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## ENHANCING SPATIAL ORGANIZATION & RELATIONSHIP TO OPTIMIZE EFFICIENCY IN DIGITAL LIBRARY

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### ABSTRACT

A library is a well-planned facility where information's are curated collection from a source or similar resources, selected by experts and are made accessible to a defined community for reference or borrowing is of high importance. A library that is designed with keen consideration on proper spatial organization and relationship to optimize efficiency and ensure it is a digitally considered space. Library should no longer be confined places but should adopt and open spatial plan that will allow interaction between scholars this why including learning commons are necessary, in line with this, emphasis on design methods that will allow for purpose is highlighted here. The functionality of the library space and how this space relate is dependent on how functional and the spaces flow into themselves. Principles and guidelines in achieving this paper carefully examined. This paper therefore seeks to emphasize principles that should be adhered, to ensure the optimization of space and how they relate to themselves through the review of studies and related articles.

**Keywords:** Library, Spatial Organization, Optimal Efficiency, Learning Common.

### INTRODUCTION

The inception of library has followed current trend and this can only be enhanced when spaces are properly planned with high level of functionality and openness. Designing this kind of facility can also be optimally effective when all spaces has a good inter relationship and flow.

#### Flexibility

Library building must be designed and built in such a way as to accommodate any change in library structure and services. The introduction of modern information technology into the library profession has caused reorganization of library services and structure.

To satisfy this current development in the library information systems and reader services, new library buildings now follow the principles of flexibility. It uses unified module size, unified floor height and unified building load Yunliang, (2001). Standards to apply this principle of flexibility. In the 3U standard, the unified module size of library building considers the size and arrangement of regular reading desk and the book shelves in the reading area. It supports the need of flexible separation of library area and save space at the same time.

Yunliang, (2001) stated that in Shanghai-China, in the mid-1980s the module size of library buildings constructed is about 6 to 7.5 m. For example, the size of the Shanghai library and the Bao Jiaotong library at the Shanghai University are both 7.5 x 7.5 m. The unified floor height is about 3.6 to 4.5 m. This height satisfies the natural light and ventilation needs of a library building. Combining with air conditioned and artificial light, readers can be assured of good light and ventilation in all the activity area of the library. Unified building load meets the demand of future development of libraries for openness and for the open stack layout of "combined storage and reading area".

The study of the different types of library has great influence on the the design functionality of the design.

### **Types of Library**

Many institutions make a distinction between a circulating or [lending library](#), where materials are expected and intended to be loaned to patrons, institutions, or other libraries, and a reference library where material is not lent out. Travelling libraries, such as the early horseback libraries of eastern Kentuck and [bookmobiles](#), are generally of the lending type. Modern libraries are often a mixture of both, containing a general collection for circulation, and a reference collection which is restricted to the library premises. Also, increasingly, digital collections enable broader access to material that may not circulate in print and enables libraries to expand their collections even without building a larger facility.

Lamba (2019), reinforced this idea by observing that “today’s libraries have become increasingly multi-disciplinary, collaborative and networked” and that applying Web 2.0 tools to libraries would “not only connect the users with their community and enhance communication but will also help the librarians to promote their library’s activities, services, and products to target both their actual and potential users. Libraries exist in three varying types as explained below.

### **Academic Libraries**

Academic libraries are generally located on college and university campuses and primarily serve the students and faculty of that and other academic institutions. Some academic libraries, especially those at public institutions, are accessible to members of the general public in whole or in part. Academic libraries are libraries that are hosted in post-secondary educational institutions, such as colleges and universities. Their main function is to provide support in research and resource linkage for students and faculty of the educational institution. Academic libraries house current, reliable relevant information resources spread through all the disciplines which serve to assuage the information requirements of students and faculty.

Specific course-related resources are usually provided by the library, such as copies of textbooks and article readings held on 'reserve' (meaning that they are loaned out only on a short-term basis, usually a matter of hours). Some academic libraries provide resources not usually associated with libraries, such as the ability to check out laptop computers, web cameras, or scientific calculators.

Academic libraries offer workshops and courses outside of formal, graded coursework, which are meant to provide students with the tools necessary to succeed in their programs.<sup>[1]</sup> These workshops may include help with citations, effective search techniques, journal databases, and electronic citation software. These workshops provide students with skills that can help them achieve success in their

academic careers (and often, in their future occupations), which they may not learn inside the classroom.

The academic library provides a quiet study space for students on campus; it may also provide group study space, such as meeting rooms. In North America, Europe, and other parts of the world, academic libraries are becoming increasingly digitally oriented. The library provides a "gateway" for students and researchers to access various resources, both print/physical and digital. Academic institutions are subscribing to electronic journals databases, providing research and scholarly writing software, and usually provide computer workstations or computer labs for students to access journals, library search databases and portals, institutional electronic resources, Internet access, and course- or task-related software (i.e. word processing and spreadsheet software). Some academic libraries take on new roles, for instance, acting as an electronic repository for institutional scholarly research and academic knowledge, such as the collection and curation of digital copies of students' theses and dissertations. Moreover, academic libraries are increasingly acting as publishers on their own on a not-for-profit basis, especially in the form of fully [Open Access](#) institutional publishers.

### **Children's Libraries**

Children's libraries are special collections of books intended for juvenile readers and usually kept in separate rooms of general public libraries. Some children's libraries have entire floors or wings dedicated to them in bigger libraries while smaller ones may have a separate room or area for children. They are an educational agency seeking to acquaint the young with the world's literature and to cultivate a love for reading. Their work supplements that of the public schools.

Services commonly provided by public libraries may include storytelling sessions for infants, toddlers, preschool children, or after-school programs, all with an intention of developing early literacy skills and a love of books. One of the most popular programs offered in public

libraries are summer reading programs for children, families, and adults.

Another popular reading program for children is PAWS TO READ or similar programs where children can read to certified therapy dogs. Since animals are a calming influence and there is no judgment, children learn confidence and a love of reading. Many states have these types of programs: parents need simply ask their librarian to see if it is available at their local library.

### **National Libraries**

A [national or state library](#) serves as a national repository of information, and has the right of [legal deposit](#), which is a legal requirement that publishers in the country need to deposit a copy of each publication with the library. Unlike a public library, a national library rarely allows citizens to borrow books. Often, their collections include numerous rare, valuable, or significant works. There are wider definitions of a national library, putting less emphasis on the [repository](#) character. The first national libraries had their origins in the royal collections of the sovereign or some other supreme body of the state.

Many national libraries cooperate within the National Libraries Section of the [International Federation of Library Associations and Institutions](#) (IFLA) to discuss their common tasks, define and promote common standards, and carry out projects helping them to fulfill their duties. The national libraries of Europe participate in [The European Library](#) which is a service of the Conference of European National Librarians (CENL).

### **Public Lending Libraries**

A public library provides services to the general public. If the library is part of a countywide library system, citizens with an active library card from around that county can use the library branches associated with the library system. A library can serve only their city, however, if they are not a member of the county public library system. Much of the

materials located within a public library are available for borrowing. The library staff decides upon the number of items patrons are allowed to borrow, as well as the details of borrowing time allotted. Typically, libraries issue [library cards](#) to community members wishing to borrow books. Often visitors to a city are able to obtain a public library card.

### A Community Library In [Ethiopia](#)

Many public libraries also serve as community organizations that provide free services and events to the public, such as reading groups and toddler story time. For many communities, the library is a source of connection to a vast world, obtainable knowledge and understanding, and entertainment. According to a study by the [Pennsylvania Library Association](#), public library services play a major role in fighting rising illiteracy rates among youths. Public libraries are protected and funded by the public they serve. Bates Hall, the main reading room of the [Boston Public Library, Boston, Massachusetts, United States](#)

As the number of books in libraries have steadily increased since their inception, the need for compact storage and access with adequate lighting has grown. The [stack system](#) involves keeping a library's collection of books in a space separate from the reading room. This arrangement arose in the 19th century. Book stacks quickly evolved into a fairly standard form in which the cast iron and steel frameworks supporting the bookshelves also supported the floors, which often were built of translucent blocks to permit the passage of light (but were not transparent, for reasons of modesty). The introduction of [electrical lighting](#) had a huge impact on how the library [operated](#). The use of glass floors was largely discontinued, though floors were still often composed of metal grating to allow air to circulate in multi-story stacks. As more space was needed, a method of moving shelves on tracks (compact shelving) was introduced to cut down on otherwise wasted aisle space.

### Reference Libraries

A reference library does not lend books and other items; instead, they can only be read at the library itself. Typically, such libraries are used for research purposes, for example at a university. Some items at reference libraries may be historical and even unique. Many lending libraries contain a "reference section", which holds books, such as dictionaries, which are common reference books, and are therefore not lent out.<sup>[28]</sup> Such reference sections may be referred to as "reading rooms", which may also include newspapers and periodicals.<sup>[29]</sup> An example of a reading room is the Hazel H. Ransom Reading Room at the Harry Ransom Center of the University of Texas at Austin, which maintains the papers of literary agent Audrey Wood.<sup>[30]</sup>

### Research Libraries

A research library is a collection of materials on one or more subjects.<sup>[31]</sup> A research library supports scholarly or scientific research and will generally include primary as well as secondary sources; it will maintain permanent collections and attempt to provide access to all necessary materials. A research library is most often an academic or national library, but a large special library may have a research library within its special field, and a very few of the largest public libraries also serve as research libraries. A large university library may be considered a research library; and in North America, such libraries may belong to the Association of Research Libraries.<sup>[32]</sup> In the United Kingdom, they may be members of Research Libraries UK (RLUK).<sup>[33]</sup>

A research library can be either a reference library, which does not lend its holdings, or a lending library, which does lend all or some of its holdings. Some extremely large or traditional research libraries are entirely reference in this sense, lending none of their materials; most academic research libraries, at least in the US and the UK, now lend books, but not periodicals or other materials. Many research libraries are attached to a parental organization and serve only members of that organization. Examples of research libraries include the British Library, the Bodleian Library at Oxford University and the New



York Public Library Main Branch on 42nd Street in Manhattan, State Public Scientific Technological Library of the Siberian Branch of the Russian Academy of Science. Lahore

### **Digital Libraries**

Digital libraries are libraries that house digital resources. They are defined as an organization and not a service that provide access to digital works, have a preservation responsibility to provide future access to materials, and provides these items easily and affordably.<sup>[36]</sup> The definition of a digital library implies that "a digital library uses a variety of software, networking technologies and standards to facilitate access to digital content and data to a designated user community." Access to digital libraries can be influenced by several factors, either individually or together. The most common factors that influence access are: The library's content, the characteristics and information needs of the target users, the library's digital interface, the goals and objectives of the library's organizational structure, and the standards and regulations that govern library use. Access will depend on the users ability to discover and retrieve documents that interest them and that they require, which in turn is a preservation question. Digital objects cannot be preserved passively, they must be curated by digital librarians to ensure the trust and integrity of the digital objects.

One of the biggest considerations for digital librarians is the need to provide long-term access to their resources; to do this, there are two issues requiring watchfulness: Media failure and format obsolescence. With media failure, a particular digital item is unusable because of some sort of error or problem. A scratched CD-Rom, for example, will not display its contents correctly, but another, unscratched disk will not have that problem. Format obsolescence is when a digital format has been superseded by newer technology, and so items in the old format are unreadable and unusable. Dealing with media failure is a reactive process, because something is done only when a problem presents itself. In contrast, format obsolescence is preparatory, because



changes are anticipated and solutions are sought before there is a problem.

Future trends in digital preservation include: Transparent enterprise models for digital preservation, launch of self-preserving objects, increased flexibility in digital preservation architectures, clearly defined metrics for comparing preservation tools, and terminology and standards interoperability in real time.

### Special Libraries

All other libraries fall into the "[special library](#)" category. Many private businesses and public organizations, including hospitals, churches, museums, research laboratories, law firms, and many government departments and agencies, maintain their own libraries for the use of their employees in doing specialized research related to their work. Depending on the particular institution, special libraries may or may not be accessible to the general public or elements thereof. In more specialized institutions such as law firms and research laboratories, librarians employed in special libraries are commonly specialists in the institution's field rather than generally trained librarians, and often are not required to have advanced degrees in a specifically library-related field due to the specialized content and clientele of the library.

Special libraries can also include women's libraries or LGBTQ libraries, which serve the needs of women and the LGBTQ community. Libraries and the LGBTQ community have an extensive history, and there are currently many libraries, archives, and special collections devoted to preserving and helping the LGBTQ community. Women's libraries, such as the Vancouver Women's Library or the Women's Library @LSE are examples of women's libraries that offer services to women and girls and focus on women's history.

The Long Room of the Trinity College Library in Trinity College, Dublin, Ireland. It is a legal deposit or "copyright library" and is entitled to receive a copy of all books published in the UK.

Special libraries are distinguished from special collections, which are branches or parts of a library intended for rare books, manuscripts, and other special materials, though some special libraries have special collections of their own, typically related to the library's specialized subject area.

For more information on specific types of special libraries, see law libraries, medical libraries, music libraries, or transportation libraries.

## LEARNING COMMONS

### **Review.**

The idea of a learning commons has existed for at least two decades, though the terms used to describe it vary. In his discussion of the “teaching library,” Tompkins envisioned a space that would be familiar today as a library commons: “an integrated environment, replete with information specialists working in concert with teaching faculty and rich in courseware and information resources—a facility in which text, animation, graphics, sound and video (and professional support) are configured to meet the needs of the independent learner...” (1990, 78). Tompkins also sets the stage for later discussions on campus collaborations and the importance of informal learning spaces, outside of the traditional formal classroom learning space, by noting that such planning “calls for campus collaboration to devise a facility that will continue—via computer courseware, information software and print products—the learning that is formally initiated in the lecture hall” (78). In the years since the idea of the learning commons was first introduced, discussions and research on the broader issue of campus learning Rethink, Reuse, Recycle 275 spaces has included frequent mention of library commons spaces and has expanded to include virtual learning spaces along with physical spaces Dugdale (2009).

The habits and preferences of Generation Y students, especially their desire for social and experiential learning, figure heavily in the design of learning spaces and the need for integrated and collaborative services to support those spaces and the learning that takes place

within them (Bailey and Tierney 2002; Beagle 1999; Brown; Lippincott 2004).

As part of the transition in both the design of library learning spaces and the terminology used to describe these spaces, the concept of the learning commons has become more prevalent. There appears, however, to be no clear agreement that the learning commons is different from the information commons (or the research commons or just the commons, the term used in this paper). Lippincott acknowledges that she has used the terms “information commons” and “learning commons” interchangeably (2006).

However, Stephen Abraham, in his introduction to Beagle’s *The Information Commons Handbook*, gets at the idea of the shift from the information commons to the learning commons by referring to libraries moving back to a “user-centered approach” (away from a techno-centric focus) and instead using “technology in the service of our clients” (Beagle 2006, vii). MacWhinnie provides some underpinnings for this idea of the learning commons by noting the broader trend to “collocate learning resources with other services for the convenience of users” (2003).

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## ARCHITECTURAL DESIGN CONSIDERATIONS TO ACHIEVING OPTIMAL SPECIAL ORGANIZATION AND RELATIONSHIP.

- **Spatial Planning.**

The planning and layout of a building forms the foundation for all other wayfinding elements. Spatial planning involves identifying, grouping and linking spaces.

Planning a layout involves the identification of spatial units and understanding their purpose, function and relationships to other units. Based on these relationships and functions, units can be grouped into zones of common function/ identity.

Understanding the logical progression of, and relationships between spaces will determine the circulation system and is an important aspect in creating an effective wayfinding system. Directional signs can only do so much to assist users in illogical, complicated routes. The goal is to keep circulation systems simple and legible to a user by reducing the number of decision points, maximising visual access and minimising any change in level and directions in between landmark and nodes.

Comprehending relationships between zones, including the physical and visual access required between them, allows the qualities required in the circulation paths that connect spaces to be explored. For

example, clear lines of sight from car parks to entrances and from entrances to lift foyers or reception counters helps guide the consumer to their destination or to information that will further assist the consumer to navigate the health facility. These visual access requirements will therefore impact how these zones are laid out and connected, for example how open and direct the path is.

Different methods can be used to plan library space and it will attain the openness, flow and functionality.

Below are certain pattern that can be adopted to attain optimal spatial efficiency.

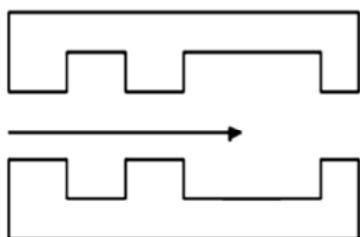


Fig 1: Chain Spatial Pattern.  
spatial pattern

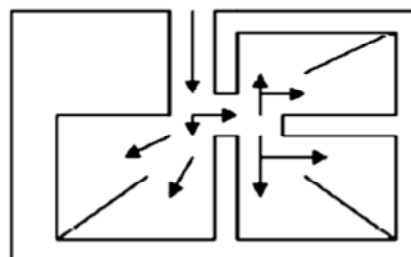


Fig. 2 Window

**Chain (A):** and window pattern **(B):** The main aim of the chain pattern is to allow library users to navigate regarding their interest in displayed books or materials.

**Window (B):** From the central point, Library users can move towards the rooms according to their interests

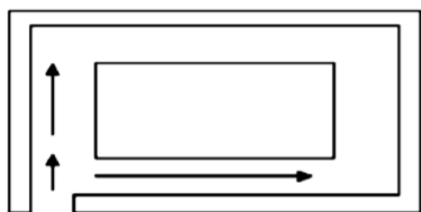


Fig. 3: Central Spatial Pattern:

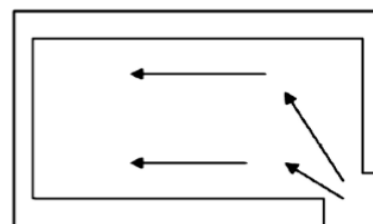
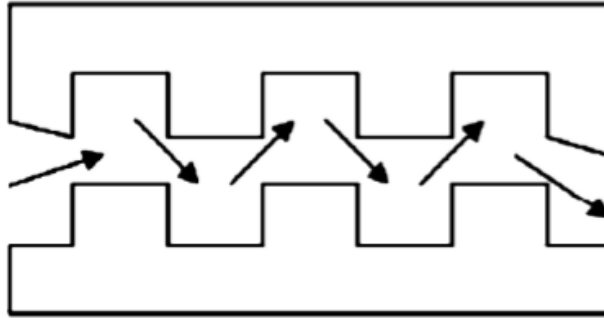


fig 4: Block Spatial Pattern

**Central:** Describing the collection in the center, the aim is to allow Library users to see it from different viewpoints

**Block:** It provides navigation voluntarily and in a random fashion



**Fig 5: Brush Spatial Pattern:** The main aim is to allow visitors to move through the rooms voluntarily.

**Source:** Erbay (1992) in Ash (2005)

The adoption of this patterns can actually as it relate to the designed spaces should be conceptually design to enable optimally actualization of the space and also create inter-relationship of spaces.

## CONCLUSION

The designs of library following the current trends of the technology does not require a boxed in space. It designed spaces should have the attribute of openness in other to allow for flexibility of users and then in turn create spatial inter relationship. This also when imbibe allows for the facility users to have easy access and flow in the designed facility. This reserch therefore can be recommended for further studies as it breaths on the basic guidelines that can enhance proper functionality of a library design.

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