CHAPTER 2

REVIEW OF THE LITERATURE

A review of the literature revealed three distinct categories in which the literature can logically be reported. The first area reviews the history of space utilization in general and space utilization involving electronic catalogues/gadgets and information technologies. The next area includes recommendations and suggestions about space allocation for catalogues/gadgets and information technologies. The last area involves space allocation and space use in the library.

The problems of space allocation in the library are as old as the library itself. The Alexandrian library which flourished from the second century B. C. to 47 BC “was greatly enlarged and enriched … and, by the middle of the first century BC, it contained more than 700,000 rolls” (22). Clearly, space was a problem and there was a need for library expansion even in the Hellenistic period.

In the 15th century, the invention of the printing press with movable type resulted in an increase in the supply of books. “Libraries increased in number and in size; and learning … was now within reach of any person who wished to peruse it” (23). National libraries formed during the 17th century include the Prussian State Library in Berlin, the Kongelige Bibliotek in Copenhagen, and the National Library of Scotland (24). National Libraries continued to increase in number in the 18th and 19th centuries. Reading became fashionable for women and all classes of the people, thus increasing the size, types, and number of libraries (25). The growth of the Library of Congress is indicative of the space difficulties experienced by many libraries. In 1800 Congress appropriated US$5,000 (US$ Five thousand only) for books and housing for the collection in the Congressional building. By 1815, the total collection was less than 5,000 volumes. By 1851, 55,000 volumes made up the collection; in the late 20th century, the Library of Congress occupied three buildings and contained approximately 90 million items (26). The lack of space in libraries continues in the 1990s.

23. Ibid P. 43
24. Ibid P. 48
25. Ibid P. 50
26. Ibid P. 68
Some information storage devices help reduces the space requirement dilemma by providing way to miniaturize records. Computer software, compact discs, and microforms compress information in records and reduce the space required for storage. Information increases daily; scientific data alone double every 20 months (27). As information increases, so does the need to use machine-dependent formats and machines to enable the use of information. Although miniaturized records and compact storage help, they do not solve space problems.

In the recent past, changes in information technologies, especially the use of automated catalogue systems, CD-ROMs and now Internet, transformed the way space is used in the library. In the mid 1980s, few libraries had automated system in India for circulation and information access. Most of these systems operated on mainframes located outside the library building. By the 1990s some libraries started using mini-computers located within the library buildings. But by the year 2000 decreasing hardware and software costs and an increase in the availability of automation software continue to provide a greater likelihood that the most of the Indian libraries are planning for automation.

2.1 Space Utilization Recommendation:

Several authors, including Cohen and Cohen (28), Klasing (1981), (29) and Boss, (30) offer recommendations in an attempt to help library media specialists resolve issues regarding space utilization. Space recommendations for use with new technologies are often out of date by the time printing and distribution take place. The constant changes to newer and different microcomputers and their associated peripherals, which may be larger or smaller than ones they replace, make many guidelines difficult to use. While microchips and circuitry are continually improved and further miniaturized, the actual hardware of a microcomputer must still be large enough for patrons to use comfortably. Screens, keyboards, printers, desks, chairs, and the surrounding space to use them must be adequate, but determination of adequate space is difficult.

Actual space recommendations for microcomputer workstations range from minimum of 16 square feet to accommodate a microcomputer and printer to 40 square feet when including work space for users (31).

Though different uses of microcomputer workstations create different need for space, Cohen and Cohen stated that 30 square feet per user are necessary in the library for any type of use (32). Working with equipment such as a microcomputer terminal and microfiche reader/copier requires more room than working with books. The equipment occupies space; the reader needs space, and the reader benefits from having a place to write. All machine-dependent formats require more room than a traditional study carrel (33).

Klasing stated, “The rapidity with which technology is changing, especially the miniaturization of delivery systems, makes it difficult to predict what types of equipment and spatial accommodation will be needed in the future” (34). It is recommended that buildings have maximum flexibility to be better able to handle technologies of the future (35).

Boss stated that plans for space must be made not only for equipment, but also for air circulation around the equipment. Added heat produced by computer systems may increase air-conditioning requirements by as much as 40% (36).

Hall (1966) indicated that there are four distinct distances of personal space in public areas. Intimate distance is zero to one and one half feet. With this distance, sight, olfaction, and heat from the other person’s body as well as the sound, smell, and feel of breath all combine to indicate the unmistakable presence of another body. Personal distance is the small protective area that persons maintain between themselves and others. This distance is one and one half feet to four feet. According to Hall’s study, library patrons feel comfortable at a social distance (four to twelve feet), which is the distance at which people can work in the presence of others without feeling the need to talk to others. Public distance is at least twelve feet and is the distance at which human beings can take evasive or defensive action (37). Hall also recommended back-to-back seating because this type of patron seating arrangement allows human beings to have a feeling of isolation within a small space.

The information explosion, automation, financial constraints, and simply running out of room have combined to place considerable pressure on already stretched library facilities. Older library buildings designed at the turn of the 20th century and after the independence may be efficient, may be able to handle newly automated systems and may be make room for materials of

33. Ibid. p. 91.
35. Ibid. P. 9
varying formats, but today’s librarian, more often than not, find herself or himself in a situation where the space needed - and available - is not only for two different functions, but the functions are mutually exclusive.

Librarians must plan careful and use every square foot of assigned space in a manner, which will help them fulfill their library’s mission. Fraley/Anderson says:

“Automation of library functions generates changes in job responsibilities which in turn affects space allocation. The two problems that have to be dealt with concern people and organizational change. For example, the addition of a word processor not only requires redesigning work stations, but redefining tasks and work relationships, because it affects not only the number of staff needed to perform a task (where before automation perhaps three people were involved, now only one is necessary), but how the staff readjusts - both physically and temperamentally”(38).

About Library Users he further says that:

Planning skill and knowledge of library operations are important in defining the nature of the user problem since this problem must be considered in all of the space-planning steps. A common problem in libraries is a lack of seating space for patrons. When the patrons rearrange furniture constantly, and the service points are not accessible, user are communicating that the library has not translated its mission into an effective space utilization plan. Over the years, the seating space can be eroded to such an extent that the total library operation is affected (39).

The diversity of services in the public library has caused some available user space to be committed to one large room, which can serve as a gathering place for the community. The availability of technology for transmitting programmes and meetings by disk and teleconferencing mandates a viewing room, perhaps one with classroom seating.

Noise is another problem requiring space reconfiguration as a solution. The photocopy machine, microform readers, conversations at the reference desk, typewriters, system printers, slamming doors, traffic patterns, buzzing security devices, running of movies, speakers systems for the guest lecture, cheers from the students and the sounds echoes that are a part of the architecture, influence the use of the library space is becoming more and more difficult to find in all types of libraries including university libraries.

A decision on user-space arrangements made during another era is not usually applicable to present needs. User space may have to be rearranged to meet today's fire codes or accessibility regulations for the physically handicapped (disabled). A number of remodeling projects undertaken during the last fifty years, and housing special equipment to each and use materials. Fraley/Anderson describes this situation in following words:

"Each time the library plans to offer a new service, the service must be viewed from a perspective of space utilization. If the planner - whether librarian, architect, or consultant - is unaware of the ramifications of providing a service, such as meeting rooms in a public library or a reserve operation in an academic setting, then the service might not work and the primary reason for this failure will be the improper allocation of the library space" (40).

Metcalf (41) in his scholarly introductory publication says:

"Each library is unique, just as is each academic and each research institution. A library building should reflect the needs of scholarship, the teaching program, the relative emphasis on different subjects, and special character and style of the institutions. Furthermore, the buildings reflect the individual philosophy and practice of library service at the time that the building is programmed and designed. It is conditioned by its particular site and neighboring buildings".

He further says the effect of growth and change in library:

"One condition of overriding importance in the planning of academic library building deserves emphasis. Libraries have particular pressures for continuing growth. Library buildings, therefore, must be able to accommodate change more readily than other types of academic buildings. Even assuming no growth in student enrollment, the library building is the one facility that may need expansion, primarily due to growth in the book and other collections. This is particularly true for a research institution".

While clarifying about space requirement he further says:

"Estimating the space requirements for a library's book collections is but one of the problems that must be faced when a new building is programmed. If a completely satisfactory formula could be provided for such estimates, the task could be greatly simplified, but experience suggests rather that the first rule should be "Beware of formulas". Libraries differ, and there is no satisfactory substitute for consideration of the individual case by an expert librarian, library consultant, or architect... Finally, remember when in doubt

another basic rule in library planning: A healthy library tends to outgrow its bookstack space and its building sooner than expected (42).

This is an Internet age and technology is causing important changes in how libraries in general and academic libraries in particular function. It is especially fueling increased user demands and expectations for information resources and their time delivery. Yet very little has been written regarding designing libraries to take into account the impact of changing technologies.

Many lay people believe that there will be no need for a physical place called a library in the future, given that everything in the information realm will be accessible from the computers on their desktops. A first observation is obvious: even electronically stored information takes physical space somewhere and requires plenty of equipment and staff to accession, index, retrieve and deliver it. The second is less obvious. According to recent estimates less than five percent of current information is in some kind of electronic form (43); it may reach 10 percent by around 2001 (44). And for undergraduate academic library collections, which house primarily monographic types of materials, the continued likelihood that the printed form will predominate in the foreseeable future is high (45).

Nevertheless, technology is affecting physical space needs in major ways: digitization is beginning to replace microforms, audio/visual resources are evolving into multimedia/hypermedia formats and computer equipment is pervasive throughout the modern academic library (46). Also, major projects are underway to produce extensive digital libraries (47). Factors which as these have led at least one major academic library (Cornell University) to conclude that the need for additional space will begin to slow after the year 2000 and may stop by 2010 (48).

Other evidence suggests that "the library as a physical fact is becoming more important (Moreno, 1995) and that the need will continue for academic libraries to serve "for self-education and discovery outside the classroom and laboratory" (Lucker, 1992). What is needed, then, to determine future space needs for the library, is a reassessment of its mission in light of the probable impact of new technologies, and consequently, how this is likely to translate into more specific space requirements for the various functions. The two sections to follow attempt to do this.

43. Moreno, E. M. - The Profession: Reinventing the Library; Where Print and Electronic World Collide, Architectural Record, 185(11), November, 1995, P. 30-33
46. ACRL Standards: Standards for College Libraries, 56(4), April, 1995, P. 245-257
47. Pool, R. - Turning an info glut into a library, Science, 266(5182), 7th October, 1994, p. 20-22
2.2 The Likely Impact of Technology on Mission:

Most would agree that the primary function of a library will continue to be to provide organized inexpensive access to information, no matter what its form. But technological innovation is likely to add a new need to "create on the network a knowledge-management system that enables scholars to navigate through the resources in standard, intuitive and consistent way" (49). This will require new expertise and equipment to accomplish.

With regard to the information itself, the trend has been for quite some time to seek resources both inside and outside the library to meet user's needs. Interlibrary loan networks have diversified and will most likely migrate to a common electronic medium, the Internet (Larsen, 1991). In addition, fee-based document delivery services are being more widely used for supply of externally held materials. However, internal collections will continue to grow, not just in the conventional book category, but also in non-book formats, which still require space and equipment to access their content (50).

Thus, if anything, technology is adding to the demands for library to accommodate more print and non-print materials than before. In addition, it is adding the need forever more sophisticated telecommunication and computer systems to manage access to on site and external resources (Reid, 1995). Also the library staff to help user cope with the new varied systems must perform increased training and instruction. With regard to the need for physical space to fulfill the library's revised mission, it becomes unlikely that less will be needed than currently and most probably more, as described below.

2.3 The Spatial Impact of Technology on Library Functions:

General: Technology itself is causing increased demand for space in many areas of the library. There are growing numbers of computer workstations for patrons and staff alike and other equipment such as network file servers need specialized and additional space often not found in existing facilities (Lucker, 1992).

Instruction: A growing role of the library is helping students and others learn to use the new technology to access information. This is requiring libraries to supply more space for face-to-face consultation with information professionals (51) and most often necessitating the provision of a large, well-equipped user

instruction room (52). Thus, as the instructional mission of the library is becoming more important, due in large part to introduction of technology, more square footage needs to be supplied for this function.

Monographs: As discussed above, monographic collections, especially for undergraduate libraries, are likely to continue to grow steadily. While digitization of some materials may result in some physical savings, there are more formats that the library needs to collect; most of these require additional space for equipment to access them, not to mention more specialized storage facilities to house them.

Periodicals: Serials in electronic format seem to be one of the best prospects for introducing space saving in academic libraries. Journals in electronic format will no doubt continue to increase, although those in scientific, technical and medical disciplines are doing so at a more rapid rate (Lucker, 1992). Another factors also points in this direction, that being the extra-inflationary increases in pricing by many publishers (Clemmer & Smith, 1992).

Processing: In most "behind the scenes" areas of the library, technology is often causing the need for more rather than less space for equipment to handle incomplete systems. While this may be ameliorated in the future, the immediate space needs for areas like cataloging continue to grow (53).

Reference: While technology is driving the need for more instructional space, it is impacting positively the need for space for reference materials themselves. A growing number of resources are available in electronic form and often from resources housed outside the library. As in serials, however, collections are heavily reliant upon information in professional and scientific areas are experiencing space savings more dramatically (Martier & Siddle, 1993).

Study Space: A number of authors confirm this one's experience that technology is increasing the requirements for study space in academic libraries [Boss, 1987; Johnson, 1992; Lucker, 1992]. Not only are more students relying on facilities like libraries in colleges and university campuses for studying, more space per student is required to accommodate the use of technology (e.g. laptops and workstations).

In general, use of new technologies is not relieving the need for more space in libraries. While there is some potential for capping or slowing the growth for additional physical space for some library functions, existing formulas often don’t provide adequate space for the new technologies themselves, increased study space requirements, and new format storage and the equipment needed to use it (54).

The table below summarizes the probably impact of technology on the overall space requirements for key academic library functions over the next 20 to 25 years approximately in our libraries:

### 2.4 IMPACT OF TECHNOLOGY ON SPACE NEED

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<th>FUNCTION</th>
<th>MORE SPACE</th>
<th>LITTLE CHANGE</th>
<th>LESS SPACE</th>
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<td>Monographs</td>
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<td>Study Areas</td>
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One thing is certain: there will be continued need for space planning in libraries to allow for flexibility and electrification to almost all points (55 and 56). While it is uncertain, given the analysis above, how technology may specifically change any one library function, it has become certain it will cause change in general over the foreseeable future. The researcher concludes that it would be unwise to count on technology to save the library space, but it would be wise to plan it continually altering the mix of space requirements needed to conduct the functions of a modern academic library.

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