

ORIGINAL RESEARCH

Delineation of Framework for Architectural Ambience of Indian Public Libraries of the Future

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ABSTRACT

This research delves into the transformative potential of architecture in shaping the future of libraries by focusing on spatial quality, facilities, and ambience, placing users' needs and preferences at the core of the investigation. The primary objective is to ascertain whether architecture can and should assume a pivotal role in reshaping the trajectory of libraries. The study extensively explores the multifaceted needs of individuals in futuristic library settings, aiming to decipher whether technological advancements alone suffice or if the incorporation of new technologies alongside captivating spatial environments while preserving the essence of traditional libraries, primarily books, is the key to meeting users' expectations. By centring on users and their desires, this research endeavours to unveil the essential elements that define a futuristic library and elucidate the delicate balance between technological innovation and the timeless allure of literature within the library space, to eventually create welcoming, dynamic spaces that foster community engagement, learning, and exploration within libraries. The methodology incorporated the mixed methods approach. A -comprehensive set of indicators were established through the synergy of available literature which included various existing theoretical and analytical models and case studies. This synergy was further interpreted in the form of a questionnaire. A cross sectional purposive study was conducted through a survey with help of the questionnaire where visitors of 3 public libraries situated in New Delhi participated. The online survey was conducted through Google forms sent to 60 willing participants out of which 60 of them attempted the survey. The rate of response was 68.33% indicating 41 respondents who completed the survey. From results of the data collected through the questionnaires, the analysis and discussions could be derived to arrive at a cohesive direction of the existing theories and the community's idea and aspirations of the image of a modern library to indicate an architectural ambient design approach for the Indian libraries of the future.

Keywords: Futuristic libraries, library ambience, futuristic library image

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INTRODUCTION

Public libraries are described as "the local gateway to knowledge, provides a basic condition for lifelong learning, independent decision making, and cultural development of the individual and social groups" in the UNESCO Library Manifesto 2022. According to the International Federation of Library Associations and Institutions (IFLA) standards, there should be one public library for every 3,000 people. The Raja Rammohun Roy Library Foundation (RRRLF) reports the presence of around 47,000 libraries to date. A 2014 report by the Ministry of Culture (MoC) relies on a survey that says we have 54,846 public libraries. The 2011 National Census states 75,000 libraries.

IFLA itself reports a figure of approximately 154,000 libraries in total. Thus, with over 1.4 billion population and varying literacy levels, India needs more public library units. Public libraries act as catalysts for promoting literacy by offering reading materials, organizing literacy programs, and supporting educational pursuits. The advent of digital technologies has revolutionized the way information is accessed, shared, and consumed. E-books, online resources, and digital media have gained popularity, challenging traditional library formats. Public libraries must adapt to these shifts and cater to the diverse needs of their users. This study will help learn and focus on rethinking the roles of public libraries as per

the plethora of emerging demands such as specialized collections, career development resources, spaces for entrepreneurship, and cultural activities, workshops, seminars, platforms for local authors, artists, researchers, and so on, thus enabling libraries to become vibrant community hubs.

BACKGROUND

Understanding library as a spatial entity and its spatial framework

The PLACE project, Public Libraries Arenas for Citizenship, which received funding from the Norwegian Research Council delves into the role of libraries as communal spaces and their potential to nurture community bonds and generate social cohesion by studying 3 library branches. Their findings concluded that public libraries have the potential to function as central hubs for cross-cultural, cross-generational, and cross-socioeconomic interactions, as they are institutions frequented by various segments of society (Aabø et al., 2010). Audunson and Aabø conducted an extensive observational study in the same 3 libraries to better comprehend how users utilise the library while gaining a greater grasp of the library's social function. Through the observations, library as a space was categorized into public, private and parochial realm (Audunson R. et al.,2012).

- Library as a public space with private activities
- Library as a place to experience cultural plurality
- Library as a place for joint activities and parochial realm

The authors Watkins and Kuglitsch in their research, advocated for service-learning programs as a mutually beneficial framework for librarian-user collaboration, with special emphasis on students and young adults.

Libraries have engaged their users to enable better understanding of service-learning courses within the implementation of interconnected spaces. It achieved the desired objective of fostering environments which promote informal learning behaviours. Curiosity, discovery, and exploration are the basis for this informal learning process. The librarian needs to be connected to the user, the user to available resources, and different disciplines to one another. The essence of these areas was the blending of science with art, signifying that creativity in science and accuracy in art were not contradictory. The achievement of such a dream demands experimentation and initiative, but the process may be possible with only then when hands on and active learning programs sustain it. Ultimately, such libraries provide support to the intentional as well as informal learning of users (Watkins and Kuglitsch, 2015).

Four space model

The model encompasses four interconnected "spaces": the inspiration space, the learning space, the meeting space, and the performative space (Jochumsen M. et al.,2012). These spaces are designed to collectively advance four key objectives for the future of public libraries:

- enhancing the spatial experience,
- promoting community involvement,
- empowering individuals, and
- fostering innovation

It is important to note that these four spaces should not be perceived as fixed physical rooms; rather, they represent versatile opportunities that can be realized both within the physical library and in the digital realm of cyberspace.

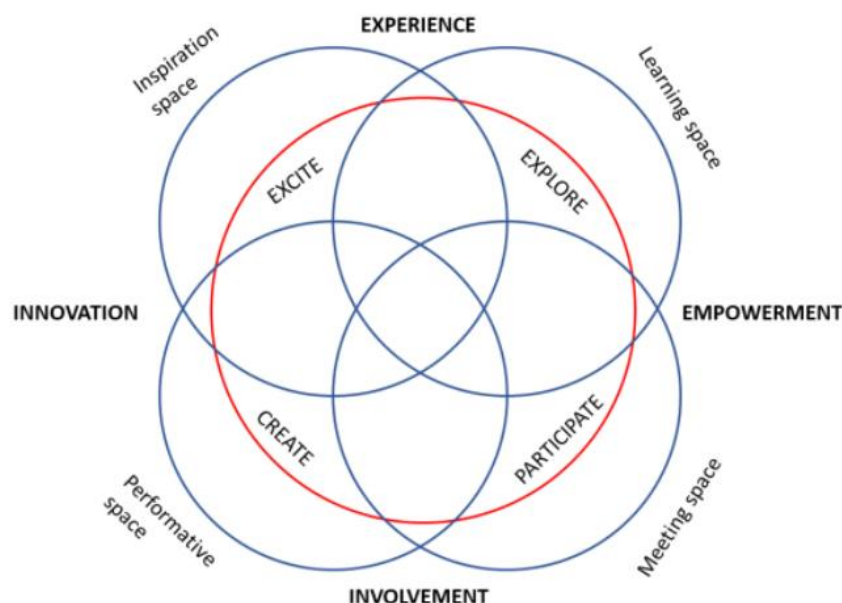


Figure 1The four spaces by Dorte Skot-Hansen, Henrik Jochumsen and Casper Hvenegaard Hansen. Source: Skot-Hansen, Jochumsen and Hansen.

The library's model comprises four distinct but interconnected spaces, each serving a specific purpose:

- Inspiration Space
- Learning Space
- Meeting Space
- Performative Space
- Collaborative Space
- Sanctuary Space
- Interaction Space
- Community Space

Space assessment tools for spaces in library

Fred Kent, an architect, and the founder of the Project for Public Spaces, has emphasized that while people may no longer rely solely on libraries for meeting their information needs, they are likely to visit a library if it is considered a "desirable place". Kent identifies four key characteristics that contribute to desirability:

- Access and Linkages
- Uses and Activities
- Sociability
- Comfort and Image

Corral along with her students carried out a library space assessment which was a review and a professional case study. Student groups engaged in a comprehensive evaluation process that involved defining their assessment criteria, conducting quality assessments at individual sites, and performing cross-case analyses to generate recommendations for improvements. Their efforts were guided by a growing interest in learning space assessment as indicated in the literature. This trend represents a tendency towards the application of mixed methods, namely, quantitative and qualitative approaches with greater attention to ethnographic methods supported by multimedia tools. Another emerging trend is to design holistic toolkits and frameworks that will be used for evaluation purposes (Corral S., 2016).

Another student group used two separate frameworks Fig 2. It used the combination of the Standards. By visually compiling these frameworks into a somewhat modified composite version, they sought to successfully achieve a more holistic analysis of library spaces than just a simple list of criteria. Their rationale was to utilize the ACRL standards for structuring their observations while using Cunningham and Tabur's pyramid structure to provide contextualization. This innovative combination provided both a conceptual framework that would help to make sense of library space and an operational set of elements on which to concentrate in the assessment, and this can make the assessment of the functionality and effectiveness of a library more powerful.

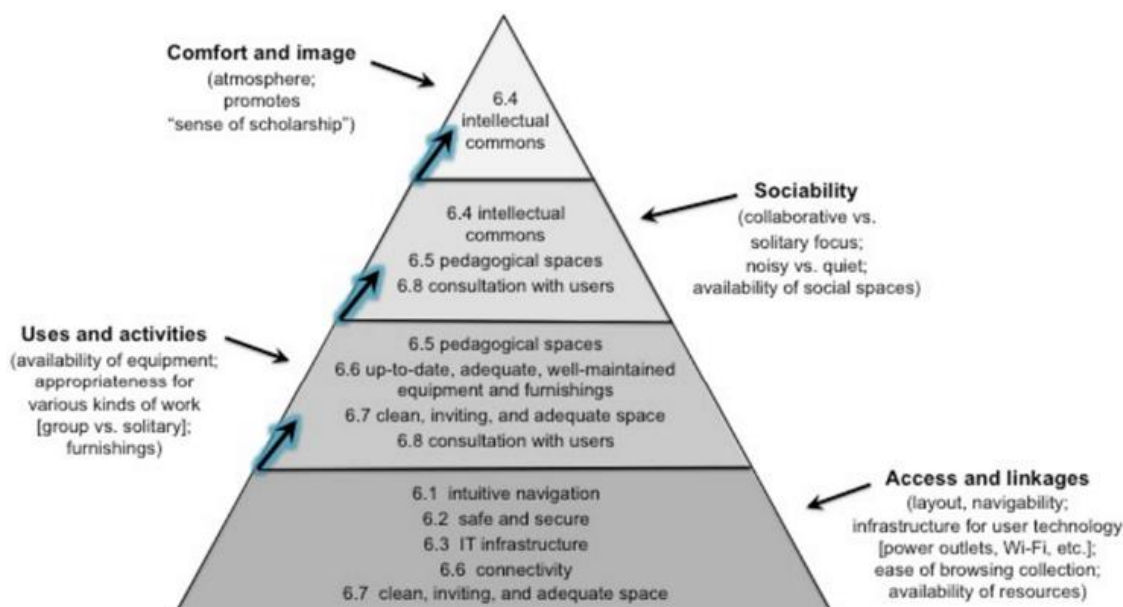


Figure 2. Composite Hierarchy of Space Assessment Criteria (ACRL standards). Source: Sheila Corral

TEALS assessment framework

The Tool for Evaluation of Academic Library Space (TEALS), was developed at Deakin University, Australia, (Abassi et al. in 2012 and 2013). TEALS is

an assessment and prescribing tool. It does not only provide the identification of problems but also offers recommendations for the possible intervention and improvement to be made. It can be described as a

"reflective" and "empowering" tool; it is friendly, rapid, and convenient to apply. TEALS takes into account both the functional and design aspects of a firm and social dimensions and are emotional (experiential) and easily fall under Cunningham and Tabur's (2012) framework. From massive research and visits to the library sites, the TEALS framework, according to Abassi et al. in 2012 and 2013, consists of ten Criteria of Quality that contribute to its overall effectiveness.

- Establishing a positive image and identity.
- Creating an inviting and welcoming entry point.
- Adapting to changing needs and fostering flexibility.
- Offering a range of spaces to accommodate diverse users and purposes.
- Cultivating an environment that evokes a sense of place and inspiration.
- Prioritizing a people-centered and social atmosphere.
- Ensuring functionality and operational efficiency.
- Effectively integrating cutting-edge technologies.
- Guaranteeing both comfort and sustainability in the surroundings.
- Addressing concerns related to access, safety, and security

In her research, (Corrall S., 2016), with the help of one of the student groups used the TEALS framework to conduct a quantitative assessment using a standard 10-point numerical scale to assess all the ten criteria of the framework.

Key design concepts of libraries

User centric design

Author Aaron Schmidt devised the three primary principles of user experience (UX) design:

- Useful
- Usable
- Desirable

Activity centric zoning

In his research, Kabel Nathan Stanwicks explores the process of zoning within a library, specifically focusing on the allocation of spaces for silent study, quiet study, and collaborative study areas. At the University Libraries, a systematic approach was taken to understand how library patrons utilized the facilities. Through meticulous floor counts and data collection, three distinct categories of spaces were defined: collaborative zones, quiet zones, and silent zones. (Stanwicks K.N., 2016)

In collaborative zones, library users are encouraged to engage in group work, allowing normal speaking voices and permitting the use of headphones with mobile devices and computers.

In quiet zones, occasional quiet discussions are acceptable, but cell phone conversations are not allowed.

Users should have their cell phones on vibrate mode for a peace ambience.

Silent zones, by contrast, are purely silent areas. No noise shall be produced, like chatting, and all other electronics must be placed on silent. Headphones are strictly used for any audio outcoming. These well-defined zones were created to answer the different needs and requirements of library users in regards to studying and working. For these distinctions above, the library further invested electrical and data upgrades in each zone to serve specified requirements particular to its user.

Nayana Wijayasundara, in his research, aimed at the objective to propose a framework for library space planning based on the experience gathered at the University of Sri Jayewardenepura (USJP) library. The paper focuses on the significance of space planning in libraries, keeping in view the exponential growth of information, the increase in student numbers, learning and teaching innovations, technology advancements, and other changes. The framework will provide spaces that meet the current and future needs of library users, focusing on student needs and priorities. (Wijayasundara N., 2018). The devised framework according to the data collected comprised four main aspects: Knowledge Reservoirs, Learning Zones, Interactive Spots, and Service Areas.

This Knowledge Reservoir Zone is a place in the USJP library where actual printed materials are kept-books, journals, and other relevant reading materials. The need to store was one major concern for a library of such magnitude; however, it has largely been put on the wayside now as online, electronic resources become added regularly. The Knowledge Reservoir Zone includes the Lending Collection, Permanent Reference Collection, Scheduled Reference Collection, Periodicals Collection, and the Ceylon Room. (Wijayasundara N., 2018) Learning Zones, are areas that are designated for user reading and studying. The learning zones are student-centered spaces with adequate seating and individual study carrels. The largest Learning Zone in the library is a dedicated reading room with a separate entrance. There are other Learning Zones integrated with Knowledge Reservoirs (Wijayasundara N., 2018). The designated Interactive Spots are areas where library customers can socialize, relax, and use their own or library-provided technological gadgets. These spots include the lobby, staircases and trolley ways, and the English Zone. The lobby area includes movable benches, tea and coffee vending machines, and Wi-Fi facilities. The English Zone is designed particularly to help users learn the English language, with comfortable seating and adjustable revolving racks for books. Gadget corners are also provided in the lobby area, especially designed furniture items with computer tables for the users to browse the internet or check their emails.

Overall, the library aims to create technologically rich and inviting spaces for its users. (Wijayasundara N.,

2018). Service zone (Fig 7) are areas including IT, acquisition, cataloguing & processing, photocopy center, cloakroom, and other office spaces. They directly deal with customers and provide specific services such as book borrowing, photocopying, inquiries, and beverage facilities (Wijayasundara N., 2018). The Knowledge Reservoirs occupy the largest area in the library, accounting for approximately 38% of the total floor area. The Learning Zones cover about 32% of the total library floor space. Interactive Spots make up around 18% of the total area. Service Areas account for approximately 12% of the total floor space. (Wijayasundara N., 2018). The study shows that while the influence of technology has led to a decline in traditional print media, it is important to acknowledge that print materials continue to hold relevance for users. Furthermore, when considering library design, it is crucial to recognize that interactive spaces extend beyond traditional reading areas. These interactive zones encompass lobby spaces, entrance areas, and transitional spaces such as staircases and walkways. These transition spaces play a significant role in library zoning and can effectively serve the purpose of encouraging user interactions without causing disruptions to other library patrons.

Aesthetics

Certain factors such as natural lighting, personal space, motivational quotes, computer access, warm lighting, and tech-rich facilities play an important role in learning space whereas other factors such as noise, black and white (color scheme), and traditional and cultural art styles are least preferred in present time (Chauhan A., 2021).

The authors Gorantonaki and Uzzell in their research stated that libraries have transitioned from being predominantly solitary study spaces to environments that actively encourage social interaction.

In this modern setting, the libraries have expanded their spaces to make the study setting more comfortable, and elements such as "coziness" are becoming relevant. Coziness as an element goes beyond to emotional comfort, which describes feelings of control, security, and emotional connection through these spaces. Lastly, physical and social warmth complements the cozy atmosphere with the environment being inviting yet fostering positive social interactions with users. It is a multi-dimensional design solution for transforming libraries into warm, beautiful, and emotionally fulfilling study spaces.

Design considerations for library space

Libraries should explore many of the key design concepts as described by various authors. To be considered a success, a library must feel domestic rather than institutional.

Libraries must prioritize comfort, safety, proper lighting, and flexibility in their design. This entails allowing patrons to move freely between various

spaces within the library, fostering a sense of inclusivity and adaptability. (Mathews and Soistmann, 2016) In essence, library spaces should align with the actual behaviours and preferences of users rather than adhering to normative, idealized, or outdated assumptions

- Strategic role of space
- Versatile spatial offerings

Flexible design for spaces and furnishings

Adaptable zones enable individuals with varying preferences to discover an area that aligns with their requirements and work patterns. However, it's essential to emphasize that flexibility is more about the structural layout of a space, rather than merely having mobile furniture (Dallis, 2016). The concept of flexibility fosters a conducive learning environment by acknowledging the social aspects of learning, empowering users to tailor the arrangement of their study area (Bennett, 2007). Additionally, enhancing the mobility of technology and removing bulky, fixed service stations can enhance the adaptability of a space (Dallis, 2016). Users aren't necessarily abandoning libraries altogether; they're just using outdated or uncomfortable facilities less frequently. Consequently, offering spaces that permit the easy reconfiguration of furniture and the movement of individuals is likely to attract a more extensive user base.

Enhancing and captivating environments

Libraries should also have spaces which give delight and wonder to the users. (Kent, 2005). This could include exhibits highlighting rare and delightful library-owned content. It could also include celebrations of learning—items like scientific posters, engineering models, the results of research projects, and user-created art installations (Bennett, 2007). When designing, it is important to leave some spaces unfinished and discover the unpredictable uses imagined by learners (Mathews and Soistmann, 2016).

Lighting

Natural Lighting

The authors Swaris and Perera conducted case studies for their research in order to identify the optimum reading light for visual comfort and how it affects users psychologically. Three case study libraries with different daylight integration strategies are selected for analysis: University of Moratuwa (UoM) with side lighting strategies, University of Kelaniya (UoK) with top lighting strategies, and British Council Library (BCL) with a combination of clerestory windows and side windows (Swaris, W. et al. 2017).

The UoM reading space was preferred by the subjects due to its low lighting and non-uniform illuminance within the space. However, it was noted that the UoM space lacked diffused daylight and had the presence of glare.

UoK Case Study: The UoK reading space utilized top lighting strategies with a saw-tooth roof form, which provided diffused daylight and was devoid of glare.

However, the users did not like this space due to its high light levels.

BCL Case Study: In BCL reading space, clerestory windows with side lighting strategies gave diffused daylight. The space was said to be the most comfortable as it had no glare or specular reflections. Daylight combined with white colour surface was cool and favourable for reading.

From the case studies, it can be seen that glare and reflections are the major factors affecting visual comfort in library spaces. Glare causes discomfort and distraction, while reflections cause visual disturbances and readability is reduced. To achieve visual comfort, it is necessary to design lighting strategies that reduce glare and control reflections. This can be achieved by proper placement of lighting, diffusing light sources, and using appropriate materials to reduce reflections.

Artificial lighting

In good illumination of a library, there are some critical factors in effective designs, such as the technical need for lighting. For example, if it is assumed that it would be enough at 300 lux to have proper lighting with no glare and discomfort to the human sight or vision; there will be no form of sickness for people who will sit inside a library.

There are many uses of colors in lighting because color helps to bring various impressions and, therefore, cause reactions to human beings. Different colors of light can influence different emotions and moods. Warm and soft lighting gives a warm and relaxed impression, while cool lighting provides a vibrant and energetic feel. Choice of color in lighting design can assist in establishing the desired atmosphere and enhance the overall experience of a space. However, contrast in lighting also tends to influence the visual feel of a space. Contrast environments which are highly set between light and dark contrasts can give a feeling of hierarchy and can be of immense help in drawing attention toward specific objects or spaces, while low contrast environments bring the comfort and relaxed feeling with a person. (Cungiono K. et al., 2021).

Acoustics

People's judgment on whether the acoustic environment is sufficient and acceptable in multifunctional public libraries can even be more closely tied to how they perceive their acoustic environment and what brings them there, rather than objective measures of sound. (Xiao J. and Alletta F., 2016). The study considered the needs and preferences of various user groups, their perceptions of sound environment, creating acoustic space hierarchy and the utilization of acoustic materials with various colours and patterns were some of the interventions proposed in the study.

Designing into the future

While new library buildings are being constructed, stakeholders should embrace the new standards of building design. With a surge in internet users and declining reading habits, it's crucial to evolve from traditional book-based libraries to 21st-century spaces. It's time to envision and construct forward-thinking, future-oriented libraries to meet evolving needs. Providing different types of spaces for readers like individual setting, group discussions, study carrels, meeting spaces for community growth, inspiring spaces for creating art and open garden spaces can be a way forward (Handa T.S., 2021)

Observation

The evolution of libraries has transformed them from traditional repositories of books into multifaceted spaces encompassing public, private, and specialized domains. With changing learning paradigms, education has expanded beyond the confines of printed materials to incorporate audio-visual and kinaesthetic modalities. Consequently, researchers have put forth various spatial frameworks to cater to the contemporary requirements of library users.

In response to these evolving needs, researchers have developed spatial assessment tools for both qualitative and quantitative evaluations of library environments. It is evident that the design of library spaces should prioritize user-centric approaches. Effective zoning, aligning with the library's diverse functions, is crucial to accommodate patrons' distinct needs. Aesthetics also hold a central role in the design process, significantly influencing the outcome. Researchers have also emphasized the versatile utilization of space to enhance the overall quality of library design. Considerations such as lighting, encompassing both natural and artificial sources, and the acoustics within a library space profoundly impact its ambiance.

While it is imperative to adapt libraries to meet users' evolving demands, researchers also underscore the importance of preserving the traditional aspects that define these institutions.

Survey

A qualitative cross sectional survey was done where the purposive sampling of library visiting people was conducted with the help of questionnaires. The questionnaire was generated from the synergy of the background and literature review. Visitors of 3 public libraries situated in New Delhi were directly physically approached and requested to participate in the survey by the second author. Once a member consented to be a part of the survey, they made aware about the purpose of the research, assured about maintaining their anonymity and that the survey and the research was purely for academic research purposes and no commercial intentions. They were also informed that by participating and completing the survey they were consenting to be a part of the survey. The data was collected through google forms sent

through an anonymous link via the mobile app Whatsapp from 1st to 30th November 2023. The questionnaire was sent to 60 willing participants out of which 60 of them attempted the survey. The rate of

response was 68.33% indicating 41 respondents who completed the survey.

The survey had a questionnaire of 23 items out of which 4 indicated quantitative demographic data.

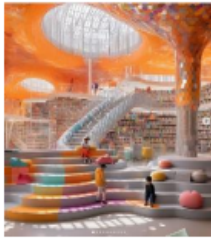




Questionnaire







Table 1 Table depicts the questionnaire indicating the details of the items circulated via Google Forms

Demographics	
Item 1	What is your age? (Multiple Choice Question)
option a	5 to 12 years
option b	13 to 17 years
option c	18 to 40 years
option d	41 to 59 years
option e	60 years and above
Item 2	What is your gender (Multiple Choice Question)
option a	male
option b	female
option c	other
Item 3	What is the highest level of education you have completed? (Multiple Choice Question)
option a	Less than high school
option b	High school or equivalent
option c	Bachelor's degree
option d	Postgraduate degree
option e	Doctorate/PhD
Item 4	What is your current occupation? (Multiple Choice Question)
option a	Student
option b	Employed full-time
option c	Employed part-time
option d	Self-employed
option e	Seeking opportunities (preparing for entrances/ looking for jobs/, etc.)
option f	Retired
option g	Homemaker
Library Adventures: Your Visits & Experiences	
This section aims at understanding your visits and experiences of present day libraries.	
Item 5	How often do you visit a library? (Multiple Choice Question)
option a	Daily
option b	2-3 times a week
option c	Once a week
option d	2-3 times a month
option e	Once a month
option f	Rarely (a few times a year)
option g	Never
Item 6	If visited less frequently, kindly state the reason behind the reduced frequency of visits.
option	(Fill in the Blank Paragraph Space)
Item 7	If visited frequently, kindly state the positive points that encourage you to visit libraries frequently.
option	(Fill in the Blank Paragraph Space)
Item 8	What is the primary reason for your library visits? (Checkboxes)
option a	Borrowing books and materials
option b	Studying and doing research
option c	Attending events and workshops
option d	Recreational activities (group discussions, study groups, formal/informal meetings etc.)
option e	Spending family time with partner/child
option f	Bunking sometimes
option g	Reading comics, manga, about other cultures
option h	I read comics
Item 9	What do you most enjoy about visiting a library? (Checkboxes)
option a	Quiet and peaceful atmosphere
option b	Meeting and connecting with people
option c	Engaging with books and information
option d	Connecting with people of similar interests
option e	Never visit
Item 10	Describe your current library experience in up to five adjectives, including both positive and negative ones
option	(Fill in the Blank Paragraph Space)









Designing Tomorrow's Libraries: Your Preferences








Explore your vision for the libraries of the future by sharing your preferences in this section. It will help create innovative and user-centric spaces that cater to your needs and desires





Item 11	Do you support the idea of reimagining libraries to better meet today's needs, moving beyond traditional concepts?
option	Linear scale of 1 to 5 with 1 equating to strongly disagree and 5 equating to strongly agree
Item 12	If yes, do you think changing the quality of spaces within a library will help in its reimagination?
option a	Yes
option b	No
option c	Maybe
Item 13	Which of the following space will encourage you to spend more time in the library and enjoy the ambiance? (Checkboxes)
option a	More engaging and colourful décor  <i>Questionnaire Figure 1 source: https://www.instagram.com/celestedesign-studio/p/CtCSWARutRj/?img_index=1</i>
option b	Creating designated family-friendly areas.  <i>Questionnaire Figure 2 Source: https://www.theguardian.com/books/2019/dec/10/state-library-victorias-triumphant-redesign-its-not-just-about-books-but-community</i>
option c	Offering a variety of seating options (e.g., bean bags, traditional chairs)  <i>Questionnaire Figure 3 Source: https://www.rightman-group.com/</i>
option d	Incorporating diverse cultural elements in the design  <i>Questionnaire Figure 4 Source: https://x.com/japanfoundation/status/1542691255905177601?mx=2</i>
option e	All of the above
Item 14	Which type of lighting do you like best for a library: natural light from windows or the artificial lighting from lamps and fixtures? Please choose from the images below (Multiple Choice Question)
option a	Option 1  <i>Questionnaire Figure 5 Source: https://www.archdaily.com/297897/helsinki-central-library-competition-entry-ooda/library23</i>

option b	Option 2		<p>Questionnaire Figure 6 Source: https://www.archdaily.com/793332/yangzhou-zhongshuge-x-plus-living?ad_medium=office_landing&ad_name=article</p>
option c	Option 3		<p>Questionnaire Figure 7 Source: https://www.archdaily.com/882819/tianjin-binhai-library-mrvd-plus-tianjin-urban-planning-and-design-institute</p>
option d	Option 4		<p>Questionnaire Figure 8 Source: https://www.archdaily.com/948542/dujiangyan-zhongshuge-bookstore-x-plus-living/5f70d52863c017c26200027c-dujiangyan-zhongshuge-bookstore-x-plus-living-photo</p>
option c	Option 5		<p>Questionnaire Figure 9 Source: https://amazingarchitecture.com/futuristic/futuristic-library-in-london-uk-by-miroslav-naskov-mind-design</p>
Item 15	<p>On a scale of 1 to 5, how much does having green spaces integrated into the library matter to you in order to bring a touch of nature into the library environment?</p> <p>Questionnaire Figure 10 Source: https://www.instagram.com/crazy_architecturee/p/CxxlXKYs4dY/?img_index=2</p>		<p>Questionnaire Figure 11 Source: https://www.instagram.com/celestedesign.studio/p/CtCSWARutRj/?img_index=5</p>
option	<p>Linear scale of 1 to 5 with 1 equating to Least Important and 5 equating to Most Important</p>		
Item 16	<p>Would you like libraries to have extended hours and additional facilities, offering a different ambiance during late evenings/nights and weekends? (Multiple Choice Question)</p>		
option a	<p>Yes</p>		
option b	<p>No</p>		
option c	<p>Maybe</p>		
Item 17	<p>If yes, please select from the following options regarding the facilities you would like to see.</p>		
option a	<p>Sleep pods</p> <p>Questionnaire Figure 12 Source: https://www.theglobeandmail.com/business/technology/article-tech-companies-make-room-for-the-office-power-nap-recognizing-the/</p>		

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<p>option b</p>	<p>Access to outdoor/rooftop study areas</p> <p>Questionnaire Figure 13 Source: https://budget.edem.ua/631150000/project/19778?return=project:</p>	
<p>option c</p>	<p>Music jamming rooms</p> <p>Questionnaire Figure 14 Source: https://skyscraperpage.com/forum/showthread.php?t=241606&page=2</p>	
<p>option d</p>	<p>Podcast and recording studios</p> <p>Questionnaire Figure 15 Source: https://skyscraperpage.com/forum/showthread.php?t=241606&page=2</p>	
<p>option c</p>	<p>Light therapy stations</p> <p>Questionnaire Figure 16 Source: https://signalhfx.ca/halifax-public-libraries-offer-light-therapy-lamps/</p>	
<p>option f</p>	<p>Outdoor movie screenings/book readings</p> <p>Questionnaire Figure 17 Source: https://www.timeout.com/montreal/news/the-best-free-outdoor-movie-screenings-in-montreal-this-august-080422</p>	
<p>Item 18</p>	<p>On a scale of 1-5, how important is it for libraries to have ancillary spaces for relaxation and meditation like these?</p> <p>Questionnaire Figure 18 Source: https://www.archdaily.com/892208/explore-these-architecturally-innovative-bookcases/5acbb3c7f197ccbe8a000093-explore-these-architecturally-innovative-bookcases-image</p>	
<p>option</p>	<p>Linear scale of 1 to 5 with 1 equating to Least Important and 5 equating to Most Important</p>	
<p>Item 19</p>	<p>Which of the following futuristic ambiance features and activities would enhance your library experience?</p>	
<p>option a</p>	<p>Interactive learning art installations</p>	 <p>Questionnaire Figure 19 Source: https://www.killadesign.com/portfolio/museum-of-the-future/</p>
<p>option b</p>	<p>Cozy reading nooks with advanced lighting</p>	 <p>Questionnaire Figure 20 Source: https://www.instagram.com/celestedesign.studio/p/CwdfB4etKq-?img_index=1</p>

option c	Indoor plants and greenery		<p>Questionnaire Figure 21 Source: https://www.instagram.com/celestedesign.studio/p/CtCSWAruTrj/?img_index=6</p>
option d	Interactive storytelling sessions		<p>Questionnaire Figure 22 Source: https://www.world-architects.com/en/architecture-news/building-of-the-week/an-ode-to-the-educated-citizen</p>
option e	Integration of augmented technology		<p>Questionnaire Figure 23 Source: https://www.instagram.com/celestedesign.studio/p/Cxf94latfhl/?img_index=3</p>
option f	Virtual reality gaming tournaments		<p>Questionnaire Figure 24 Source: https://www.tapscape.com/vr-technology-the-latest-innovations-and-uses/</p>
option g	Science and technology learning exhibits		<p>Questionnaire Figure 25 Source: https://ideum.com/news/ideum-life-science-exhibits</p>
option h	Flexible open plan spaces (large atriums) for group discussions, informal meetings, study groups, author signings, performance spaces, etc.		<p>Questionnaire Figure 26 Source: https://www.archdaily.com/882819/tianjin-binhai-library-mvrdv-plus-tianjin-urban-planning-and-design-institute</p>
option i	None, I prefer a conventional library		<p>Questionnaire Figure 27 Source: https://cu7ious.medium.com/the-power-of-a-book-or-how-to-use-static-libraries-in-c-a20cf26b5483</p>

<p>Item 20</p>	<p>In addition to conventional library spaces, do you feel the need to bring library spaces into open area like below images keeping in mind Indian context and conditions? (Multiple Choice Question)</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>Questionnaire Figure 28 Source: https://x.com/parametricarch/status/1685414233607917568?mx=2</p> </div> <div style="text-align: center;">  <p>Questionnaire Figure 29 Source: https://x.com/parametricarch/status/1685414233607917568?mx=2</p> </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="text-align: center;">  <p>Questionnaire Figure 30 Source: https://www.archdaily.com/965307/bookworm-pavillon-nudes/60f53a27dbcbe11be1d00a33-bookworm-pavillon-nudes-photo</p> </div> <div style="text-align: center;">  <p>Questionnaire Figure 31 Source: https://www.facebook.com/photo.php?fbid=758642516268593&id=100063685535383&set=a.678295127636666</p> </div> </div>
<p>option a</p>	<p>Yes</p>
<p>option b</p>	<p>No</p>
<p>option c</p>	<p>Maybe</p>
<p>Item 21</p>	<p>Can these spaces contribute to a long-term transformation of library environments? Your insights are highly valued, especially from those who frequently visit libraries.</p>
<p>option</p>	<p>(Fill in the Blank Paragraph Space)</p>
<p>Item 22</p>	<p>In your opinion, which of the ideas must not be incorporated or might hinder the original purpose of libraries.</p>
<p>option</p>	<p>(Fill in the Blank Paragraph Space)</p>

RESULTS AND ANALYSIS

- The respondents were all in the age group of 18 to 40years if age. Out of 41 respondents, approximately 70.7%, i.e., 29 out of 41 were female respondents, whereas the other 29.3%, i.e., 12 identified themselves as male. The gender demographic was important to analyze their choices related to future of libraries, especially in context of Indian cities.

What is your gender

41 responses

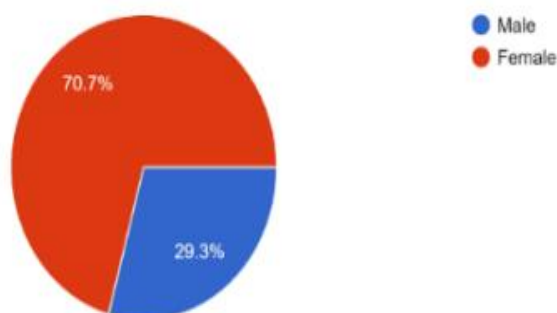


Figure 3 Survey question result. Source: Author (generated through Googleforms)

- The professions of the respondents included educators, postgraduate/undergraduate students, professionals in architecture, as well as individuals from the IT industry, both in private and government sectors. It also focused on people who are seeking opportunities by finding jobs or appearing for entrance exams. This

varied pool of participants aimed to provide comprehensive insights from different occupational backgrounds, enriching the study's understanding of the subject matter.

What is the highest level of education you have completed?

41 responses

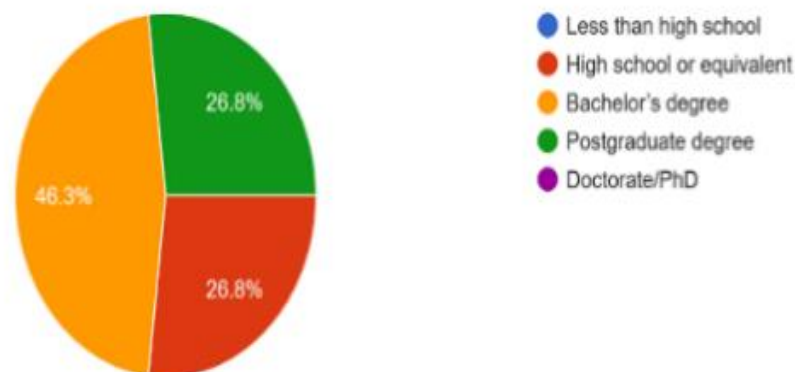


Figure 4 Survey question result. Source: Author (generated through Googleforms)

- The survey findings highlighted diverse visitation patterns among respondents, with 46.3% (23 respondents) indicating rare visits to the library, typically a few times a year. Equally distributed were those visiting 2-3 times a month and 2-3 times a week, accounting for 14.6% each (7 respondents in each category). Following closely, 5 respondents frequented the library once a week, while 4 respondents visited monthly. Intriguingly, one respondent admitted to never visiting the library, contrasting with the 3 respondents who visited daily. These insights formed the basis for analyzing the factors influencing varied visit frequencies, shedding light on respondents' preferences concerning space and ambiance within the library environment.

How often do you visit a library?

41 responses

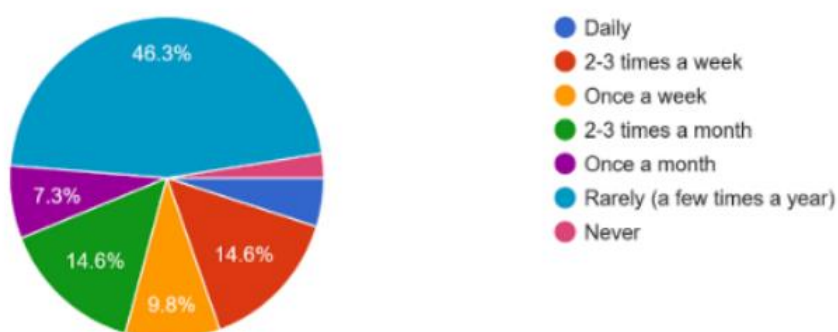


Figure 5 Survey question result. Source: Author (generated through Googleforms)

- The results of the remaining 18 quantitative were in a variety of options including multiple choice, rating questions, Likert scale, closed questions, dichotomous questions and open questions, the results of which same are discussed below.

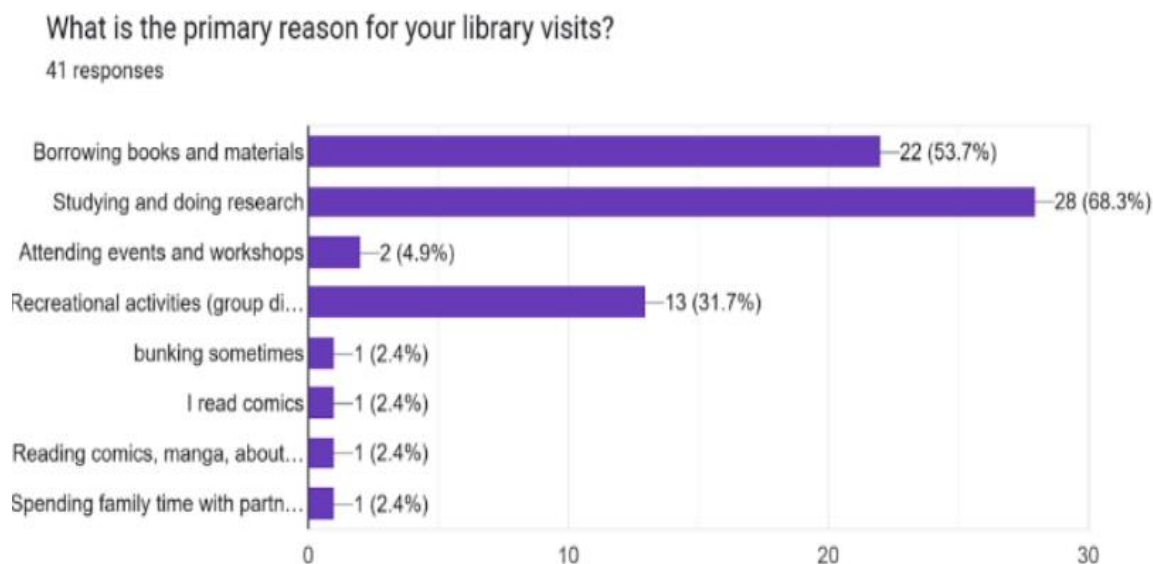


Figure 6 Survey question result. Source: Author (generated through Googleforms)

- On assessing the purpose of visiting the libraries, where the respondents were allowed to select multiple options as per their usage. The primary usage was of studying and doing research followed by borrowing books and materials as the second most selected purpose for visit. 34% respondents also visit libraries for recreational purposes such as informal meetings with family, friends, group discussions, group projects, bunking school/college classes, etc. quiet and peaceful environment of the library was the major aspect enjoyed by people in a library followed by engaging with books and information. Respondents also like to meet and connect with people and do networking.

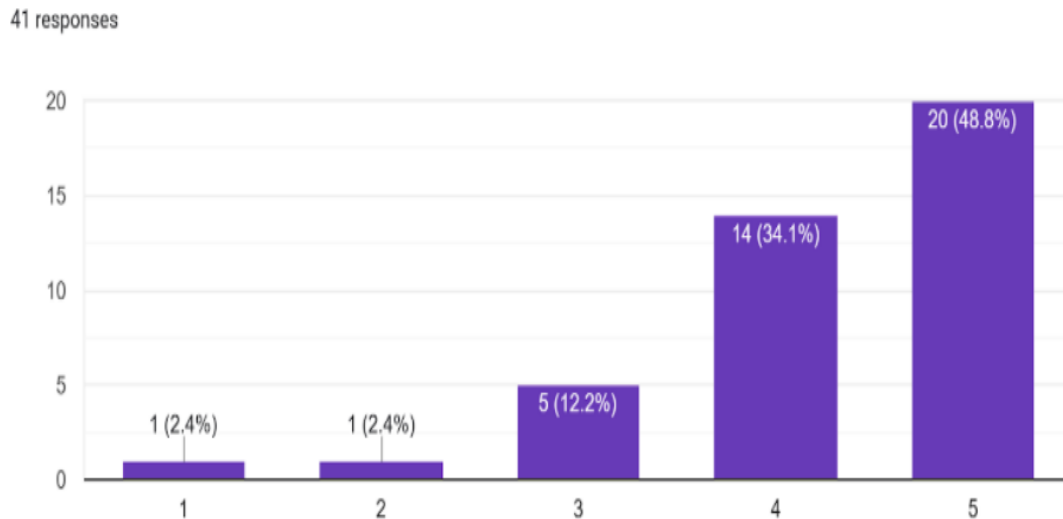


Figure 7 Survey question result. Source: Author (generated through Googleforms)

- Most respondents strongly advocated the necessity of transforming current libraries into more inviting, appealing, and knowledge-centric spaces for the future. A significant 78% of participants agreed on the potential for this transformation through enhanced spatial quality and a diverse array of engaging activities. Meanwhile, 22% expressed some uncertainty about this approach, indicating neither strong agreement nor disagreement. Notably, none of the respondents opposed the idea, signaling overall receptiveness toward the notion of reimagining libraries for the future.

If yes, do you think changing the quality of spaces within a library will help in its reimagination?

41 responses

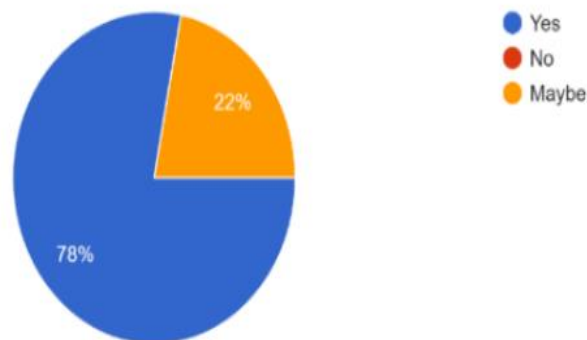


Figure 8 Survey question result. Source: Author (generated through Googleforms)

- Respondents chose a variety of seating options in majority of 58.5%, followed by incorporating diverse cultural elements within the library to engage visitors and provide topics for discussions, further followed by having a more engaging and colourful décor to create a welcoming atmosphere and attract more users to the library. Few respondents did select the all the above options indicating that all such provisions can be added. There were also additional suggestions for zoning of spaces as per the reasons of visit.

Which of the following space will encourage you to spend more time in the library and enjoy the ambiance?

41 responses

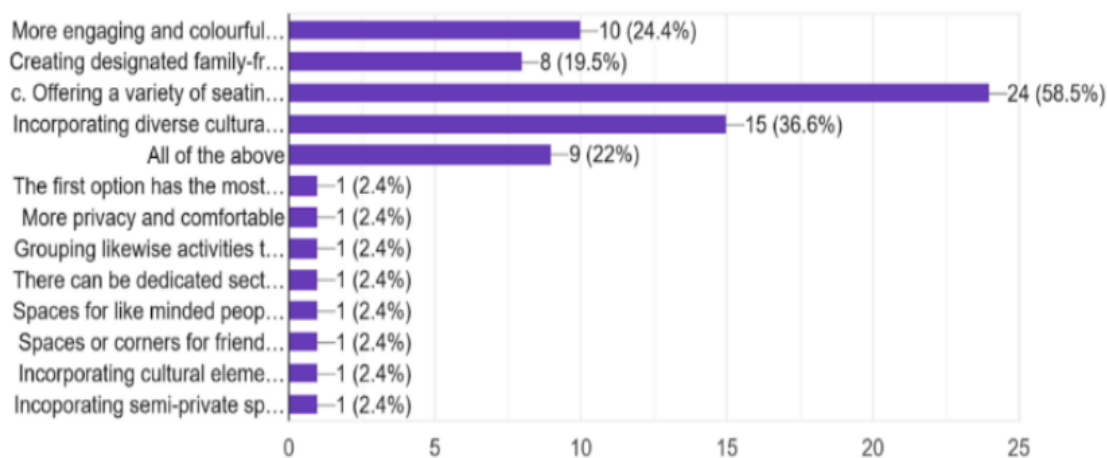


Figure 9 Survey question result. Source: Author (generated through Googleforms)

- The top choice for desired library ambiance was Option 1, with respondents favoring this lighting style. Following closely was Option 3, akin to Tianjin Binhai Library's blend of natural and artificial lighting within its expansive central atrium. Conversely, the remaining three options primarily featured artificial lighting and were less favored compared to natural light settings. Option 4 emerged as the least preferred ambiance, eliciting varied perceptions among respondents - while some perceived it as a magical setting, others found it chaotic or overwhelming.

Which type of lighting do you like best for a library: natural light from windows or the artificial lighting from lamps and fixtures? Please choose from the images below

41 responses

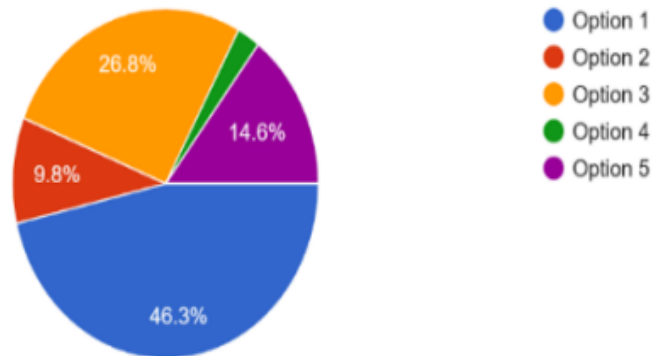


Figure 10 Survey question result. Source: Author (generated through Googleforms)

- Additionally, there were 16 scopes for the respondents to insert their comments and opinions wherever applicable from which the codes could be generated and to understand the perception of the participants.

41 responses

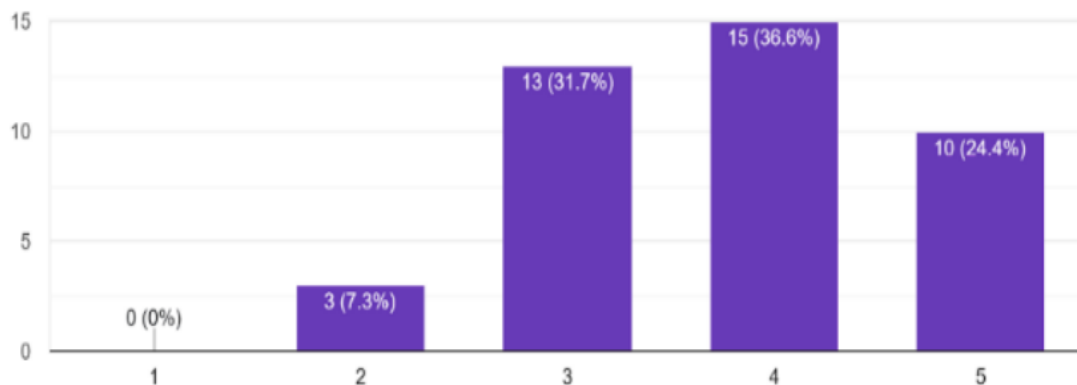


Figure 11 Survey question result. Source: Author (generated through Googleforms)

- Majority respondents agreed to the fact that it is important to incorporate natural elements within the library settings as it breaks the monotony and is believed to provide calmness.

Would you like libraries to have extended hours and additional facilities, offering a different ambiance during late evenings/nights and weekends?
41 responses

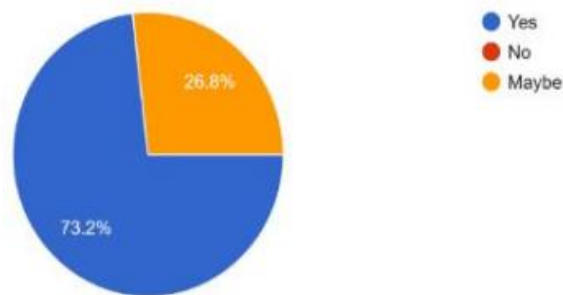


Figure 12 Survey question result. Source: Author (generated through Googleforms)

- In addition to this, when asked about extending the library hours and keeping it open during late hours and weekends, the respondents were positive about the same.

If yes, please select from the following options regarding the facilities you would like to see.
41 responses

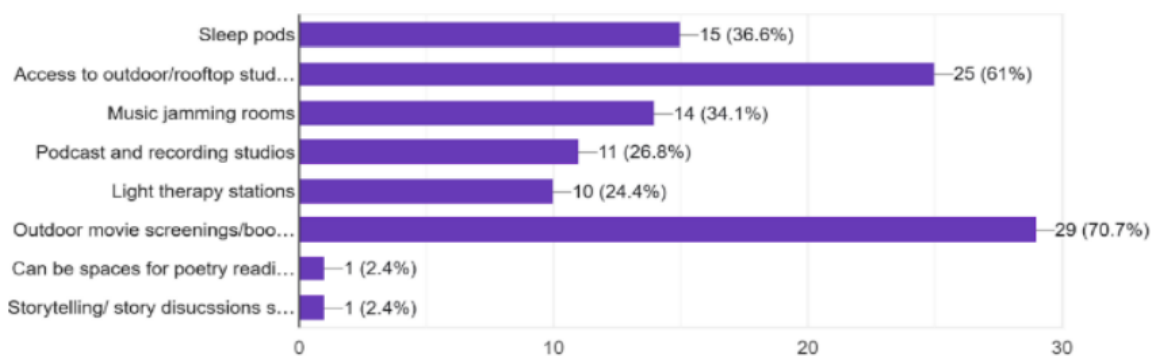


Figure 13 Survey question result. Source: Author (generated through Googleforms)

- The top choices for additional facilities required during extended hours were outdoor movie screenings/book reading events, access to rooftop study, sleep pods for reading enthusiasts.

Which of the following futuristic ambiance features and activities would enhance your library experience?
41 responses

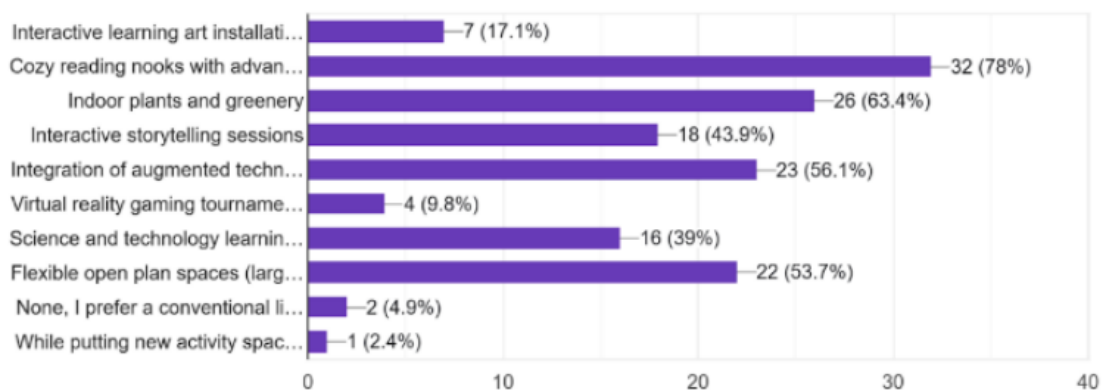


Figure 14 Survey question result. Source: Author (generated through Googleforms)

- The top choice for desired library eliciting varied perceptions among respondents. Cozy nooks and reading corners are the most desired feature for the future libraries, followed by incorporation of indoor plants and greenery, integration of augmented technology, further followed by flexible open atrium like spaces for group discussions, informal meetings etc.

On a scale of 1-5, how important is it for libraries to have ancillary spaces for relaxation and meditation like these?

41 responses

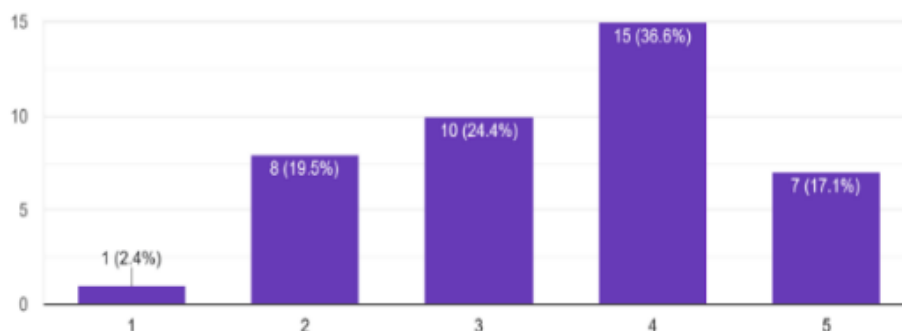


Figure 15 Survey question result. Source: Author (generated through Googleforms)

- Respondents did agree with the fact that there can be provisions for meditative spaces within a library for times when learners need a peaceful break. They also majorly agreed to the fact that libraries can also be brought outdoors in natural settings as breakout spaces in different contexts

Would you like libraries to have extended hours and additional facilities, offering a different ambiance during late evenings/nights and weekends?

41 responses

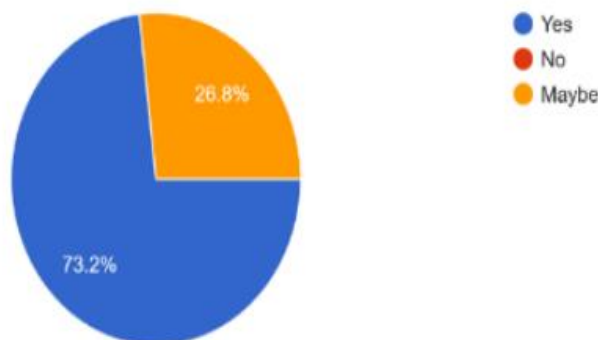


Figure 16 Survey question result. Source: Author (generated through Googleforms)

DISCUSSIONS

The following inferences can be drawn from the survey responses.

- Half of respondents rarely visit libraries due to monotonous and outdated atmospheres, lacking diverse spaces for activities and community engagement, missing opportunities for discussions, author signings, and communal learning experiences.
- Infrequent visitors attribute their lack of visits to clashing schedules, distant library locations, and uninspiring environments, deterring their interest in frequenting libraries.
- Frequent visitors, often students or individuals preparing for exams or seeking opportunities, desire peaceful learning environments but acknowledge the overwhelming and monotonous aspects of libraries, lacking breaks and diversity in spaces.

- There is a consensus among respondents that libraries should evolve to engage users through diverse audio-visual-kinaesthetic learning activities, promoting community engagement as a knowledge hub.
- Changing spatial quality and diversifying activities within libraries is seen as pivotal for reimagining them and attracting more visitors, particularly within the age range studied.
- Balancing new activities while retaining the serene ambiance is highly valued to honour the original intent of libraries and cater to book lovers seeking a peaceful reading and learning environment.
- People think that libraries should become more vibrant with colourful furnishings, different types of seating areas, quiet contemplative environments, greenery, additional hours, sleep pods, and night time events, while the library becomes a venue for learning, social activity, and family time, year-round.
- Innovative libraries should not merely become digital respondents wish for the old ways as well as the new with respect to learning.
- Just libraries digitized and turned only into spaces of repositories will not form a future because they will have to become places that make readers learn instead of just storing the books alone.
- Many respondents desire the ability to read old school material-books and even some type of reading of comic book materials like manga-in an almost library ambiance, augmented with more collaborative activities of group discussion as well as through use of AR and VR technologies
- There will always be that old method of learning paired with current innovations which are sure to diversify this enriching the process.

CONCLUSION

This paper evaluates the role architecture plays in meeting library users' needs, in addition to an assessment of their current experiences and future expectations. The findings clearly point out that architecture is quite critical in redefining the future of libraries. Spatial design and changes in the regulations of the library are some crucial steps forward. Futuristic libraries will not be just about technology they offer but balancing the modernity with timelessness, books, discussions, and cozy settings forms the bedrock for reimagining libraries, ensuring they evolve into thriving community learning centers and blissful discovery places.

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