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Rethinking Library Design: A Five Zone Spatial Transformation Framework For Future-Ready Learning Environment In Public Library Design

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Abstract

A significant shift in learning pattern from traditional book learning environment to digital collaborative learning environment has been observed in 21st century. The convenience use of technology for learning and changing reading habit of people has made the perception of traditional public libraries outdated, also the shift in educational model from rote learning to an experimental and collaborative model, had invited flexible spaces in the learning environment. Considering those changes few successful model libraries have transformed by incorporating current technology using a flexible learning environment and still serving as an asset promoting lifelong learning experience to society. This paper will discuss the evolution of library spaces over years and explore the current successful model in library design with case studies, and helps to find different space that can be tailored with traditional Library design to make it sustain as a hub for learning. The research also highlights the need to design based on five zone spatial framework, merging of compatible spaces and adaption of multiuse space design. Also brings out the challenge faced in terms of architectural components and recommends architectural framework for modern Indian library design. This paper contributes to the disclosure on Library updation and offers insight to architects and others to design modern library through five zone and multiuse space design.

Key words : Evolution of library spaces, Library transformation for 21st century, Modern library planning, Public library design, Successful library design, The five zones of modern library.

1.Introduction

Library historically is considered as gateway to knowledge, promoting education traditionally by silent reading halls and book centric spatial arrangement. Soon, library started to evolve more than just a collection of books. Introduction of printing press, development of multimedia resources, digital transformation, need for inclusive learning and change in the educational pedagogy from traditional Rote learning to collaborative learning environment had influenced library design and services rented by public library. Libraries which failed to adopt this changing environment had considered as outdated resulting in negligence of space, declining users and eventually obsolescence. Library do have potential to elevate knowledge of society acting as educational support system at the current age, still helping the people to improve the digital literacy and also helps to bring socially inclusive civic engagement. Adopting to this new paradigm few modern libraries has significantly changed by adopting digital transformation, integrating service with changing pedagogy, focusing on inclusion. Among which few public libraries had faced challenges of resource shortages spatially and financially, resulting to its own downfall. Meanwhile, few researchers proposed the theory of 'Four Space model' which acted as an overlapping and self-sustaining concept emphasis on multifunctional and inclusiveness's in Library design. Following this concept, few successful library buildings have been created

in European context which demonstrated how large public libraries had adopted to the change successful and still shines as a gateway to knowledge. The key design consideration used in successful modern library is flexibility, inclusion to user adopting multi-use space design to accommodate changing activities based on time. A parallel assessment of Indian public library shows a notable gap in digital infrastructure and flexibility in spatial planning. Addressing the need of Indian public library to update itself based on user expectations and changing Pedagogy shift, a transformation is expected to rethink the architectural framework that define modern library design as digital resource networks, e-learning, community learning programs and national priority for improving digital literacy and access to knowledge. Yet, spatial architectural guidance for Indian libraries limited, resulting in buildings that finds difficult to accommodate the modern requirements expected by the people.

This research aims to explore architectural intervention, their challenges and recommends few design strategies to plan modern Library building. This involves five zone model, multi-use strategy and energy efficiency design as a framework for designing modern library to support long-term flexibility.

1.1 Objective

1. To understand the evolution of libraries, spatially and to trace out the activity of modern library to improve user centric design.
2. To discuss the feature of four space model and to suggest design parameters and multifarious space that can be tailored with traditional library design.
3. To rethink Indian public library building as knowledge institute that evolve and remain intact with time.
4. Outlines the challenges faced during the transformation and tries to recommends solution based on architectural terms.

1.2 Methodology

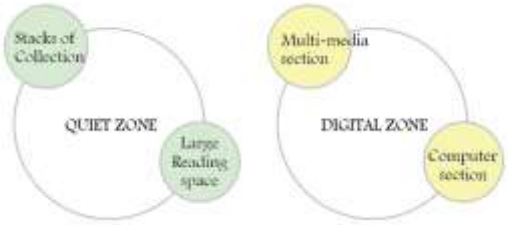
The study takes a qualitative approach of case studies and analysis spatial arrangement to understand the evolution of spaces over time. Explore the concept of ‘four space model’ with comparative analysis of successful library project and cross assessment with Indian successful library. Literature review is made to understand the evolution of library space in Indian context. Secondary data collection to understand pedagogy changes, survey report findings on user expectations and standards/guidelines available in Indian context for designing library spaces

2. Literature review and findings

2.1 Changing spatial character of library design

Since the establishment of public library, the services offered by them and spaces designed to accommodate such services has been in changing phase. One of the common phrases to represent this transformation is collection to creation (**Levine, 2011, p.5)**. Looking at the evolution, the spatial zones of ancient library during king’s period contains extensive stacks of manuscripts and is associated with monastery or temple. With the arrival of British and development of printing press in 19th century, public library started to root in India but accessible for limited people. The spatial zone of colonial library contains stacks of books with large quiet reading spaces. By 20th century development of digital resources and formation of library development committee, focusing to improve the literacy rate (13%) by facilitating adult education and integration of schools and colleges with library invited inclusive and user centric design in library building. Thus, the spatial zone accommodated digital zone and inclusive zone in addition to traditional quiet zone containing stack of books, reading spaces, computer section and group seatings. Presently, 21st century witnessed change in education pattern from rote learning to collaborative and experimental learning environment **(National Education policy, 2020)** and with further development in E-resources and the need to enhance digital literacy and technical skills has made the public library as innovative, participatory and interactive space. In addition to quiet zone, digital zone, inclusive zone, now we have innovation zone and community zone globally making public library as a multifunctional space, promoting lifelong learning to the citizen. The below table shows the spatial transformation of library during different ages.

Table 1: Transformation of spatial zoning in public library over ages

19th century (Traditional layout) • Material: Manuscripts and Books • Introvert in nature	
Early 20th century (Hybrid layout) • Material: Manuscripts, Books, Journals, Periodicals, CD, Audio-Video visuals and multimedia materials • Addition of Computer section	
Late 20th century (Inclusive layout) • Material: Manuscript, Books, Journals, Periodicals, Multimedia, Internet(E-resources). • Inclusive in nature: Children's section, Elderly section, Teen section etc.	
Early 21st century (Extrovert layout) • Material: Manuscript, Books, Journals, Periodicals, Multimedia, (WiFi) E-resources, Hologram, AR & VR. • Collaborative in nature	
Resent (multi-hub layout) • Material: Manuscript, Books, Journals, Periodicals, Multimedia, (WiFi) E-resources, Hologram, AR & VR. • Multi-functional in nature	

2.2 The Nordic Four Space Model of library design

The four-space model was proposed by Dorte slot Hansen, Casper Hvenegard Rasmussen and Henri Jochumsen in 2010. This hybrid model integrates modern digital and physical environment of library helping the community to explore, participate, create and excite **(Henrik, 2012)** through four different spaces namely,

1. Inspirational space (Emotional Engagement): Space designed to attract and inspire the community. Eg: Art installation, Displays etc
2. Learning space (Intellectual Development): Space designed to acquire knowledge through reading books and digital resources.
3. Meeting space (Social connection): Space for community interaction like common area, Group learning etc encouraging democratic participation.
4. Performative space (Creative participation): Space for expressing, sparing and performing like maker studio, creative workshop, theatres and stage.

This model shifts library architecture from a collection driven paradigm to an experience-oriented environment. The 'Book Heaven' of OODI Helsinki Central Library in Finland is the direct embodiment of inspiration space. Diffused daylighting through sculptural roof, panoramic city view and open reading lounge promote deep reading and reflective learning. The 'Learning ramps' of DOKK1 library combine bookshelves, digital workstations and collaborative zone favouring the users the utilize the space to Atten workshops, study individually and use digital creation tool within one cohort space serving as a good learning space. The 'Living Room' of Seatle Central Library creates an urban gathering environment blending movement, conversion and browsing with large, open lively zone connecting public with books, events and interactive functions serving as a great meeting space. The 'Maker space' of Charleston country public library with facilities like 3D printers, Laser cutters and engraving machines, Button makers, sewing and embroidery equipment, heat-press machines and providing tools for prototyping, DIY craft and with local art display, historical exhibits, showcases, events and programmes make an active performative space. The following table shows few activity, spaces and design needs of four spaces.

Table 2: Activities, Spaces and design needs based on Four space concept

Four space Concept	Activities	Programmable Spaces	Design needs
Inspirational	Art display, Exhibition, interactive story wall, Reading area and museum.	Lobby, Transitional spaces or corridors, Reading space, Exhibition Hall.	Minimal Distraction
Learning	Book stacks and reading, multi-media section, access to e-resources, wi-fi enable space to create, do projects and study	Collection area, Reading space, Computer and virtual labs, study pods	Strong power outlets
Meeting	Meeting and discussion, talks, seminars, club activities, play station.	Conference cubes, informal spaces, Multipurpose Hall, play area.	Inclusive design for all

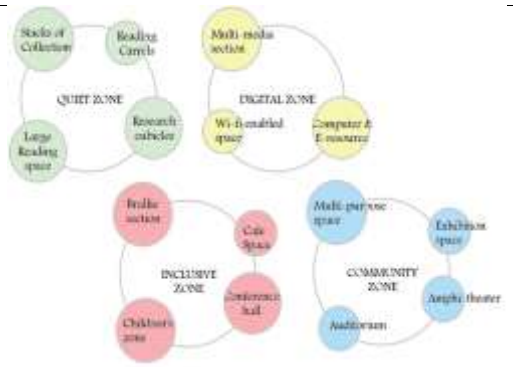
Performative	Events, cultural activity, studios, Fabrication Lab, research labs, co-working for startup's, workshops and training, showcasing performance: music, art, dance.	Maker's space, Auditorium/Amphitheatre, multiuse cubicles, labs, multi-purpose hall.	Hi-Tech infrastructure

This model was first initiated in North European countries; hence it is called as Nordic four space model. It is characterised by user centric, community focused, sustainability and flexibility in design. Following this model Nordic public library started to evolve and was considered successful by design. Few examples are Dokk1 library in Aarhus, Denmark and Helsinki Central library in Oodi in Finland. Both libraries showed high visitor numbers compared to other existing libraries.

2.3 Comparative analysis of successful design of Nordic and Indian library

The four-space model stayed within the European countries but we would trace the similar pattern of spatial program adopted in successful library design within Indian context. One of the best examples is the Anna centenary library in Chennai, inaugurated on 2010 in Tamilnadu, India. The building also holds LEED NC gold rating from IGBC.

Table 3: Comparative analysis of Library spaces

	Anna Centenary Library	**Dokk 1 Library**
Location	Chennai, Tamilnadu, India	Aarhus, Denmark
Opened on	2010	2015
Architect	C.R.Narayan Rao Consultant.	Schmidt Hammer Lessen
Annual visitors	2000 users/day	3000 users/day
Design concept	Public knowledge hub	Urban living room
Four space concept		
Different Zones		

Percentage of spaces	Quiet zone: 60% Digital zone:10% Active zone:10% Collaborative zone: 20% Innovation zone: 0%	Quiet zone: 25% Digital zone: 20% Active zone: 20% Collaborative zone:20% Innovation zone:15%
Structure type	RCC frame supporting medium span (6-8 m) column and beam	Steel with concrete supporting large span (15 - 25m) column and beam
Interaction level	Low, study-focused	High, multifunctional and collaborative
Inclusivity	Segregated zones	Shared spaces
Flexibility	Limited	Adaptable
User centric	Yes	Yes

From the table, the both libraries taken for comparative study are successful in its context attracting millions of visitors annually. We would find similarity and difference in both the library in terms of spatial, functional, structural and programmatic spaces. Anna centenary library is designed as per study focused space following traditional rote learning system eliminating innovation zone and hence dominated by quiet zone contributing 65% of space and also given strongly aligned with inspirational and learnings spatial dimension. The spaces planned in anna centenary library is permanent and is rigid. Whereas Dokk 1 library had successfully balanced mixture of all five zones and fully integrated four space model through flexible architecture, modular layout, movable furniture and long span structural layout with high ceiling demonstrating multi-use space within coherent and fluid layout. Both the libraries are planned based on their user needs, which is the reason for their popularity and survival. The spatial design of Dokk 1 library is planned to transform and take in new activity for the future whereas the spatial design of anna centenary library is planned rigid with limited flexibility to take up new activities. Dokk 1 library architecture serves as a best example to design multifunctional space with high user engagement even when confronted with spatial limitations.

3. Discussion

3.1 Modern Library space programme

Traditional library has equipped only with learning zone (quiet zone) and the modern libraries space program picks the consideration of four additional features which are digital transformation (digital zone), community focused (community zone), Universal design (Inclusive zone) and hybrid learning pedagogy (Innovation zone). Hence, the objective of any public library may differ based on its community/democratic interest or needs. The following table gives idea of few possible activities that can be tailored to traditional library to be considered as modern library.

Table 5: Spatial zones and activities of modern public library

Spatial Zone	Ideal user	Activities and spaces
Quiet zone	Students, researchers	• Book collection • Catalogue section • Journals and periodicals • Magazines/Newspapers • Reference reading zone • Individual reading space • Group reading space
Digital zone	General users	• Computer section • Audio-Video section • Wi-fi enable study cube • Holograms

		• AR/VR Learning
Inclusive Zone	Groups	• Children's – Story telling space, Play area • Teens – Homework/Project cube • College students – Tutorials, Project and group learning space. • After Graduates – Exam Preparation, Skill development Program, Studio/Co-working space, Youth counselling. • Adult – Talks, Yoga, Events, Exhibitions, community meeting • Visually Challenged – Braile section • Socially inclusive programmes – Women's, senior citizen, Farmer's, Self Helping Groups
Community zone	Community	• Cultural Events • Public gathering
Innovation zone	Students, researchers	• Digital Fabrication lab • Podcast Corner • Green Screen studio for video creation • Maker's Studio • Lending tools, tailoring tools etc

From the above table, we would find various activities and their supporting programmatic spaces rather than the activity like collection area and reading area which are the spaces of traditional library. Hybrid library accommodated collection area, reading area and computer labs. Inclusive library depends upon different age group and considers differently abled citizen. It accommodated collection area, reading area, computer or virtual labs, Informal space for storytelling, cafeteria seating/staircase designed seating acting as informal space with multi-purpose hall, conference hall, seminar halls and study cubical. Multi hub library accommodated attractive and open lobby and transitional spaces, multi-purpose hall with acoustic and lighting management, Collection area with book stacks, periodicals, journals, Multimedia, reading space, study pods, computer labs, virtual labs, wi-fi enabled study pods to learn for competitive exams and maker space to create and do projects, Conference cubes, informal seatings, play stations, Auditorium, Amphitheatre and research labs.

The spatial requirement to cater quiet zone, digital zone and active/inclusive zone is already prescribed in IS1553:1989 code. In Indian context, Community zone in library design was born during early 21st century, the new public library laid in urban context during this period had successfully incorporated collaborative zone in its layout (for example: Anna centenary Library, Chennai). Innovation zone is a recently evolving space in library design emerging as the result of National Education policy (NEP), 2020 in India adapting to new pedagogy system of learning. It is a skill driven space supporting digital literacy, creative making and active community learning.

3.2 Library in Indian context

Public libraries in India have been recognised for their potential to be local centres of information and learning, but its current state of disuse and neglection is a major point of concern (Alan Kilpatrick, 2013). National knowledge commission in report to nation 2006, has recommended encouraging community participation in library management so to revitalise library services and to make library more responsive to local needs.

The report on 'Qualitative and quantitative survey of public libraries in India' published during 2018 shows the statistical data of services provided by public library, their users and survey data of desired services needed by the people in public library. According to which we could infer that the library in Indian context is

predominantly book oriented and majority (35%) of user were aged between 19 to 25 years especially college students involved in material collection and research purpose, 24% of users were aged between 25 to 35 years of age who are employed and unemployment using to get employment information, skill development, English language improvement, research purpose and for competitive exam preparation. The survey data of desired services in public library shows that along with reading books people prefers to have wifi (51%), E-resources (47%), photocoping facility(27%), public information (23%), study groups (22%), Events and meetings (18%), Children's programme (14%), film show(12%) and others(19%).

Also, according to National Educational Policy, 2020 the pedagogy encourages collaborative and experimental learning instead of book cantered rote learning. Libraries have been strengthened to support the changing pedagogy.

The majority of Indian public library is still traditional in service especially in villages and towns. The modern library which are purpose built, digitally enable and architecturally designed are emerging and less in number. Following smart India programme and digitalisation steps were taken to transform traditional library model to hybrid model adding digital resources by retrofitting digital infrastructure in to the existing building. Example of which is Connemara public library, Chennai in which digital zone is planned alongside limiting stacks (quiet zone) of traditional library. But still traditional library finds it difficult to accommodate new zones (Active zone, Community zone and innovation zone) without full building replacement. Meanwhile Anna centenary library designed based on modern library service principles had successfully adopted active zone and community zone considering spaces like amphitheatre, auditorium, conference hall and is functioning more efficiently in today's context. But the structural constraints of Anna centenary library may seem to be rigid and not flexible to perform multiple use to accommodate new changes thereafter. Hence, the spatial planning of modern library buildings has to be designed based on four space model which are flexible to adopt new changes and should be designed with multi-use space design approach along with transformable architecture, layered lighting and acoustics and with multi scalar connectivity bringing openness in design.

3.3 Need for Multiuse design strategy in library building

IS 1553:1989 code gives the design principles and spatial aspects of library building in India. According to the code, public libraries in India is classified into 5 categories: National level, State level, city level, District level and block level library. Among which National level, state level and city level libraries should be given spatial requirement with Collection and Reading area, Seminar room, Conference room, Research cubicles, Group study room, Exhibition Room, Computer cell and multimedia room, where we could find the inspirational spaces, learning spaces and meeting spaces already exists in the spatial framework of Indian Library but excluding collaborative and innovative zone. From IS 15339:2003 code we could find the objective of Indian public library which shall act as a cultural centre, recreational centre and relaxation space by reading promoting education, information and culture. It also says that the premises should be planned aesthetically, functional, flexible and capable of extension, most preferably using modular construction.

According to ISO 11219:2012, an international guideline for planning public library building, takes in the changing pedagogy supporting collaborative and innovative learning environment and recommends collaborative zone along with innovative zone like makers space/creation space in addition to quiet zone, active zone, collaborative zone and digital zone and flexibility for adaptable spaces for future needs.

4. Challenges for designing modern public library:

4.1 Need for updated design guidelines: Modern library must balance the 5 spatial zones i.e., Quiet zone, digital zone, collaborative zone, active zone and innovation zone to remain relavent and future proof. Existing Indian norms (IS1553:1989) does not provide guideline to cater modern digital zones, collaborative spaces and innovative zone. This may result in inconsistent spatial allocation, lack of systematic zoning and difficulties in integrating new activities.

4.2 Spatial constraint: Designing with 5 spatial zones separately can take up more area than traditional library and it might seem impossible to adopt in existing library and small scale library especially in rural areas, for which merging of zones could be considered. Poorly planned spatial merging can effect user

experience and reduce the library's ability to support diverse learning needs. Hence it is necessary to set guideline for zone adjacency and design threshold.

4.3 Structural constrains: Indian library buildings have load bearing structures or column beam structure with minimum span designed as single purpose buildings, making it difficult to upgrade itself to new activities. As zone merging becomes a necessary design strategy to accommodate modern library function within limited built environment, structure should be designed based on multi use design strategies with flexible environment.

4.4 Increased energy consumption: Due to advanced digital zones and innovation zones, libraries are said to take in ICT loads and equipment load resulting in high electricity and energy demand. This should be addressed with green building integration, sustainable design and smart energy management.

4.5 Safety Management: Modern library must protect users, staffs, collections, digital assets, equipment and other technological infrastructure, which can be addressed with zoned access, clear sightless and visibility in planning spaces.

5. Recommendations

5.1 Planning for 5 zones of modern library: The main aim of modern library is to ensure life long inclusive learning, accessible to all types of resources, foster creation to build strong community for the future. Hence it is necessary to balance traditional library along with digital, inclusive(active), innovative and community learning environment. All activities of modern library are zoned under 5 different zones having unique character. The spatial distribution following by newly constructed library in India contributes to nearly 60% of spaces under quiet zone, 15% occupied by digital zone, 15% for active zone, 10% for collaborative zone and ad hoc workshop merging with active zone contributing to innovative space.

Fig 1: The Five zones of Modern library

From the survey report, we can infer that people are tending to move more towards digital resources. Also change in pedagogy based on NEP 2020, is leading way for collaborative experimental learning encouraging project-based studies, creative learning and maker's space evolving innovative zones in library. Hence the spatial distribution for modern library spaces should have equal spatial program for all 5 zones similar to the spatial distribution from Dokk 1 library. An ideal distribution for programming library space in Indian context would be 35-40% of quiet zone, 15-20% of digital zone, 10-15% of active zone, 10-15% of collaborative zone and 5-10% of innovative zone. This percentage is preferable to change based on the context and with time, hence it is necessary for the library building to be designed based on multi-use design strategy.

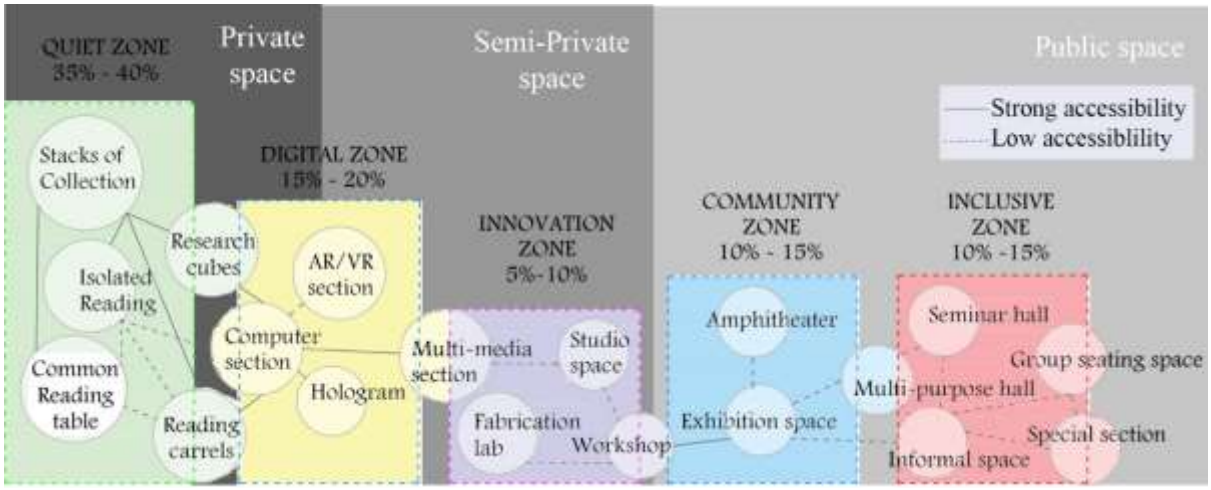


Figure 2: Programmatic diagram showing spatial distribution of modern library

5.2 Merging of 5 zones to function as multi use learning asset: In order to sustain spatial constraints merging of activities becomes predominantly important consideration. Quiet zone being traditional book reading zone needs a silent environment with good seating, lighting and ventilation for comfortable learning. Digital zone uses digital technology needs required infrastructure like placement of electrical outlet, computer cubicles, WiFi enabled spaces for quiet learning, Holograms, AR/VR, Audiovisual for active learning. Active zone considers activity for all kinds and all aged people, this zone has to be designed flexible to adopt any activity any time. Collaborative zone is for community engagement designed with acoustic barriers to conduct meeting or programmes. Innovative zone should be designed to take up high equipment load and should cater high end software.

Quiet zone permits technology use as long as sound is muted. Digital zone not only takes computer section but considers holographic information and AR/VR learning which requires different lighting, electrical requirements and acoustic management. Similarly innovation zone also needs space for heavy instruments, good electrical connections and acoustic management, hence digital and innovative zone can be merged. Inclusive zone and community zone invites people to collaborate as group or as community, hence these zones can be merged.

Table 6: Character and merging potential of 5 spatial zones

	Spatial zones	Ideal user	Character	Integration
1	**Quiet**	Students, researchers	Silent, comfort, Daylight, controlled moment	Low
2	**Digital**	General users	Technology accessibility, visibility and safety	Medium
3	**Inclusive**	Groups	Flexible seating and partitions noisy environment	High
4	**Collaborative**	Community	Active, Acoustic	High
5	**Innovative**	Students, community, researchers	Use of heavy equipment and technology, Experimental friendly and safe	Controlled

The five zone should be given equal importance across both rural and urban library, while metropolitan library can house these zones as distant spatial units, rural libraries with limited building can creatively adapt through outdoor spill over spaces. In village, shaded verandas, semi-open platform or undisturbed street sides can effectively function as active and community zone when needed, supporting gatherings, workshops and cultural activities without requiring additional built-up area. Meanwhile Quiet, Digital, Innovative zone can strategically merge into a multi-functional space using smart acoustic and flexible design environment.

5.3: Use of multi-use design strategies: The spatial distribution of five zones may differ based on context and age, in order to future proof public library building to adopt for changing behaviour of the uses, the structure must be built with multi use design principles. Also modern public library demand high level usage of energy for electricity, lighting and Ventilation, hence it is necessary to design library building based on natural lighting, passive and active ventilation and air movement, thermal comfort, smart lighting, energy efficient HVAC. Requirement for each zone defers based on its function. In order to achieve this principal, core shell model would be applied. Core shell model provides architectural system to evolve over time by separating the function into the core, which is fixed infrastructure and shell being flexible infrastructure. All services-oriented spaces like vertical circulation, HVAC, electrical room, fire escapes, rest room, staff area are placed in the core, this ensures safety and smooth functioning of the building. Shell could contain all the flexible space capable to rearrange without changing the structural system. Hence the shell should be designed with long span column beam, flexible and transformable furniture and partitions, raised flooring, plug and play infrastructure.

Table 7: Placement of five zone in core-shell concept for achieving flexibility design

	Location	**Design for Flexibility**	**Ventilation needs**
Quiet zone	Outer Shell	Highly Flexible	Passive
Digital zone	Inner shell (close to core)	Semi-flexible	Mechanical
Innovative zone	Inner shell (close to core)	Semi-flexible	Mechanical
Community zone	Overlay inner and outer shell	Flexible	Mixed
Inclusive zone	Outer Shell	Highly Flexible	Passive

Quiet zone being traditional book stacks and reading contains movable furniture layout, hence planned in outer shell, flexible to future alteration. Digital and innovation zone used high technology, hence need to be closer to core to receive Wiring and HVAC Connection from the core. Community zone needs acoustic proofing and use of mixed HVAC system for ventilation, hence should be close to core and flexible in space. Inclusive zone needs movable furniture, re-arranging spaces with respect to activity with operable partitions. Hence designed in shell.

6. Conclusion:

This study examined the evolution of library spaces and confirms that a modern public library requires a holistic spatial framework consisting of five essential zone - Quiet zone, Digital zone, inclusive zone, community zone and innovation zone to support digital engagement, social interaction, and creative production. Analysis of successful model helped to identify design strategy contributing to modern Library environment. These benchmarks were compared with Indian Library and we could clearly see the gap in zoning, Digital infrastructure and spatial flexibility in library building. A review on current pedagogical transition in India (NEP, 2020) marked by raising emphasis on experimental learning and collaborative knowledge creation, along with survey report findings on user expectations and government initiative to enhance Digital and community learning has created a need for Indian public Library to transform to continue as Lifelong learning Centre. Majority of libraries in India has still traditional silent book reading spaces, which recently was updating by adding digital infrastructure and has a long way to move on to accommodate all five zone of modern library. When the user need forces to accommodate all five zones in the upcoming age, the library buildings has to be flexible enough to take up the new changes hence the spaces must be designed to adopt new configuration aligning with user expectations. Based on these insights, the study proposes a series of architectural intervention for future public library in India. These include strategic planning of five zones to ensure functional clarity and operational efficiency. Merging of compatible zones to address space constraints especially in small and rural libraries. Use of multi-use designs strategy like core shell model, adaptable infrastructure, long span structural system to enable flexibility, stability and long-term sustainability. Thus, by adopting these architectural intervention libraries can evolve into future ready knowledge centres capable of supporting nation's growing demand.

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