week and less so as the weekend approaches.

There was also a small number of users (0-3) observed to be "talking or texting on cellphone." Their numbers decreased from mornings to afternoons on every day of the week except for Wednesday, October 9th, when it remained the same (2 users). Looking at table-graph 5.3, one notes that the largest number of users consistently observed in space B were "sitting or interacting in a group." These numbers increased from mornings to afternoons throughout the week. Daily totals ranged from 13 to 28 users, with numbers peaking on Monday, October 7th

(28) and constantly decreasing to a minimum of 13 users on Friday, October 11th. Users could have been involved in group work for university assignments, and this activity was more prevalent during the start of the week. Group activity decreased as the weekend approached. This data indicates that that space B is a popular venue for users needing to interact in a group.

Analysis of Average Number of Users in Space B

Looking at the average number of users involved in different activities in table-graph 5.4, one notes that there is a regular occurrence of users "sitting idle alone" at most observation periods (0-1.6 users). This pattern contradicts data in table-graph 5.3 relating to predominant activities, where there were very few observations of users "sitting idle alone" predominantly. This means that, although there weren't many users "sitting idle alone" during the entirety of their time at space B, there were, however, users who would be "sitting idle alone" during a few observation periods.



	Oct 7th, 10:30am-12:30pm	Oct 7th, 2:30pm-4:30pm	Oct 8th, 10:30am-12:30pm	Oct 8th, 2:30pm-4:30pm	Oct 9th, 10:30am-12:30pm	Oct 9th, 2:30pm-4:30pm	Oct 10th, 10:30am-12:30pm	Oct 10th, 2:30pm-4:30pm	Oct 11th, 10:30am-12:30pm	Oct 11th, 2:30pm-4:30pm
Sitting idle alone	0.2	0.8	1.4	0.2	1.6	0	1.4	0.4	0.2	1.2
Reading written documents	1.8	1.4	2.2	0.2	2	0.2	1.4	0.8	0	0
Writing by hand	3	4	1.4	2	2.2	3.6	2.6	2.2	2.4	1
Using own computer or tablet	5.4	4.4	5	6.2	4.8	4.4	5	3	6	4
Writing by hand (also using computer)	0.8	1.8	1.8	1.4	2.2	2	2.6	0.4	1.6	1.2
Texting or talking on a cellphone	1.2	0.6	1.2	0.2	1	1	1.2	0.2	0.4	0
Sitting or interacting in a group	1.2	3.6	2.2	4.6	2.8	4.4	3.6	3.2	2	3.8
Total averages	**13.6**	**16.6**	**15.2**	**14.8**	**16.4**	**15.6**	**17.8**	**10.2**	**12.6**	**11.2**

Table-graph 5.4 Comparison of average number of users involved in different activities in space B: Monday, October 7th, 2013 – Friday, October 11th, 2013

In studying table-graph 5.4, one also notes that the average number of users "reading written documents" decreased from mornings to afternoons on every day of the week except Friday, October 11th, when there were no observations for the activity. This pattern parallels data for predominant activities and the reason could be because of students studying for their afternoon classes during the morning but less so during the afternoons. Daily average totals peaked on Monday, October 7th (3.2 users) and decreased over the course of the week. "Writing by hand" also shows a similar pattern of weekly variation, peaking on Monday (7 users) and generally decreasing after that. However, this activity showed an increase from mornings to afternoons from Monday, October 7th to Wednesday, October 9th, and a decrease on Thursday, October 10th and Friday, October 11th. This pattern is different from data for predominant activities from Monday to Wednesday where the numbers have decreased, which means during those days, students had short stints "writing by hand."

As discussed in the previous section on predominant activities in space B, there was a considerable number of patrons "using own computer or tablet." Average number of users for this activity decreased on all days except Tuesday, October 8th. The pattern for average counts is similar to what was noted for predominant counts (table-graph 5.3), in that the only difference was for the observations on Thursday, October 10th. Therefore, it can generally be concluded that students are more involved in using computers during the morning, possibly to prepare for classes they had in the afternoon. Daily averages for "using own computer or tablet" remained similar throughout the week (8-11 users).

Looking at table-graph 4.4, one also notes that the average number of users "writing by hand (also using computer)" decreased on all weekdays except Monday, October 7th, when it increased. Predominant counts, as seen in table-graph 5.3, show an increase on Tuesday, October 8th for this activity, and this is the only contradiction between predominant and average counts. Therefore, it can be concluded that students spend more time using computers to work on university assignments during the afternoons at the start of the week, but they spend more time on this activity during the mornings as the weekend approaches. The daily averages for "writing by hand (also using computer)" remained similar throughout the week (2.4-3.2 users).

The last two activities that were recorded for space B were "talking or texting on cellphone" and "sitting or interacting in a group." In studying table-graph 5.4, one notices that there was a regular occurrence of users "talking or texting on cellphone," and their numbers

generally decreased from mornings to afternoons, as was also noted for predominant activities in table-graph 5.3. One also notices that the average numbers for users "sitting or interacting in a group" generally increased from mornings to afternoons on all days except Thursday, October 10th. We can thus conclude that users interacted in groups more during the afternoons. However, the averages seem to be low compared to the numbers in table-graph 5.3, suggesting that many users interacting in groups met only for short lengths of time.

Analysis of Space B as a Behavior-setting Milieu

Having discussed the recorded observations for space B, I now consider space B as a milieu for a behavior setting, and the recorded observations as behavioral patterns of the setting. In studying space B as a behavior-setting milieu, we recognize that the behavior objects are the study tables, chairs, and the objects brought to the space by the patrons, i.e., books, backpacks, computers and so on. The patrons, library staff, and the security personnel are the setting occupants.

Unlike space A, there isn't a particular standing pattern of behavior dictated by space B, which incorportes a variety of behavioral patterns. This spectrum of possibilities has been illustrated by the range of behaviors observed in space B, as illustrated in table-graphs 5.3 and 5.4. There was a greater distribution of activities in space B, the most observed activities being "using own computer or tablet," "writing by hand," and "sitting or interacting in a group." This flexibility of activities was afforded by the open nature of the study tables and the lack of behavior objects that dictate specific activities, making space B fairly suitable for a wide range of behaviors whether related to university assignments or leisurely activities. As discussed earlier for space A, the interdependence between the features of a behavior-setting milieu and the standing patterns of behavior observed there is called by Barker (1968, p.18) "synomorphy." The openness of the furniture layout in space B has been translated to a greater possibility of observable activities there, and this pattern illustrates the "synomorphy" in space B.

In considering the physical context of space B, we can see that there are a few features that would make space B a preferable study spot for patrons. Space B gets excellent natural lighting from the windows, as illustrated in fig. 4.13, and almost all study tables have access to direct window light. This feature is significant because not many study spaces in Hale Library have access to windows and natural lighting. Access to direct window light, however, mean that

users would be prone to unwanted glare and reflections on computer screens, which could deter some students who wished to use their computers in space B. Students have close access to a good range of accessible necessities in space B, including restrooms, water fountains, elevators, and the leisure-study book stacks. These functional features seem to attract many students regardless of activities in which they are involved.

Having discussed the observed activities and behavior-setting characterstics for space B, we will next compare and contrast the two spaces. This discussion completes the last section of this chapter.

Comparison of Observations in Spaces A and B

We can begin comparing spaces A and B by considering the number of users observed in the two spaces. Returning to fig. 4.7 in the previous chapter, one notes that the total capacity of both space A and B is similar – around 60 users. The daily totals observed for the two spaces are also similar – 30-55 users in space A and 19-46 users in space B, as illustrated in table-graphs 5.1 and 5.3. The daily totals in space A remained fairly consistent throughout the week, whereas there is a slight decline in daily totals in space B from Monday to Friday (table-graphs 5.1 and 5.3). If one compares this pattern with total averages in spaces A and B, one notes that total averages show a different pattern. Average totals are remarkably similar and, in many cases, greater in space B as compared to space A. As discussed earlier in this chapter, this contrast is because of the difference in duration of time spent in the two spaces. To illustrate this concept, two time-duration figures showing the lenght of time spent at each space during two observation periods were constructed (figs. 5.1 and 5.2). The observation periods were 2:30-4:30pm on Monday, October 14th, 2013, for space A; and 2:30-4:30pm on Monday, October 7th, 2013, for space B.

In studying the lengths of the durations lines in figs. 5.1 and 5.2, one notes that a majority of the users spent short amounts of time in space A, whereas there were many users in space B who spent a longer time there. The average time spent in space A during this period was 44 minutes, which is a shorter duration than the average time spent in space B, which was 51 minutes. This was a trend during most observation periods for the two spaces, which possibly explains the discrepancies between the average totals and the actual total number of users, where the average totals were similar but the actual totals were greater in space A than in space B.

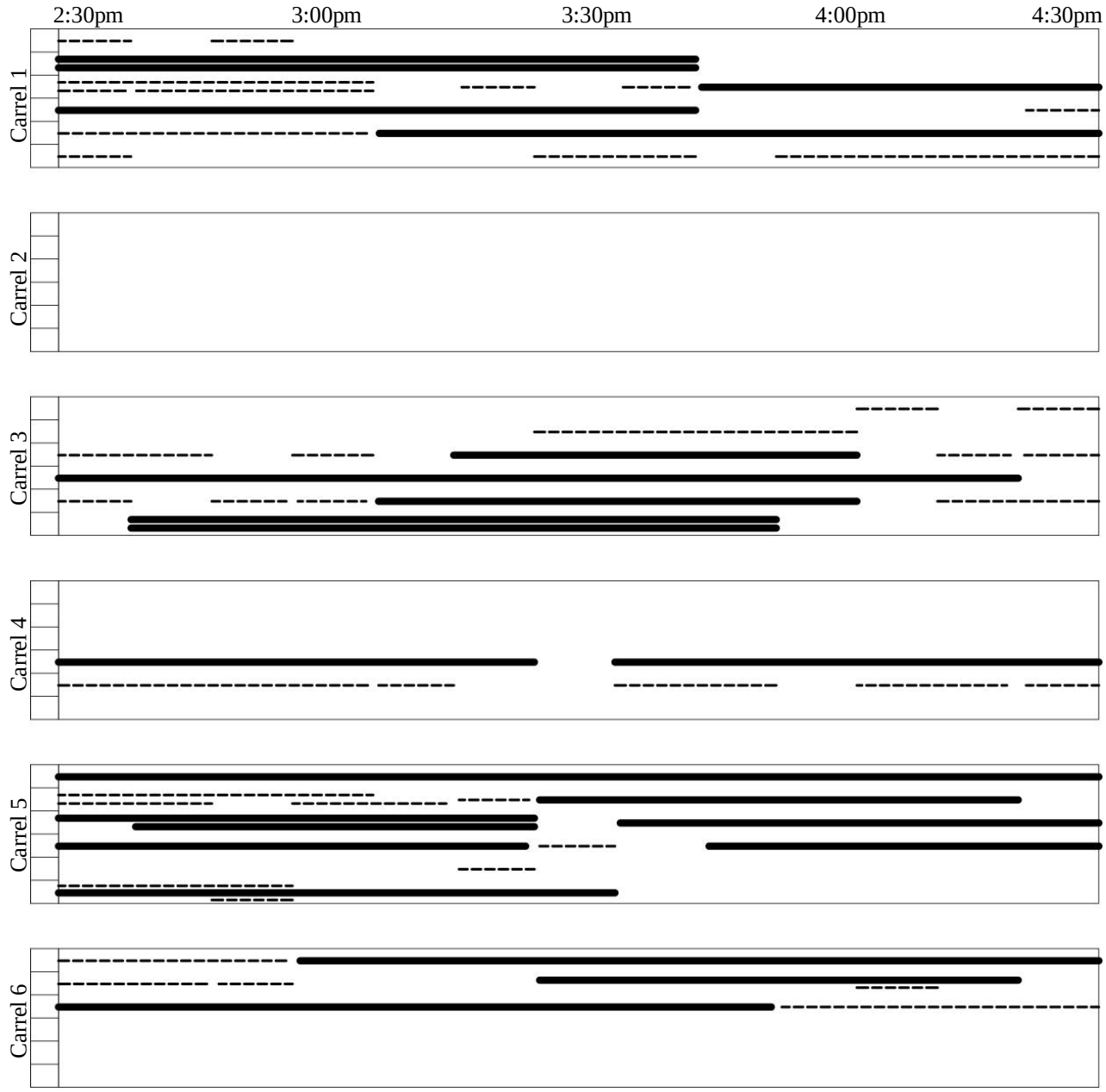


Figure 5.1 Duration of time spent in space A (Solid thicker lines represent durations more than 50 minutes): 2:30pm – 4:30pm, Monday, October 14th, 2013 (Note: Each carrel had six computer stations.)

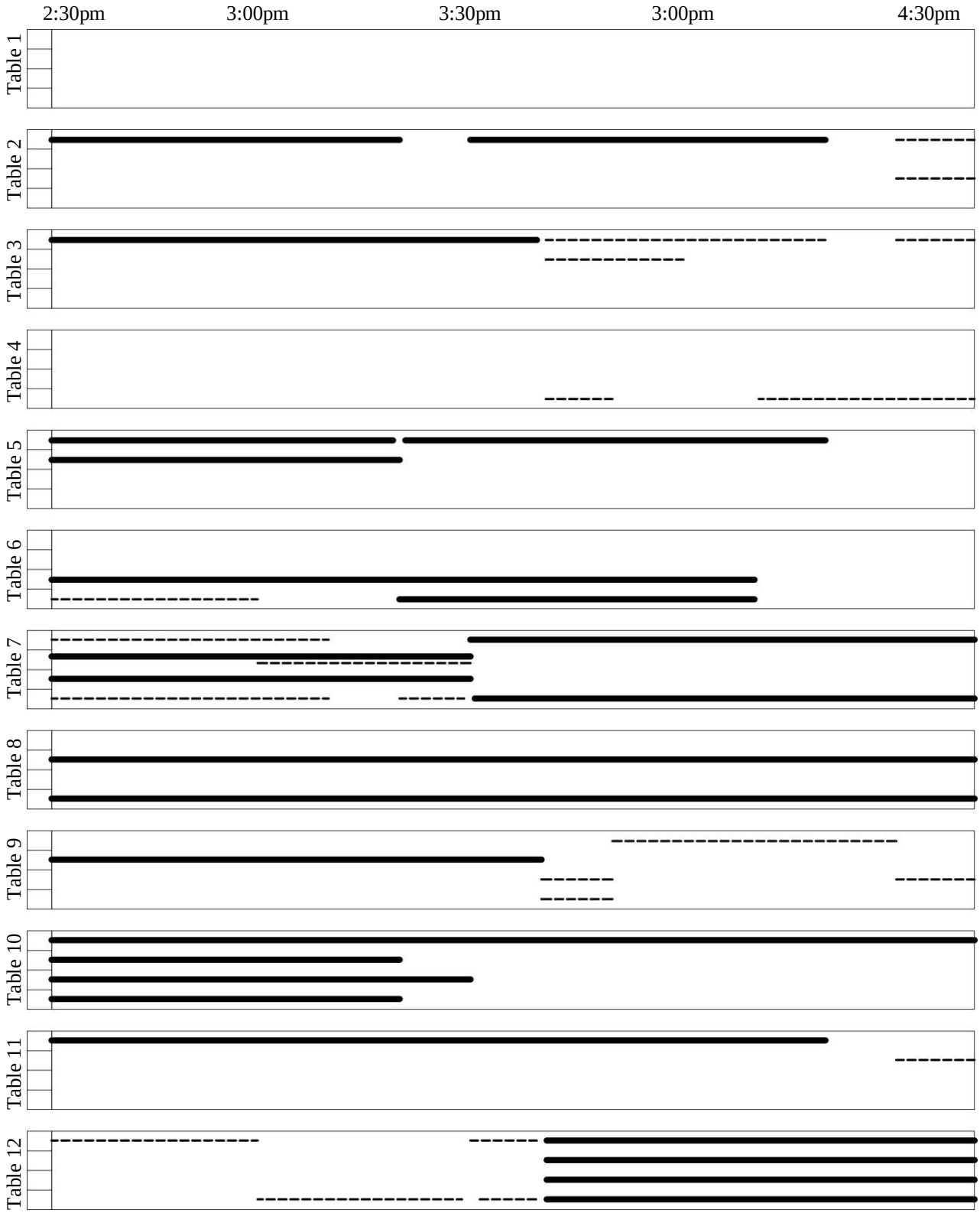


Figure 5.2 Duration of time spent in space B (Solid thicker lines represent durations more than 50 minutes): 2:30pm – 4:30pm, Monday, October 7th, 2013 (Note: Each table had four chairs, though often chairs were rearranged so that some tables had more than four and some had less than four.)

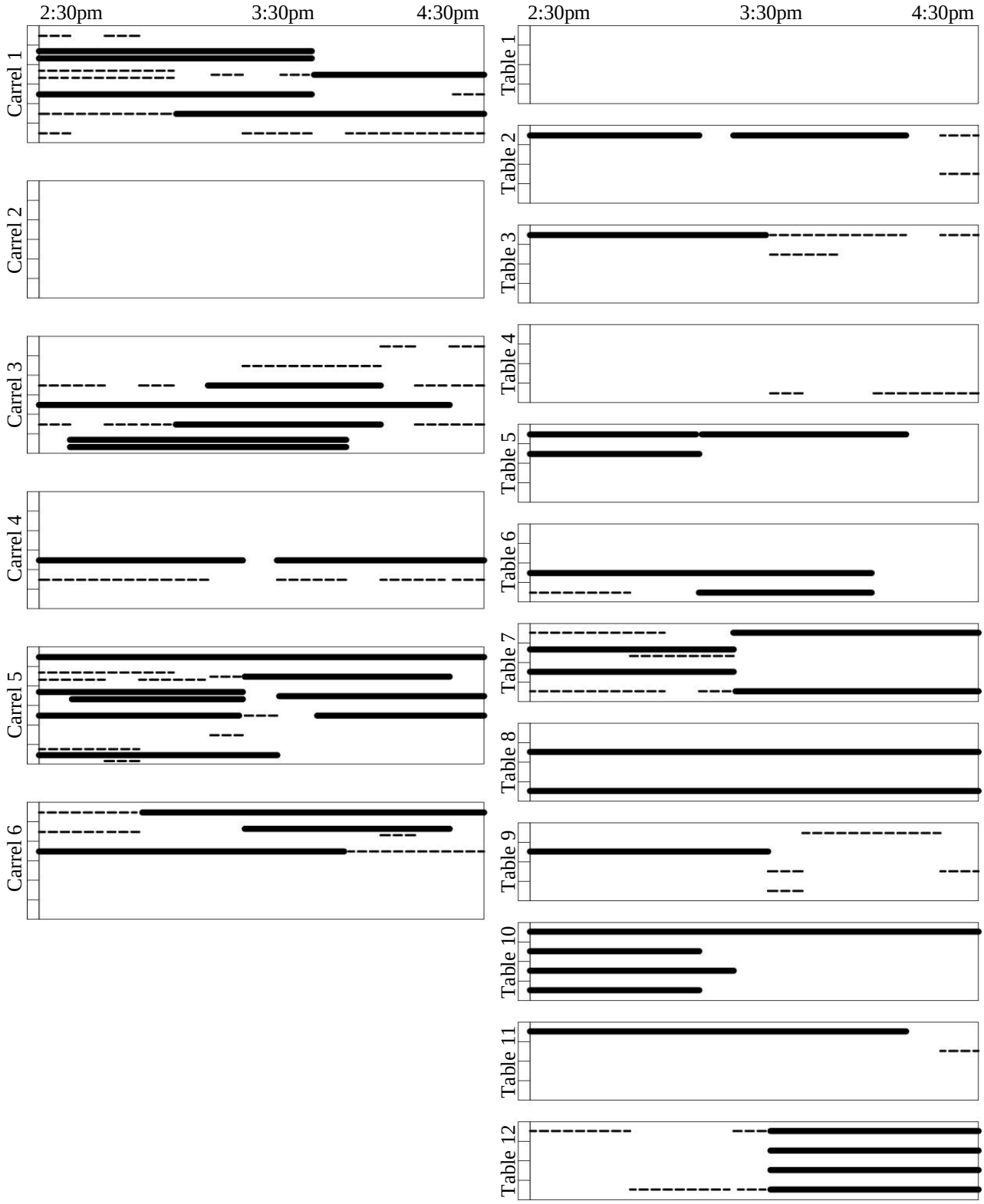
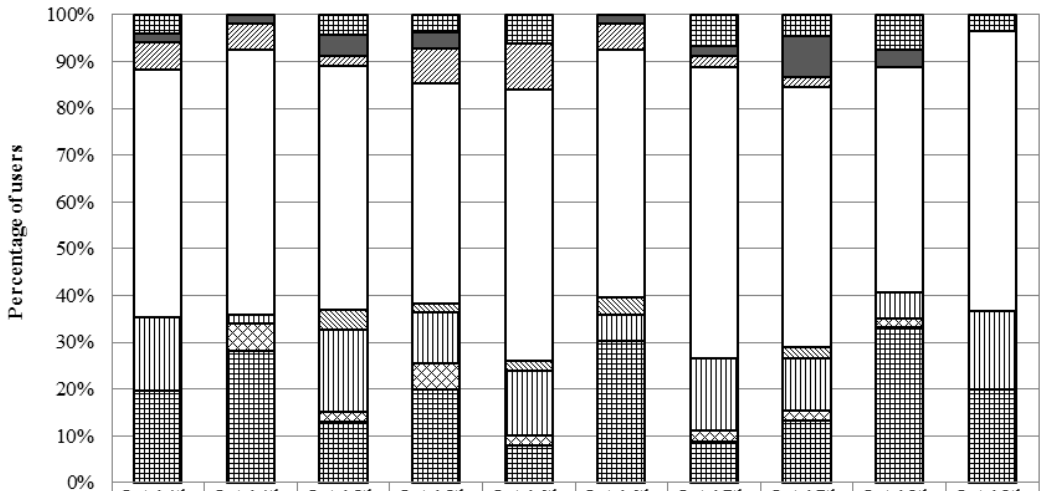


Figure 5.3 Duration of time spent in space A, 2:30pm – 4:30pm, Monday, October 14th, 2013 (left), and in space B, 2:30pm – 4:30pm, Monday, October 7th, 2013 (Solid thicker lines represent user durations of more than 50 minutes.)

To compare the predominant activities in the two spaces, two separate table-graphs were constructed for the two spaces, where the number of users involved in predominant activities is expressed in percentages and total users as shown in table-graphs 5.5 and 5.6. To compare weekly average percentages and number of users, two other tables were constructed as shown in tables 5.4 and 5.5. Looking at these figures, one notes that there is a greater variation of activities for space B as compared to space A. Table-graph 5.5 illustrates that a large percentage of patrons were involved in "using library computer" during every observation period. The percentage of patrons "using library computer" ranged from 47.3% to 62.2%, and the average was 54.6% as illustrated in table 5.4. A small percentage of patrons were observed "sitting idle alone," "reading written document," "writing by hand," "using own computer or tablet," or "talking or texting on cellphone." A slightly higher percentage of patrons were observed "writing by hand (also using computer)" or "sitting or interacting in a group."

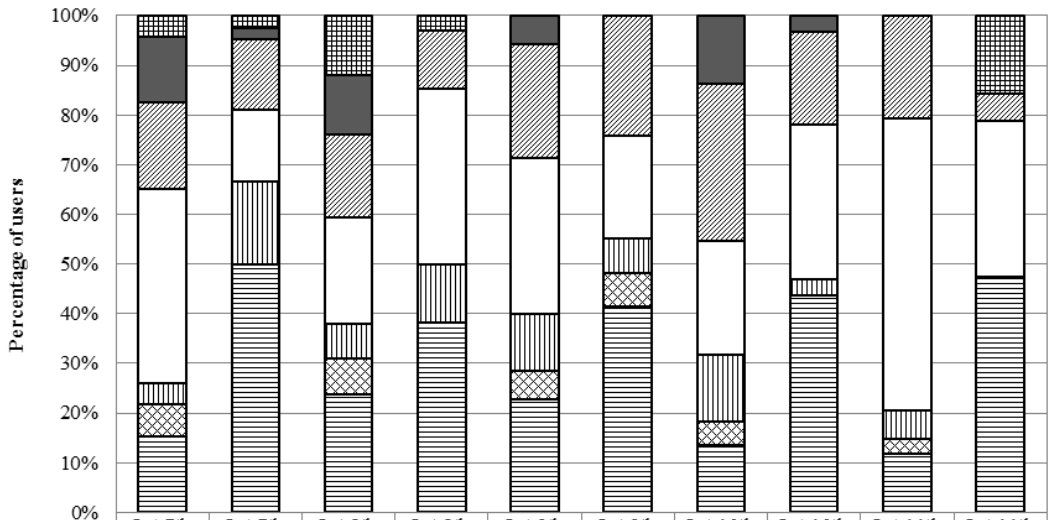
Comparing the above data with table-graph 5.6 that illustrates the percentage of users involved in predominant activities in space B, one notes that there were considerable numbers of patrons "reading written documents," "writing by hand," "using own computer or tablet," "writing by hand (also using computer)," and "sitting or interacting in a group." In space B, the percentage of patrons "using own computer or tablet" ranged from 14.3% to 58.8%; the average percentage was 30.7%.



	Oct 14th, 10:30am-12:30pm	Oct 14th, 2:30pm-4:30pm	Oct 15th, 10:30am-12:30pm	Oct 15th, 2:30pm-4:30pm	Oct 16th, 10:30am-12:30pm	Oct 16th, 2:30pm-4:30pm	Oct 17th, 10:30am-12:30pm	Oct 17th, 2:30-4:30pm	Oct 18th, 10:30am-12:30pm	Oct 18th, 2:30-4:30pm
Sitting idle alone	3.9%	0.0%	4.3%	3.6%	6.0%	0.0%	6.7%	4.4%	7.4%	3.3%
Reading written documents	2.0%	1.9%	4.3%	3.6%	0.0%	1.9%	2.2%	8.9%	3.7%	0.0%
Writing by hand	5.9%	5.7%	2.2%	7.3%	10.0%	5.7%	2.2%	2.2%	0.0%	0.0%
Using library computer	52.9%	56.6%	52.2%	47.3%	58.0%	52.8%	62.2%	55.6%	48.1%	60.0%
Using own computer or tablet	0.0%	0.0%	4.3%	1.8%	2.0%	3.8%	0.0%	2.2%	0.0%	0.0%
Writing by hand (also using computer)	15.7%	1.9%	17.4%	10.9%	14.0%	5.7%	15.6%	11.1%	5.6%	16.7%
Texting or talking on a cellphone	0.0%	5.7%	2.2%	5.5%	2.0%	0.0%	2.2%	2.2%	1.9%	0.0%
Sitting or interacting in a group	19.6%	28.3%	13.0%	20.0%	8.0%	30.2%	8.9%	13.3%	33.3%	20.0%

Table-graph 5.5 Percentage of users involved in predominant activities in space A: Monday, October 14th, 2013 – Friday, October 18th, 2013

In studying the two table-graphs, one also notes that the activities "writing by hand" and "sitting or interacting in a group" greatly contributed to space B having fewer patrons "using own computer or tablet." In space A, as illustrated in table 5.4, patrons "writing by hand" ranged from 2.2% to 10% with an average of 4.1%. In space B, however, they ranged from 5.3% to 31.8%, with an average of 18.4%, as illustrated in table 5.5. Similarly, in space A, "sitting or interacting in a group" ranged from 8% to 33.3%, with an average of 19.5%, while in space B, patrons involved in the activity ranged from 11.8% to 50%, with an average of 30.8%.



	Oct 7th, 10:30am-12:30pm	Oct 7th, 2:30pm-4:30pm	Oct 8th, 10:30am-12:30pm	Oct 8th, 2:30pm-4:30pm	Oct 9th, 10:30am-12:30pm	Oct 9th, 2:30pm-4:30pm	Oct 10th, 10:30am-12:30pm	Oct 10th, 2:30pm-4:30pm	Oct 11th, 10:30am-12:30pm	Oct 11th, 2:30pm-4:30pm
Sitting idle alone	4.3%	2.4%	11.9%	2.9%	0.0%	0.0%	0.0%	0.0%	0.0%	15.8%
Reading written documents	13.0%	2.4%	11.9%	0.0%	5.7%	0.0%	13.6%	3.1%	0.0%	0.0%
Writing by hand	17.4%	14.3%	16.7%	11.8%	22.9%	24.1%	31.8%	18.8%	20.6%	5.3%
Using own computer or tablet	39.1%	14.3%	21.4%	35.3%	31.4%	20.7%	22.7%	31.3%	58.8%	31.6%
Writing by hand (also using computer)	4.3%	16.7%	7.1%	11.8%	11.4%	6.9%	13.6%	3.1%	5.9%	0.0%
Texting or talking on a cellphone	6.5%	0.0%	7.1%	0.0%	5.7%	6.9%	4.5%	0.0%	2.9%	0.0%
Sitting or interacting in a group	15.2%	50.0%	23.8%	38.2%	22.9%	41.4%	13.6%	43.8%	11.8%	47.4%

Table-graph 5.6 Percentage of users involved in predominant activities in space B: Monday, October 7th, 2013 – Friday, October 11th, 2013

Activity	**Average% , Space A**	**Average% , Space B**
Sitting idle alone	4.0%	3.7%
Reading written documents	2.9%	5.0%
Writing by hand	**4.1%**	**18.4%**
Using library computer	54.6%	N/A
Using own computer or tablet	1.4%	30.7%
Writing by hand (also using computer)	11.4%	8.1%
Texting or talking on a cellphone	2.2%	3.4%
Sitting or interacting in a group	**19.5%**	**30.8%**

Table 5.4 Weekly average percentage of users involved in predominant activities in spaces A and B

To further reinforce this observation that the activities "writing by hand" and "sitting or interacting in a group" led to fewer patrons using computers, we can compare average numbers and weekly averages for these activities in spaces A and B. Table-graph 5.2 illustrates that average numbers for "writing by hand" in space A ranged from 0.4 to 2.8 with a weekly average of 1.16, as illustrated by table 5.5. In space B, the averages for this activity ranged from 1 to 3.6 (table-graph 5.4) with a weekly average of 2.44, as illustrated in table 5.5. This pattern is similar

to what was inferred from the analysis of weekly percentage of users involved in predominant activities. Specifically, if we look at table-graph 5.2, the average numbers for "sitting or interacting in a group" ranged from 0.4 to 3.4, with a weekly average of 1.9 (table 5.5). In space B, however, the average numbers for this activity ranged from 1.2 to 4.6, with a weekly average of 3.14 (table 5.5). This pattern is similar to inferences from the comparison of predominant activities in the two spaces, as illustrated in table 5.4.

Activity	**Weekly averages, Space A**	**Weekly averages, Space B**
Sitting idle alone	0.62	0.74
Reading written documents	0.5	1
Writing by hand	**1.16**	**2.44**
Using library computer	6.88	N/A
Using own computer or tablet	0.16	4.82
Writing by hand (also using computer)	1.42	1.58
Texting or talking on a cellphone	0.58	0.7
Sitting or interacting in a group	**1.9**	**3.14**

Table 5.5 Weekly average number of users involved in different activities in spaces A and B

This chapter has analyzed the observations in the two spaces by looking at predominant activities, average numbers and behavior-setting milieu features. The chapter also compared the two spaces and the observations recorded there. We can now look towards general conclusions by synthesizing the results of this study and integrating these results with other studies. This is the aim of the last chapter of this thesis, which follows.

Chapter 6 - Conclusion and Discussion of Further Implications

As explained in the introductory chapter, the main focus of this thesis is looking at changes incurred by study spaces in the modern academic library. This thesis has examined user qualities of library spaces by employing a behavior-setting approach to study two contrasting spaces in Kansas State University's Hale Library. The major research methodology used was behavioral observation and mapping. Earlier chapters covered the literature on library history, research on library use, and studying libraries as behavior-setting milieus. Chapters also discussed the research methods employed for describing and studying the two Hale Library spaces.

Behavior-setting analysis has been useful for describing and comparing Hale Library's two study spaces because this theoretical approach emphasizes space and environment as well as user behaviors and activities. According to behavior-setting theory, we can identify patterns of behavior in a particular space, regardless of the varying occupants making use of the space (Heft, 2012, p. 31). Within the same pool of users, in other words, we can see differences in patterns in two contrasting spaces. Having described the two spaces at Hale Library physically, the author recorded user behaviors using behavioral mapping. The method involved minimal levels of intrusion as observations were recorded from vantage points by the author as an unnoticed outsider. Comparisons of predominant activities and average number of users involved in different activities formed the basis for the analysis of the two spaces.

For the author's convenience, additional methods of behavior-setting analysis like behavior-episode accounts (continuous description of behaviors of individual users in a space over the period of their stay; Barker, 1987, pp. 1415-17) have not been used in the current research. To maintain an outsider's perspective of observed behaviors, one-to-one interviews with the users have also not been used. Both these methods, however, would provide greater information in regard to user behaviors and preferences for the two spaces (Groat & Wang, 2013, pp. 243-45; Zeisel, 1981, pp. 112-123). This information could also help better interpret the observed data and would be an important methodological complement for further library research.

As mentioned in the introductory chapter, this thesis is targeted towards librarians and library designers who could benefit from studying the performance of library spaces with the

thought of redesigning them. Although the research has spatial and temporal limitations, having been conducted in two small library spaces over the period of two weeks, I would like to speculate on the future of libraries based on my research findings. I begin by comparing these findings with other research on libraries. This comparison will help me form a well-rounded conclusion and suggest implications for how digital technologies might be better incorporated in academic-library design.

Comparing Current Research Findings with Other Library Research

The current research found that both computer stations and study tables were equally popular for patrons using Hale Library, illustrated by the similarity in average and total number of users in the two spaces. One can also infer that users' behaviors were mostly dictated by the behavior-setting milieus and their characteristics. This, however, is not all that affects user behavior in a space. The context of a milieu also plays an important role, as discussed in chapter 5. By looking at patterns established in the previous chapter, we can generally conclude that, in a particular behavior setting, behaviors of different individuals can be similar. We can compare these results with Barker's study of child behavior across different settings. He found that there was a greater similarity in actions of different children in the same setting as compared to actions of the same child in different settings (Heft, 2012, p. 31).

In comparing the current research with the Tampere Library study discussed in the earlier literature review (chapter 2), we can see a clear distinction in predominant activities. The Tampere Library study (Matthews et. al., 2013, p. 183) concluded that the most common activities were "sits alone reading or writing" and "sits or stands alone with library computer." This study suggested that the library was mostly used for individual work on university assignments. Use of computers in the Tampere Library accounted for a large percentage of activities there – 35%. In the current research, the most common predominant activities were "using library computer" in space A, and "sitting or interacting in a group" in space B. Other common activities in both spaces were "writing by hand" and "writing by hand (also using computer)." This suggests that students at Hale Library are mostly involved in university assignments, with a greater focus on group interaction. Both the findings here and for the Tampere Library suggest that the academic library is still a successful study space.

We can also compare the current research with a study of the Thomas and Dorothy Leavey Library at the University of Southern California (Gardner et. al., 2005, pp. 405-420). The main objective of this study was to understand students' preferences, activities, and what students thought would be welcome additions to the library. Understandably, this research employed students surveys on standardized questionnaires. Gardner and her colleagues found that the most common student activities in the library were "study alone," "use a computer for class work," "study with a group," and "use a computer for personal reasons" (Gardner et. al., 2005, p. 409). Use of computers constituted a large percentage of activities but, more importantly, most students stated that they used the library to "study alone." Duration of time spent at the library was less among undergraduate students and higher among graduate students. These findings point to both similarities and differences when compared to the current research. While use of computers was a popular activity in both studies, individual study was more common in the University of Southern California library, whereas group study was more common in Hale Library. Due to lack of information in the current research relating to the education level of students, a correlation between the length of time spent using the Hale Library spaces and the level of education could not be established.

Another study relevant to the current research was conducted at the University of New South Wales Library. Bailin (2011, p. 342) evaluated this library's refurbishment in regards to users' space needs. Like Gardner's study just reviewed, this research also employed standardized surveys distributed to volunteer student respondents at the library. The findings of this study indicated that the most popular library spaces were computer stations and lounge areas, followed by quiet study spaces. The least popular library spaces were the group study rooms (Bailin, 2011, pp. 346-50). This would suggest that students didn't prefer group study and instead opted for individual study. It was also found, however, that lounge areas in the library were used as group-study spaces rather than as designated group-study rooms because most students preferred the informal nature of the lounge areas (Bailin, 2011, 348-49). Compared to the current research, one notes that computer use and group study are common activities in both Hale Library and the University of New South Wales library.

I have compared the current research with other studies related to academic library use. In the following section, I speculate as to the future of academic libraries, especially in regard to digital technology.

The Digital Future of Academic Libraries

It is difficult to predict what will actually happen to academic library spaces in the future, but Childs et al. (2013, p. 201) point to the importance of having general ideas about future library trends. O'Connor et al. (2009, p. 57) state that it is important to understand the future path of academic libraries but also point to the difficulty of such predictions, especially transferring current concepts into future changes. These researchers also emphasize the importance of moving forward and embracing technological advancements, without abandoning the long-standing purpose and mission of academic libraries. Matthews et al. (2009, pp. 19-21) insist that the current literature speculating on the future of libraries lacks insight into how physical spaces in academic libraries will be used.

Childs et al. (2013, p. 201) conducted a survey and interviews in 2011 with a range of individuals associated with academic libraries – mainly senior librarians and academics – regarding current trends in libraries. The study focused largely on technology, shared services, and academic library space. Most of the respondents agreed that technology was a very important aspect of academic library space. Another important conclusion was that technology would continue to be part of the evolution of academic libraries, rather than making library space unnecessary. Some respondents suggested that physical resources like books and archives would continue to be used by students, along with digital technology for accessing information. A few others expressed their concern for creating a divide between digital resources and physical resources (more common in the US) and the conflicts to which this divided system might lead (Childs et al., 2013, pp. 202-03).

Most of the respondents interviewed in Childs et al.'s study predicted that there would be campus library spaces in all educational institutions by 2021. There were a few strong sentiments expressed regarding physical library space. Some respondents questioned whether there would continue to be libraries according to the traditional definition. Others suggested that library space would be very important to both faculty and students, while still others explained that physical library spaces wouldn't be necessary in all academic institutions. Teaching methods were also seen as an important factor for changes in academic libraries, with most respondents agreeing that teaching methods always strongly influenced changes in library space and would continue to do so in the future (Childs et al., 2013, pp. 204-06).

Sennyey et al. (2009, p. 252) approach the issue of adjusting to future changes in the academic library from a definitional perspective. The word "library" is interchangeably used to refer to the physical space of a library, the collection housed in a library, or the agglomeration of librarians, staff, and tools responsible for preserving academic resources. Sennyey et al. believe that the academic library of the future cannot focus on all three aspects equally. They insist that libraries have to focus on one or two of these aspects to be sustainably successful. Sennyey et al. also understand that emphasizing physical space would be valuable and well-appreciated. They believe, however, that academic libraries emphasizing services relevant to digital advancements would be most successful. They observe that the transition to a digitally dominant environment in academic institutions, which began more than a decade ago, will continue to require rapid changes in library needs (Sennyey et al., 2009, 256-57).

Discussion of Hale Library and Academic Libraries in General

As one component of this current study, the author interviewed Roberta Johnson, Director of Administrative and Information-Technology (IT) services at Hale Library, on October 1st, 2013. She was asked questions about the library in general and more focused questions about the two spaces studied in this thesis. A complete transcription of this interview is provided in the appendix. Johnson explained that her responsibilities include managing the layout and furniture design at Hale Library. She proposes specific furnishings and layout designs, and the Dean of Kansas State Libraries and an administrative committee then review her recommendations and make final decisions. Johnson explained that there hasn't been a major change to the Hale Library layout since the 1996 renovation, except for the addition of a group-study section on the west end of the second floor main hall (shown in fig. 4.7). The book stacks there were moved to create a space for students to work in groups with whiteboards.

According to Johnson, the library does not document furniture layout changes in any definitive preplanned way. Rather, incremental changes are made as needed, when funding is available. In addition, Johnson noted that Hale Library doesn't conduct or refer to any library research when making changes in Hale's layout or furnishings. Instead, the changes are made according to consultations with state contractors, furniture vendors, and professors on campus, so that the library can take advantage of the state purchasing system. Johnson pointed out that Hale's administrative department controls these decisions. She also explained that the library

also had senior design students evaluate different library spaces and suggest changes in carpet colors to improve wayfinding. The library staff have conducted surveys on the kinds of furniture students like and don't like, and decisions are made based on that feedback.

According to Johnson, the computer carrels were placed at the center of the main hall (in space A) during the 1996 renovation because all data lines are only accessible at that central location under the floor. To change the placement of these lines would require extensive reconstruction. The library had planned to replace the study tables in space B with newer furniture but in library surverys, students indicated that they liked the tables and their placement in regard to the natural lighting available. Because of this student input, the library maintained the original spatial arrangement. In addition, adding computer carrels in space B was not feasible because there are no data lines within the curved walls.

Johnson also pointed out that keeping the library quiet is not as an important priority as it was formerly. She explained that students seem to be divided on whether the library should be a quiet place and whether students should be allowed to converse in groups. Some students suggested that the library should add more designated quiet floors; the staff responded by adding graduate study rooms on the third floor. Johnson explained that changes in student assignments and an increasing class emphasis on group work has led to the library sometimes being too noisy.

Johnson believes that the two spaces studied in this thesis are both successful, simply because they are always occupied. Productivity to her is students spending time at the library doing direct school work or taking a rest so they can return to school work refreshed. She does, however, believe that the computer carrels aren't practical anymore and need to be replaced, although she hasn't had any complaints about it from the students. She envisions computer carrels that are more flexible and that allow groups of students to work at a single station.

Johnson explained that Hale Library is currently considering ways to add more study rooms and to replace single-user computer carrels in the library. She believes that student activities in a library can be partly controlled via particular seating arrangements. She also believes that libraries today are generally moving in a book-less direction, for example, the Hunt Library at North Carolina State University, which has opted for a heavily electronic infrastructure. Other libraries are removing book stacks and replacing them with more “usable” space for student study groups. She again mentioned the Hunt Library, which has over one hundred different types of seating. She also mentioned that there is an increasing demand for

electric outlets and wi-fi services for portable devices. As a result, libraries need to be flexible technologically, and keep up with shifting student demands.

A successful academic library is one that caters to the entire range of student needs. Applegate's (2009) study on the usage of spaces at the Indiana University Library demonstrated that different spaces are used by varying numbers of students, depending upon different stages of the semester. Each library space had its own appeal among students, and library patrons surged at the end of semesters. While libraries have to compete in popularity with spaces like student centers, they are still the preferred choice among students for academic purposes (Applegate, 2009, pp. 341-46).

From studying the two spaces in Hale Library and other academic library studies, it can be inferred that the two aspects of libraries that today are shifting most quickly are library collections and physical spaces. Libraries used to pride themselves on the size of their collections and the need to add to those collections. Libraries enjoyed large budgets for acquiring books and other written materials. Today, however, libraries must make the transition from printed to electronic media. For library patrons, the main concern is accessing these resources. Today's patrons more often favor electronic rather than paper resources because of the ease in acquiring digital materials when needed (Ross & Sennyey, 2008, 149).

The shift to electronic resources has a direct impact on a library's physical spaces. Digital resources can be accessed by patrons regardless of their geographical location. In addition, libraries that are physically small can house vast digital collections by acting as the liaison between patrons and these collections. Library spaces dedicated to housing collections are becoming fewer, whereas the study areas and public spaces in libraries are increasing. This means that academic libraries as a place must compete with spaces like student centers or food courts (Ross & Sennyey, 2008, pp. 149-50). Ultimately, the academic library has to re-evaluate its mission, find ways to accommodate both traditional spaces and digital technologies, and thereby carve out a new identity that can accommodate rapid technological and educational changes.

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Appendix A - Interview with Roberta Johnson, Director of Administrative and Information-Technology Services

What follows is the author's interview with Roberta Johnson, Director of Administrative and Information-Technology Services. This interview was conducted on October 7, 2013, and was digitally recorded. The interview has been reproduced with Johnson's permission.

Sachit Manandhar: Does Hale Library document furniture layout changes?

Roberta Johnson: No, not anything official. The second floor changes – there were some sort of general blueprints put together as far as how it was going to go out. We moved stacks of material from the west end to make it a collaborative space. When we move large amounts of shelving, I will do that, but we don't really keep an ongoing record partly because the furniture moves all over the place. We try to put it where we think the students want it and then it sort of goes around from there. So, I don't have anything official at all, and we don't really have an official policy regarding furnishings. When we hear that there's a need, like in the case we heard that there was a need for a collaborative space, groups of students and whiteboards, and mobile furniture. We tend to then address those needs as it comes.

S.M.: Does the Division of Facilities design the furniture and furniture layout?

R.J.: We work with a couple of on-site contractors. We're not limited to but encouraged to use state contractors. We have a couple of furniture vendors that come in and help us. We've had help from professors at the Interior Design department too, to bring in something really different and see how that was used as opposed to the traditional big sofas. So, we tend to get help from within the state purchasing system, but we control that over here. I'm really responsible for putting the designs together and then the Dean and administrative team reviews them and approves them basically.

S.M.: So, does the Division of Facilities have a schematic plan of the layout?

R.J.: They have the floor plan of the building and the fire code footprint, but none of that includes furnishings. We don't keep plans that show the furniture layout.

S.M.: So, you design the layout according to the demands?

R.J.: Yes, and we collaborate with a vendor or a professor on campus and any expertise available. Six years ago, we went to senior design students and let them go to spaces. Wayfinding carpet differentiation came from them. We also use feedback and other inputs.

S.M.: What kind of methods do you use to get feedback?

R.J.: We conduct surveys – chairs that people like or don't like etc., and we make a decision based on that.

S.M.: What was the idea behind placing the computer carrels in the middle of the hall on the second floor and the study tables up against the curved wall?

R.J.: In the original addition in 1997, all the power and data lines were put there in the center under the concrete floors. So to change that would take extensive work. We've tried to replace the study tables next to the curved wall, but students like that because of the natural light. So, we always go back to those tables.

S.M.: Why aren't there any computers in the study tables next to the curved wall?

R.J.: There aren't any data lines there and right now, every line is full. We also have the right amount of computers in the library right now.

S.M.: Does Hale Library research library seating studies in the US?

R.J.: Not us, but vendors like SteelCase do the studies and come to us to show them. But for example, in the Hunt Library at North Carolina State University, research has been done.

S.M.: Is it a priority to keep the library quiet?

R.J.: Depends upon who you ask. Students ask for more quiet zones, but they also have different expectations. International students, especially, expect quiet spaces. We have provided two graduate study rooms which are private and quiet, because graduate students are involved in less collaborative work. It's a balance between quiet work and group work right now. People don't like being shushed. We're fortunate to have a lot of traffic, which we work very hard for. On the flipside, we have noise. I'd like to have a no-cellphone policy, as they're disruptive. However, I don't want to police the students. In my experience, the students are the best police. They use the instant-messaging system to let us know when there's a lot of noise, and then we can intervene.

S.M.: Are the two spaces we discussed before – the computer carrel cluster and the curved wall seating – successful in your opinion?

R.J.: Yes, I think so. The second floor, in general, is most successful. I don't get a lot of complaints about the spaces there.

S.M.: Do you think they're productive, in terms of students being involved in schoolwork or leisure activities?

R.J.: That is subjective. The leisure time spent there can be productive in the long run, if you have a rigorous schedule. That is still productive, and very personal. The survey that we do every four years tells us that these spaces work for them. We get around 6000 students every day through the gates. As resources become more virtual, the spaces change, and what's needed to be successful changes too. We're trying hard to make a library that doesn't need a librarian. Just because you don't need to be here isn't a bad thing. Success is hard to define. If people come and sit and stay, I think that's productive.

S.M.: What kinds of changes is Hale Library looking at?

R.J.: Study rooms. There are infrastructure problems. The computer carrels on the second floor, that we discussed about, need to be replaced. I would like something more flexible and spacious, where more people can work at a single station. I think we can control activity with seating. Like we see that the soft seating is often used for sleeping. But other ways too, like we can use book stacks to separate two spaces.

S.M.: Where's library design and librarianship heading, in your opinion?

R.J.: Depends on where you are. North Carolina State has a new library which is heavily electronic. Half of the resources there is electronic. There is a tendency to clear out book stacks to make way for usable space, that cater to small study groups. This is challenging at Hale Library. For example, we're trying to put varied seating furniture. Hunt Library at North Carolina State has over a hundred different types of seating. It's about giving students choices. I'm in favor of laptop trays to encourage people to bring laptops. People can eat or drink there. Mainly, we're trying to prepare for portable device situations. The book checkout and leave situation of thirty years ago is over. In 1996, we have traditional wooden chairs. Now we've added soft seating with wheels to make seating layouts more flexible. Assignments have changed. More group projects require more group work places, and the library is working to serve that purpose.