

UNIVERSITY LIBRARY BUILDINGS OF THE FUTURE

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Abstract - Various view points of the library planners about the future's library buildings have been explained in this paper. With the advances in information technology, some librarians believe that modern and well planned library buildings are not so necessary in the future. On the other hand, many others believe that more modern and well technologically equipped library buildings should be built to fulfill the future needs of the library users. Characteristics of the future library buildings have also been enumerated in this paper. The need for various spaces for computers and other information technology equipment has been emphasized throughout the paper.

Keywords - Library Buildings, Information Technology, Library Planners, Modular Library Buildings, Library Equipment.

INTRODUCTION

Libraries are responsible for the preservation of the culture through the storage, retrieval and dissemination of knowledge. Thus, libraries should possess various types of printed and non-printed documents, as well as highly developed technological and communicational equipment. Library holdings should be housed in easily accessible places. Convenience and comfort should also be provided for the users through well-planned library buildings.

The form of the library building is determined by the function of the library. "Form follows function" is considered by most of the architectures. Thus, the form, design and the plan of the libraries mostly change according to the function of the libraries. These changes are always followed by the nature of the library collection, and the storage and retrieval function of the libraries. Using the minimum effort for storage and retrieval of library material is the most important function of libraries, which is generally provided in well-planned library buildings. Also, libraries are primarily constructed to house and maintain on-site materials, since collections define the essence of a library.

On the other hand, while planning a library building, we propose to construct a building, which will be in operation for a long period of time. We also hope that the library services will be as effective as the day of opening for the long life of the library building. To achieve this, we have to visualize the future needs of the users. Since the form of information storage is changing rapidly, it is difficult to predict the exact space and equipment required

for an unknown future. Therefore, it is logical to plan library buildings according to what is available at the time, and not according to what might one day become available. Likewise, the form of the future library buildings depends on what we have learnt from the past and what we can deduce from the study and analysis of the present library buildings.

Historically, library buildings have gone through three different stages. First, there are ancient libraries, in which the only function of libraries was to collect and preserve the library material and also to provide suitable space for the library users. Relatively, large reading halls and closed book stacks for preservation of the books were the main characteristics of the ancient library buildings. Since, the number of library holdings was not much, fixed function library buildings were functional. Convenience and comfort had not been provided for the users as well as the library material in most of the cases. Library services were not as satisfactory as today and users were not too many to expect more facilities.

Second generation of library buildings was started with flexible modular buildings. In fact, with an increase in the number of library users as well as library collections and the need for more convenient library services, modular library buildings emerged. Satisfactory library services, as well as the required space and suitable library facilities have been provided for the convenience of the library users as well as the safety of the library material through planning modern library buildings.

Finally, with the advances in IT and communication systems and the need for using various technological equipment for faster and easier library services, the need for the third generation of library buildings was felt. Electronic sources of information, digital libraries, paperless libraries, libraries at home, libraries without walls, Internet as a personal library, etc. are some of the advances, which have challenged the existing characteristics of well-planned library buildings. At present, almost any library function services, such as cataloguing, circulation, acquisition, indexing, etc. have been computerized. In other words, technology has imposed itself on the libraries for providing easier, better and more convenient and economical library services. Consequently, the form and the plan of the library buildings will be affected due to technological developments and their use for the library services. Since we live in a fast changing world of IT, it has changed many traditional customs of the people and it will change the existing concepts of functional library buildings as well.

To achieve a concrete conclusion and predict correctly the characteristics of the future library buildings, especially those of university libraries, various technological and communicational progress in service of libraries have been examined for the present study. The space and other facilities required for the technological equipment have also been evaluated. Having a concrete evaluation, the present plans and the architectural features of some of the newly constructed library buildings, both in developed and developing countries, have also been studied. Prediction of librarians, library planners, architects, as

well as the futurists about the future library buildings has also been investigated. Present and future needs of the university library buildings in Iran have also been examined. At the end of the study, some suggestions for planning functional library buildings, as well as the characteristics of future library buildings have been presented.

TECHNOLOGICAL ADVANCES IN LIBRARIES:

Generally speaking, libraries as repositories have not been changed drastically since the beginning of recorded time. But the technical progress of the last two decades is so great that it is going to change the libraries as well. It is believed that the technological developments of the last decades are equal to all the progress and achievements that man has ever obtained. New technological developments have changed the traditional library services drastically. Almost every function of the libraries has been altered to some extent, due to the advent of computer, electronic devices and telecommunication facilities. Various types of libraries have already been in transition from manual to electronic systems. Traditional library services, such as book and journal acquisition, book cataloguing, circulation of library material and even reference services have been provided through electronic gadgets. Developments in telecommunication and computer technology have clearly led to changes in library automation too.

Since the changes provide more convenience for the library staff as well as the users, libraries employ more and more IT equipment. Likewise, as the amount of information grows and newer technological means for storage and retrieval of the library collection emerge, librarians commit themselves to expand their traditional role and functions in order to remain active and meet the required users' needs. In fact libraries, as many writers believe, should flourish in an electronic age in order to survive and remain as active members of the information centres. Peggy Johnson [8] emphasizes that: "The changes brought about by advances in technology are so extensive that it is difficult to assess their total effect, but it is clear that libraries are in a state of fundamental transformation".

At present, most of the libraries have changed their traditional role. Employing new methods of information storage, retrieval and transmission to users all over the world, has been taken as serious by the librarians. Thus, they have to cope with their shortcomings and provide the latest IT equipment, required for better library services.

It is believed that libraries should be "reinvented" in the electronic environment. Thiagarajan [19] predicts that there is a gentle transition from "paper-based knowledge" towards a "paperless society" at present. Hence, because of the ever changing function of libraries and due to rapidly progress of information technologies, the future of libraries is open ended.

Moreover, as Thomas Tanselle [17] states, as technology changes, the function of earlier objects is brought into question. Thus, librarians should be very careful about the

technological changes that occur around them. Sheila D. Creth [2] believes that library professionals need to redefine the requirements for academic librarianship, accept the challenge to reshape the library organization and establish new partnership.

Despite the emphasis of most of the library, professionals on the need for technological changes in libraries, there is some type of resistance to the changes as well. Those who are used to print-based traditions are uncomfortable with technology-based information and reveal some resistance to the need for the technological changes. But as Norman D. Stevens [16] states, in a near future we may be at a point, in which those trained in a technology-based tradition will be uncomfortable or impatient with books and manual services. Similarly, libraries that do not use information technology to meet the needs of their users, especially in university libraries, will be relegated to the back waters of their community. Thus, unlike the old and somewhat the present libraries, in which the size, location and the architecture of the library building, as well as the provision of suitable equipment, were/are of great importance, innovation in providing up-to-date information services, at any time needed, is of immediate and important needs of most of the existing libraries.

The need of the libraries to information technology is more than what was mentioned above. As more and more people purchase personal computers, and as computers are more connected to various networks as well as the Internet, libraries are more responsible to provide various required information through highly technological media. William Gray Potter [14] believes that the real function of libraries and electronic databases is to provide services that are efficient and powerful and people can use it in their daily life. Most of the writers also stress on the need and the quality of the technology, which is employed for libraries. Magid Igbaria and Conrad Shayo [7] emphasize on the said problem, stating, "The perceived attributes of innovations are relative advantage, compatibility, complexity, observability, and triability. Relative advantage is "the degree to which an innovation is perceived as better than the one it replaces" as measured by the monetary gains, convenience, enjoyment, and satisfaction derived from its use. The greater the relative advantage, the higher the rate of adoption of the innovation."

On the other hand, despite the emphasis on provision of various types of technological equipment, telecommunication and even Internet, it should be remembered that every library should fulfil the needs of the community it is built to serve. Since the information expectation of the library users is different in every country and even within a special community, this should be kept in view while providing technological facilities for the libraries. As Arnold Hirshon [5] emphasizes, the emerging libraries must constantly meet users' expectations through creativity, innovation and risk-taking. Therefore, since libraries have had the role of conserving and preserving our cultural heritage, with the present changes of library functions and with the advancements in communication systems, they

should fill the gap between print-oriented education system and the emerging electronic society.

NEW INFORMATION MEDIA IN SERVICE OF LIBRARIES

In planning future library buildings, library planners should be well-acquainted with the various existing forms of technological equipment and the available form of the computer readable material. The possibility of the electro books, for example, can affect the space required for storing library collections in future. Likewise, the historical philosophy of collection management is changing radically, which is because of the electronic publishing of some library material. Thus, library planners should well keep this in their mind while planning library buildings. In this part, various new information media that are used to store knowledge and information have been explained briefly.

At present, with rapid technological developments, new forms of transferring information have come out. Different types of technological media equipment, such as videocassette recorders, audio tapes, and hi-fi units emerged in the early stage of this development. Magnetic disks, CD-ROMs and electronic books and journals have also been employed for storage of the printed material in some libraries. Motion pictures and closed-circuit television and also computers have all changed the old concept of the printed books. Thus, a formidable change, and according to some writers "a revolution" in the world of communication has been occurred that the library planners should be quite aware of.

Electronic journals, which are published in almost every field of study are growing very fast. According to Rick B. Forman [4], "The number of electronic journals grew 150% from 1995 to 1996, and it seems reasonable to expect an even steeper growth rate for the remainder of the 1990s as publishers retool more than 165,000 existing print serials for digital distribution." He concludes that when this large number of periodicals as well as other library material are published electronically, libraries will need to change their functions. Therefore, since there will be databases full of journals, there is no need to houses journals and consequently no need to plan very large space for these. If the books could be published electronically and economically, the said conclusion could be drawn for book stacks as well. In fact, at present, some books are published through the Internet and other electronic forms, but the number of them is not much to draw the same conclusion for book stacks now.

At present, Internet has also provided the possibility to reach various types of information. This facility has provided a unique opportunity for researchers and library users who are in need of the up-to-date information. But unlike the other facilities such as, e-mail, telephone, etc. which are possible through the Internet, libraries cannot rely on the Internet totally. Paul Lukez [10] in a study entitled: "Whither://Multi-Media. (Cyber). Libraries?", has examined the present condition of the Internet. He states that the amount

of digitized information comprises only ten percent of all the texts. Thus, the researcher who uses just the Internet to search the related information, loses 90 percent of the existing documents. He also emphasizes that only those library materials published after 1991 have entered the Internet at present, so for digitizing the remaining material there is still a long way off. On the other hand, using the Internet, one has to spend too much time and money, because the information is not so classified on the Internet. William Katz [9] believes that there is an obvious chaos on the Internet and librarians who are used to the systematic classification of information have some problems in using it. Likewise, Soon M. Chung and Juhnnyoungs Lee [2] believe that the Internets has fallen a victim to its own success. Using the mentioned media for transmission of information, future library buildings could serve as research centers, cafes, resource centers, and even marketplaces, so library planners should plan the future library buildings according to the future needs.

IMPACT OF TECHNOLOGICAL ADVANCES ON FUTURE LIBRARY BUILDINGS

Numerous Librarians and library planners believe that, the use of various technological equipment for library services has changed the need for the old standard space of library buildings. Technological developments in library services have not only led to ease, convenience, speed and economy, but also they have changed the need for the large space of the traditional library buildings. For example, while relatively large space was necessary to house public catalogue cabinets, the same function can be done faster and easier through some personal computers, located in various places of the library buildings. Thus, if we do not understand the technological and information progress of our time, and if we do not ascertain the needs of our users, we may plan unsuitable and not functional library buildings that are unable to provide users' present and future needs.

Although these changes will be done one day, these are not the immediate needs of the majority of libraries. In other words, present types of electronic equipment being used for the library services can be housed in the existing library buildings. Many librarians believe that the changes that are ahead of us are not always as new and revolutionary as we think. It is true, after so many years, despite the availability of numerous types of electronic equipment to provide highly progressed information technologies, which have been employed for library services, reading rooms and book stacks. In fact, the remaining physical space of the library buildings have not fallen into misusc. Even today's new and modern library buildings are planned almost similar to other existing well-planned library buildings. However, special attention has been paid to provide the required space for the newly employed technological equipment and the related required facilities.

PREDICTION OF FUTURE LIBRARY BUILDINGS

Although nobody can predict the future precisely, according to what we have learnt from

the past and by evaluating the present advancements in information technologies, we can have a rough estimation of what is going to happen in future. But as Terence K. Huwe [6] pointed out, prediction of the future is a risky endeavor too. Nevertheless, library professionals should have an estimation from the future in order to prevent planning wrong library buildings. Arnold Hirshon [5] in his article entitled "Running with ...: breaking new habits to survive in the virtual world" stresses that as we look into future, we need to break some of our old habits. He also emphasizes that because of the rapid advancement in modern technologies, we need also to break some of our newer habits as well.

It is believed and confirmed by various social theorists as well as other thinkers that we have entered the post-industrial age. Technological advances have changed most of the aspects of our lives. Knowledge and information rather than capital and military forces are the new basis of power. Therefore, library and information centers have received a special attention in order to provide the required up-to-date information.

Libraries are in transformation from "collection buildings" to "information centers". Librarians also, as James L. Terry [18] believes, are considered as information professionals. Thus, librarians should be aware of the formidable role that they should fulfil at present and in future. It is believed that only a few people will refer to libraries, if libraries do not provide their information needs and expectations in futures. To have a comparison, the death of the typewriter is a good example and analogy for the future of libraries. Although some people still use typewriters, these have virtually disappeared from the marketplace. Generally speaking, libraries are assumed to be stable and traditional, thus, librarians should think about the technological advances fundamentally and provide the required library services. Hence, a strong technological infrastructure will be essential in order to create an effective information environment for the future libraries. As Richard Waters [20] states, libraries will be responsive to changes instead of being merely reactive. Moreover, the concept of library as a warehouse of information is losing its validity.

Educational experts also believe that libraries should provide the information for the "New Learning Communities", where education is transmitted through electronic instruments. Even at present some correspondence and open universities transmit their educational texts and prospects through the Internet, educational satellites and other forms of electronic media. Gloria Rahmann [15] Stresses on the said prediction stating, "With the arrival of the streaming media technologies, the future books are right for the extension of academic media services to the Web. Private sector demand for networked media to deliver training and corporate information will speed the development of products and services employing the streaming technology."

Similarly, it is predicted that in the near future, libraries would be more valuable in terms of their telecommunicational and informational services than their stocks and even buildings. Danuta A. Nitecki [12] emphasizes that the commitment to the delivery of great service has the potential for directing the mission, the structure, the human resource

development and the service programs of libraries of the future. Thus, providing suitable services for the future library users determines the prediction for future library buildings as well. Likewise, while the rate of satisfaction of users from the libraries was (and in some cases is) largely based on convenience, speed, accessibility and acceptability, high quality and flexible information and communication services are of the emergent needs of users in most of the libraries today and in future. This is what library professionals, library planners and architects should fulfil while planning new library buildings.

Generally, while planning new library buildings, provision of the required space for the ongoing function of libraries, as well as the technological advances should be taken into account by the library planners. Flexibility of the space has been considered as a key element for solving the future space problems of the libraries. David L. Michaels [11] points out that a flexible facility will indicate opportunities for responsive change

Anyhow, an examination of the existing library buildings reveals that for the future library services we need the modification of the physical environment of libraries in order to meet the advances in technological library services. Moreover, library users should find the library buildings welcoming and supportive as well. According to various librarians, architects, futurists and information technologists the following changes will occur in the future library buildings.

1. Since the information is provided on-line, the importance of location of the library buildings can be changed entirely. Likewise, when a library user, sitting at a work station, far away from the library can have an on-line terminal and can integrate databases and use various documents and library collection, there is less need to travel to the libraries.
2. Since the main task of libraries is to obtain, store, retrieve and also exchange information in any form, the new form and the required space of library buildings will likely be influenced by the form of the library material.
3. Since computers, which can hold library collections, can be located and used everywhere through connecting to networks, there is no need to plan large space for computers within the library buildings.
4. Although technological advances will affect the form of the library buildings in future, printed books will be stored and used in the near future as well. Thus, the required space for storage of printed library material should also be provided.

In conclusion, the majority of the library planners predict that very exiting years and very different forms of library architecture, planning and design will be ahead of us. However, the idea "city as a library", which is possible through Internet, may also be accepted as a successful idea for future libraries. The advocates of this idea believe that the physical and virtual architecture of the library of the future could be fully integrated into every laboratory, office, classroom, etc. wired into a network [10].

A SURVEY OF SOME OF THE NEWLY CONSTRUCTED LIBRARY BUILDINGS

In an evaluation of the newly constructed library buildings, the majority of these are located in developed countries, more than 40 modern library buildings were examined. Despite the prediction of those believing that most of the existing space of the present buildings won't be necessary in future, almost all the standard space of the library buildings had been planned for the said libraries. Michael Browne [1] in the introduction of the said study reveals that there might indeed be those who would argue that the idea of an information store within a building is an anachronism I believe that the libraries presented here prove this view to be both premature and unfounded. He continues that, in the near future, even with the advances in information technology the situation would be almost the same as the present. He states if we substitute an electronic source for the books, it will not affect the design of the library buildings. A library user who is using the information source, whether a book or a computer, needs almost the same amount of space. Therefore, if we substitute computers for the books, there is no need to change the present space of library buildings drastically.

Generally speaking, library designers create libraries based on an awareness of what exists. Since, information technology has been changed dramatically in the last ten years, and is certainly to be changed in the coming future, it will affect somehow the design of the library buildings. Thus, the existing library buildings will act as models to be criticized, amended and developed in order to cover the future needs of libraries. However, library designers should remember that although information can come down the wire through computers, books will survive centuries without their content being affected in any way [1]. Hence, a new form of communication does not necessarily substitute previous ones, it may widen the possibilities.

On the other hand, like the printing press that affected the architecture of ancient libraries, the book itself is under attack from another technology, the computer. And this is another threat to the present space of library buildings. Therefore, books will lose their present setting in future [13].

Those futurists and library planners who believe that we don't need the library buildings in future, should pay attention to the point that people psychologically and sociologically need to attend public places. Olley [13] explains that, a library needs to establish a human-centered environment, rich in choices which appeal to the senses and psyche. Likewise, people like to be where the pursuit of knowledge is celebrated. And that celebration, as Michael Brawne [1] states, "may well show itself through architecture, through the manipulation of space, the control of light and sound and movement, and the creation of meaning, achieved by the thoughtful use of materials." Physical and psychological environments used by the readers have contributions to understanding of a text that is generally possible in well-planned library buildings.

Due to the above mentioned points, most of the existing modern library buildings under study had been planned on the lines of the previous ones. Providing large space for library collections, users and the staff as well as beautiful and welcoming outside architecture are the main features of the existing modern library buildings.

FUTURE PREDICTION IN UNIVERSITY LIBRARY BUILDINGS OF IRAN

Prediction of suitable university library buildings for an unknown future in Iran is generally provided through possibility of external expansion, as well as the inside flexibility of the space. But, as the data collected reveals, majority of the university library buildings in Iran is presently confronted with space problems. Providing large and suitable space for library materials, users and staff is of immediate needs of the libraries. Thus, shortage of space is one of the most important problems, that libraries should cope with by constructing new library buildings. On the other hand, since some of the library services are being done manually in majority of the libraries, the need for sophisticated technological equipment and also the required space have not been felt seriously by most of the libraries for the time being. On the other hand, using computers by the Iranian students is in its infancy level. Computers and other related equipment are comparatively expensive, thus only few people have the capacity to purchase personal computers. The entire society of Iran does not possess computers, Internet connectivity and other electronic devices. Hence, people are generally used to various traditional and manual systems. Library services are also not very much computerized in all the university libraries. In recent years, some libraries have just stopped to use computers for cataloguing, circulation of the library collection, ..., but only some parts of the holdings of libraries have been computerized. Therefore, library users prefer to use card catalogues, for example, instead of computerized library databases. Yet, some of the newly established libraries have catalogued their library holdings completely with the help of computers. National library of Iran has also provided a national computerized database, which has provided a unique possibility for those libraries that are eager to computerize their library holdings.

Internet, which is used in majority of modern university libraries, due to high price of Internet connection and because of some other restrictions, has not been commissioned in majority of university libraries in Iran. Information need of the library users is provided through CD-ROMS and other machine-readable material in some of the universities. Thus, the need for planning and designing special space for computers and other IT equipment has not been felt seriously by the majority of the universities in Iran. Hence, the ideas of "Paperless Library", "City as a Library", "Digital Library", etc. are not meaningful and compatible with the immediate needs of the majority of university libraries in Iran.

For want of implementation and installation of Information Technology gadgets in university libraries in Iran, only a few libraries have provided the required wiring, ventilation,

dampness, dust and noise control and other facilities within their library buildings completely. Those libraries, which use computers for their library services, have installed the said equipment in various vacant spaces within the library buildings. Consequently, the noise pollution of the computers, users and the staff bother other users studying in the reading halls and other sections of the libraries. Moreover, dust, dampness, excessive hot, etc. can also destroy the computers and other related equipment, since the required facilities have not been provided fully. Hence, future university library buildings in Iran should be planned with special attention in providing suitable space and other related facilities for computers and other technological equipment.

Despite the above-mentioned shortcomings of IT in university libraries in Iran, a struggle for computerizing university libraries has been started in the recent years. Librarians are hopeful to tackle the space problem of the present university library buildings in the near future.

So, the future library buildings in Iran should be planned in order to meet the required space for the various technological equipment of the libraries. Moreover, since more and more library users will be in need of computers and other IT equipment, suitable space should be provided for them as well. Suitable wiring, ventilation, dust control equipment, etc. are also essential and should be predicted for the future library buildings in Iran. On the other hand, since the students generally refer to the libraries instead of the private sectors in order to obtain their information needs, libraries should be very active in employing highly technological equipment for dissemination of information. So, the space and other required facilities as well as telephone lines, etc. should also be planned for future library buildings in Iran.

While planning new university library buildings in Iran, the required standard space for the traditional services of the libraries should be provided appropriately. Since the ongoing function of the libraries will not be shifted totally to electronic services in the near future, book stacks, periodical sections, the reading halls as well as space of library buildings should also be planned for the future library buildings. Besides what was emphasized here for planning new library buildings in Iran, other general principles of library buildings should also not be kept in mind, while planning and designing new library buildings.

Since technology imposes itself on libraries one day, to solve space problems of the existing library buildings, and to save the costs, it is proposed to introduce and implement most sophisticated and advanced level Information Technology equipment in the university libraries in Iran as soon as possible.

CONCLUSIONS AND SUGGESTIONS FOR PLANNING FUTURE LIBRARY BUILDINGS

In order to meet the expectations of the users and the staff in providing suitable library

buildings, the following points, based on different views of the librarians, library builders, architects as well as the futurists have been suggested. While planning and designing new library buildings, the following points can help the librarians and the architects to provide well-planned and functional library buildings, capable to cope with the technological requirements in the future.

1. Design a library building to be responsive to the ongoing traditional functions of libraries as well as the future technological changes.
2. Maximum inside flexibility as well as outside expansion is the key feature of functional library buildings.
3. Since some traditional functions of libraries will be managed through electronic equipment completely, the space of public catalogue cabinets and periodical sections, for example, can be planned according to technological equipment required for the said functions.
4. Design secondary stairs and other permanent parts outside the library buildings in such a way that these do not come in the way of changes in the university library buildings in the near future.
5. Library buildings should be located centrally in the university campus.
6. Despite the advances in Information Technology, future library buildings should be planned even better than the existing ones.
7. Since convenient library services depend largely on the speed, accessibility, acceptability and high quality of services, providing suitable space in library buildings is a serious factor to achieve the said purposes.
8. Libraries could be measured as good information intermediaries, if good planning and correct mix of people and technology could be managed together inside the library buildings.
9. Since the process of transition from traditional library services to digital services may take a long time, it is recommended to plan a separate part of the new library buildings for IT services.
10. Since library users in future may visit the library buildings just for using Internet and other databases, enough suitable space as well as the required technological equipment should be provided for them.
11. The standard space of the library buildings should be measured according to the future technological advances and the needs of the users, documents and equipment.
12. The outside architecture of the future library buildings is expected to convey the IT concept running within the library buildings.
13. Since there is not any time limit for using the Internet, and other electronic databases, the possibility of using these, even at the closing time of the libraries, should be provided for the library users, through providing the required equipment in suitable

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