IMPORTANCE OF ARCHITECTURAL DESIGN IN LIBRARIES FOR THE BLIND

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Keywords: architectural design, library for the blind, green space

1. Introduction

Libraries can be considered the greatest scientific-cultural centers existing today and can be traced back through the history of mankind across the world. From early on the study of library history shows that the main objective of libraries was to provide a place for collecting and storing human knowledge and to offer services to readers using these structures. Initially, only certain classes of society (scientists and nobles) had access to these libraries, but in time, this circle of library users widened together with the growth of human thought and culture, so that today, anyone can be regarded as a potential (public) library user [1].

Nowadays, libraries are responsible for providing adequate resources and conditions to fulfill the information needs of all members of society without exception. To achieve these objectives, public libraries should consider users from different perspectives. The physical conditions, (blindness, deafness, physical disabilities, etc.) of potential library users should be evaluated and considered by those involved in planning libraries, such as architects and librarians, during all phases, including that prior to construction and during the design of the library building and its interior spaces.

The blind and visually impaired are actual and potential users of libraries. As users, the importance of recognizing their particular characteristics and needs must be taken into account in order to offer appropriate and efficient services.

Architecture, with its emotions and ideas for improving quality of life, is a physical process manifested in the construction of buildings possessing different functions. It satisfies the human need for well-being by providing living spaces, security and comfort; this is evident in the similar construction patterns created by different societies over the centuries. Human perception of this process is totally dependent on how an individual understands space. In other words, people understand space, volume, surface and so on, through their sense of sight. But, the blind, regarded as a minority group in society, lack any of the conventional senses required to understand space

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and architecture. They therefore require spaces which are different. This means considering their physical conditions in order to prevent them from developing a sense of being excluded and isolated from society, especially from libraries which aim to offer services to everyone.

On the other hand, allocating a project of this dimension to such a low percentage of the population cannot easily be economically justified [2]. Therefore, a space to be used by the blind and visually impaired, should be designed bearing in mind their perception of the architecture and consequently presenting an accurate pattern of the space which takes into account this perception. By accurately observing the specified criteria, regulations and standards, blind users can be provided with the desired conditions, in addition to guaranteeing their tranquility and safety in these structures. This article reviews the importance of architectural design in libraries for the blind and visually impaired as regards site, green areas, building type, entrances, motion axes, flooring, and book shelves.

2. Library location

Selecting an appropriate site to plan and construct the building is one of the most important aspects that should be considered at the very beginning of the design process. The active context of cities is the best location for libraries. Easy access to the site, security requirements and indexes used by the blind for navigation are other important points to be considered. The existence of natural elements on site and their integration with the desired design is another important and useful factor in selecting an appropriate place for library construction [3].

It is advisable that architects consider a number of aspects in selecting the appropriate location:

1) The library building should be visible from a distance, i.e. it should not be located among tall buildings and not too near adjacent buildings, if possible. This index is important so that blind users can easily navigate around the library building when situated among other constructions;
2) The pavements leading to the library should be even and flat and curb cuts avoided.
3) Public transportation routes should also be considered in selecting a place for the library site [4].

The library site should be located in the vicinity of public transportation (such as bus and underground stations), in order to facilitate users' mobility, particularly those with special needs. This consideration can, therefore, contribute to increasing the number of library users.

3. Green spaces

One of the main factors affecting the design of all library areas, is the difference in a blind person's perception of space. This factor should be considered in designing green spaces. A blind person's disinclination to frequent crowded places may be attributed to unclear noises and their difficulty in recognizing them. Trees are extremely effective in controlling and reflecting noise, especially peripheral noise, if several types of trees are used simultaneously. The presence of trees can minimize environmental acoustic confusion and improve peripheral acoustic quality [5]. As well as reducing acoustic confusion, when designing libraries architects should also take into consideration that trees planted in interior and exterior areas of libraries should enable users to fee land enjoy similar delights to those experienced at parks [4,6].

Plants should be given even more careful consideration in designing green spaces surrounding libraries for the blind. Obtrusive plants whose foliage is at the same height as the blind person's face and head should not be used. In selecting trees and plant coverage, the use of trees with small fruits (berries, etc.) and those with heavy leaf fall should be avoided to prevent coverage of the travel paths and consequent skidding/slipping while in movement. Additionally, planting thorny bushes or similar greenery, (e.g. roses) and trees and bushes that produce a great deal of waste, which is subsequently deposited into the surroundings (e.g. pines) should be avoided around motion axes and seating provided for the blind [5].

4. Building

Library buildings are designed to be used, which means that in order to deal appropriately with heavy user traffic, they must possess the necessary structures. To cope with the ever-increasing number of people, considerable space is needed, consequently, public libraries are constructed in large spacious buildings often consisting of several floors. Accessibility to all parts of the building is regarded as one of the main features in using this construction and should be facilitated by reducing any effort, disturbance or discomfort involved, to a minimum. Therefore, factors such as the library complex, its growth rate, number of potential and actual users, library sections (catalogue, reference, borrowing, study, etc.), furniture and equipment, the way services are offered, physical conditions (climate, user comfort, consideration of their physical and cultural conditions, maintenance of the library complex, humidity, heating-cooling systems, light, noise, etc.) and other elements should be considered in library building design [6].

5. Entrance

The building entrance is one of the most important architectural issues to be considered. The entrance design of any building depends on site features, building accessibility, building application and number of uses [7-8]. In addition to the above-mentioned cases, when designing library entrances for the blind, architects should consider their particular conditions (physical and motor) as well as their perception of space and environment.

As far as possible, stairs should be avoided in designing these entrances. They should be located on the ground floor and main travel paths leading to them easily identified. If stairs are unavoidable, they should be built using even tread and height in riser. It should be noted that whether there is one single step or a flight of more than 10 steps, there must be a landing. It is necessary to install a handrail and nosing in designing the building entrance stairs. To aid accessibility of the library entrance further, in addition to stairs, a ramp may be incorporated (with a maximum slope of 6%), if required. To enable the coming and going of blind users, the library entrance should be 2 meters wide.

Entrance location is also highly important, since the relationship between this and the area of space where the person enters determines the path to be taken and the type of activity to be performed inside the building [9] (Figure 1).

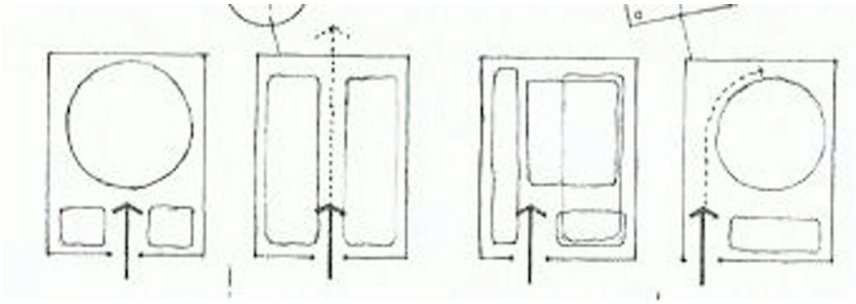

Figure 1. Building entrance [9]

One of the aims an architect designing libraries for the blind and visually impaired has, is to try to define a main entrance and exit, through making accessibility to all library facilities as effortless as possible. This may involve simplification of the traffic pattern of the library and also lead to a reduction in building costs and use of multiple entrances and exits (watchman, maintenance). It is, however, important to allocate a separate entrance for delivery of postal consignments and transport of library resources and equipment, to avoid the possibility of users who are blind or visually impaired being faced with problems of movement while entering and leaving the library. Putting this into practice means increasing accessibility of the blind and visually impaired to libraries.

6. Motion axes

Creating axes is one of the main principles in organizing a building. Historically, it can be traced back to the development of our spatial perception across the centuries. An axis is a line between two points and spaces that can be arranged around it (Figure 2).

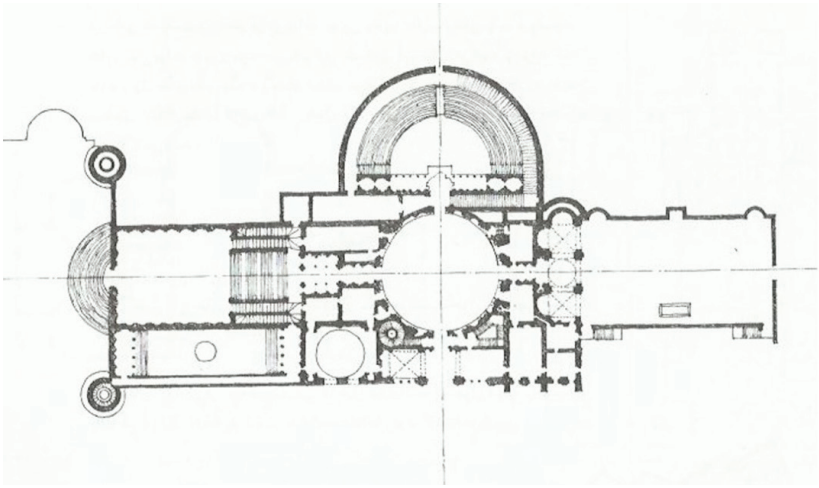

Figure 2. Motion axes [9]

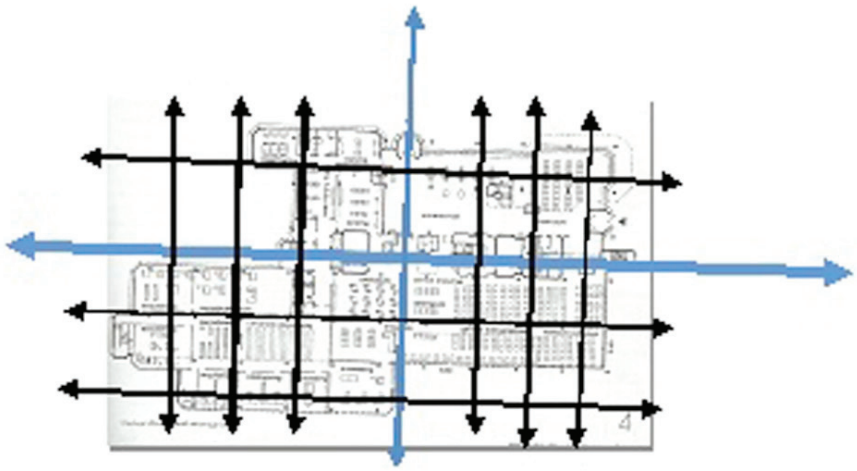

Figure 3. Main motion axes of library [7]

There should be no more than two main axes in a library, as it can create confusion in the blind user. The axes should preferably be perpendicular. In addition, it is suggested that developing secondary axes, parallel to these two axes would further help the user. Central or radial design methods should be avoided as far as possible (Figure 3). If moving from one floor to another is inevitable, the integration of stairs or ramps in compliance with regulatory standards are recommended [9].

7. Flooring

The best floor covering to use in libraries is matting, which must be installed correctly following particular specifications. For example, it should be light-colored, attractive, well-designed, soft and elastic. It should render the movement of chairs, tables and other library equipment as easy, smooth and unobtrusive as possible. The equipment should not deface the matting. Although the use of moquette to cover library floors has been widely employed, there are disadvantages related to hygiene and health, as well as other factors such as staining and dust absorption that should be considered. Matting used at the library entrance should certainly be washable, but should not change or deteriorate as a result [4].

Library floor surface and design for the blind and visually impaired is highly important for the majority of this group of users, as perception of paths and spaces must be realized through identifying marks found on its surface. Therefore, architects should consider the type of path covering, potential contact angles and conditions and other means of perception received through the flooring [2].

Employing a variety of materials with different qualities, considering dimension, roughness, elasticity and flexibility, together with reverberation are additionally invaluable in facilitating mobility of the blind when used in relation to their spatial perception. This would help them to be guided along pre-determined paths and move more easily

around the library by means of their sense of touch; these elements should be planned in an orderly and objective way in the initial design project of the library [2-3].

Matting with tight slippery naps should evidently be avoided in flooring. Variation in the floor level of travel paths makes it easier for the blind and visually impaired to detect, identify and locate the various library spaces. A number of factors including washable matting and their appropriateness and taking into consideration indoor climatic conditions (heating and cooling),should also be considered in selecting flooring material and diversifying the library floor in a methodical way. It is therefore advisable that a well-planned objective design should be followed when planning a library floor layout for the blind and visually impaired.

8. Space between reference shelves

Spaces between reference shelves are called “shelf passageways”. In designing shelf passageways, the passageway width should be considered for easy traffic and movement of the users [6]. The desired width is 90cm (min) and 120cm (max) for the blind using canes.

The width and number of passageways depend on the rate and frequency of traffic and use of the complex. A 2.30-meter width is recommended for heavy traffic between two rows of shelves. For smaller libraries, a width of 1-1.30 meters is sufficient [7] (Figure 4). The width of the passageway should be designed so that users can easily pass through without disturbing those already present in the space. In other words, in libraries for the blind and visually impaired, the width of shelf passageways depends on the size of the complex, user frequency and the width required for the blind to use their canes without hindrance.

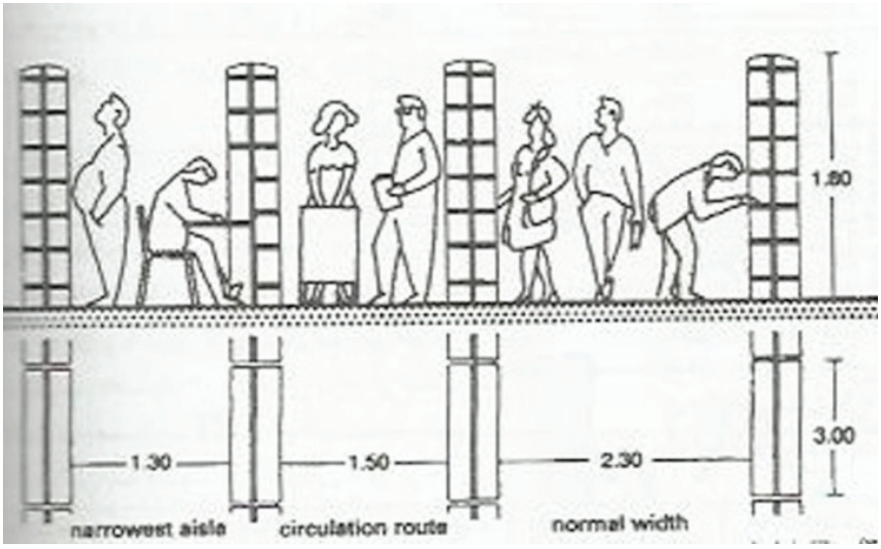

Figure 4. Space between reference shelves [7]

9. Shelf height

The appropriate shelf height is between 110cm (min) and 120cm (max) in order to facilitate the blind user's actions by means of tactile signs and guides positioned on the shelves themselves [7] (Figure 5).

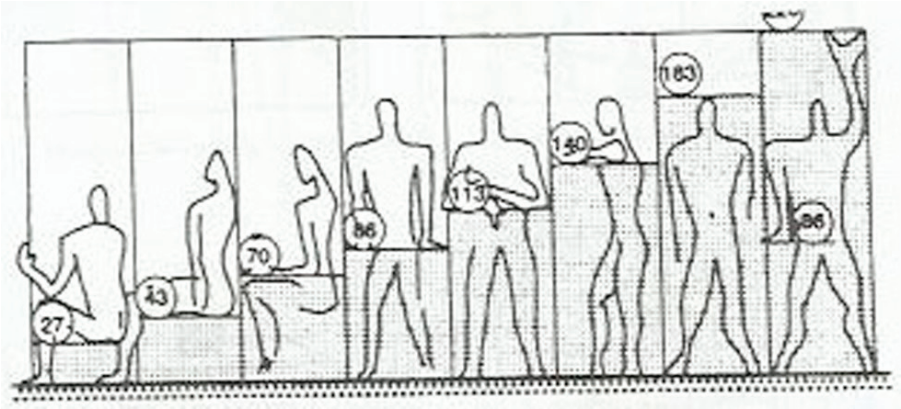

Figure 5. Shelf height [7]

10. Conclusion

The mission of libraries, together with their objectives, is based on culture, education and the enhancement of the level of knowledge and science of society through fulfilling the informational needs of their users. Included in this, is also the consideration of the 5th principle of Ranganathan library science (the library is a living dynamic organism), where growth of the complex, readers and library staff are introduced as effective factors in their growth and clearly refers to the importance of providing the necessary library conditions and facilities to offer services to all users. Libraries are regarded as the most exclusive scientific and cultural centers throughout the world and should offer services to everyone. The minority group of the blind and visually impaired are regarded as potential and actual users of libraries, especially public ones. Evaluating their physical conditions and understanding their problems with regard to their perception of space, can play a significant role in designing an appropriate and effective space to offer quality services to the blind, increase number of library users, improve their accessibility to references and strengthen their self-confidence. Undoubtedly, cooperation between librarians and architects in designing an efficient, appropriate, comfortable and safe space for the blind play an undeniably important role in realizing this mission and achieving these objectives, in accordance with library science standards, regulations and architectural design.

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