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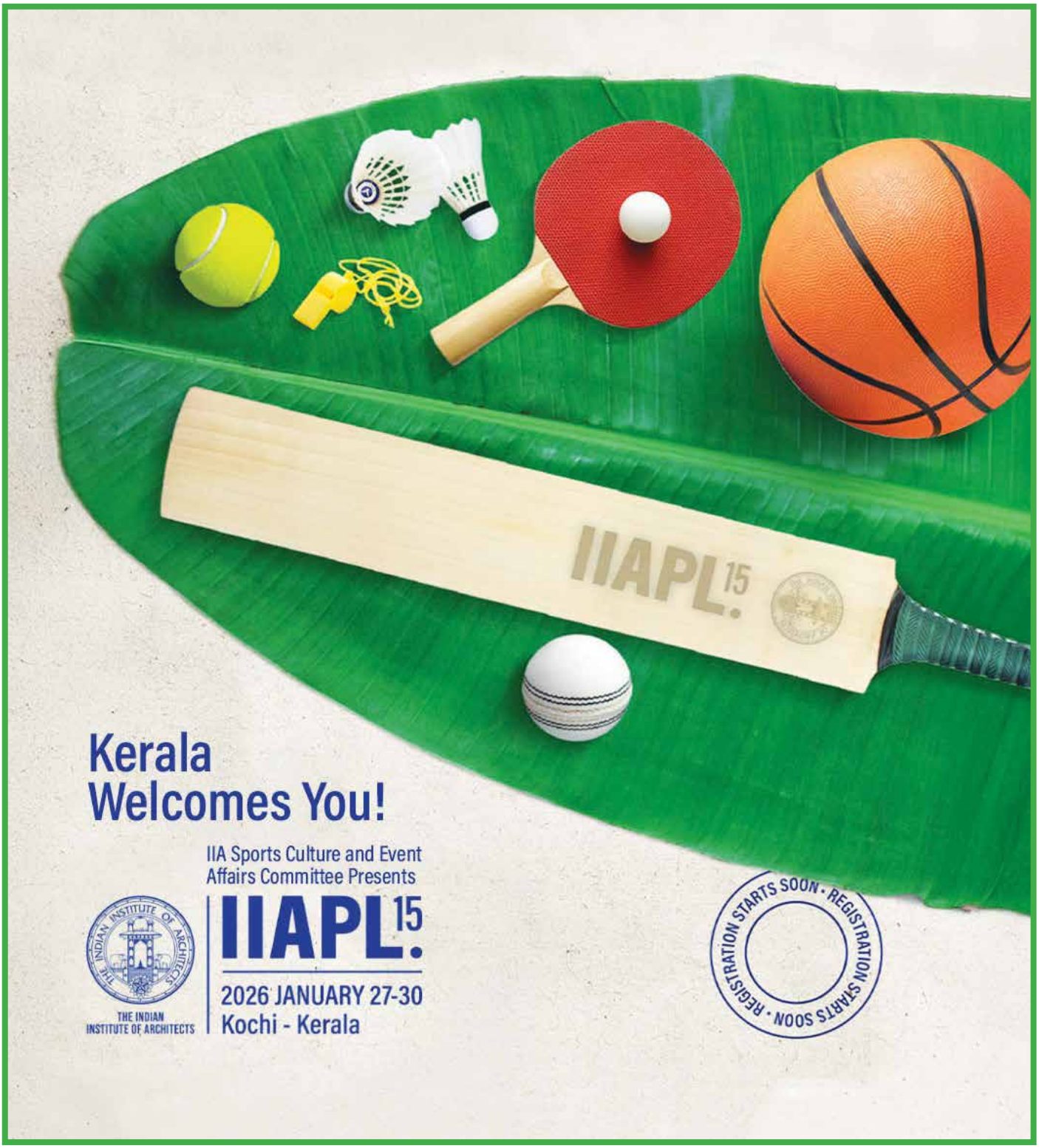

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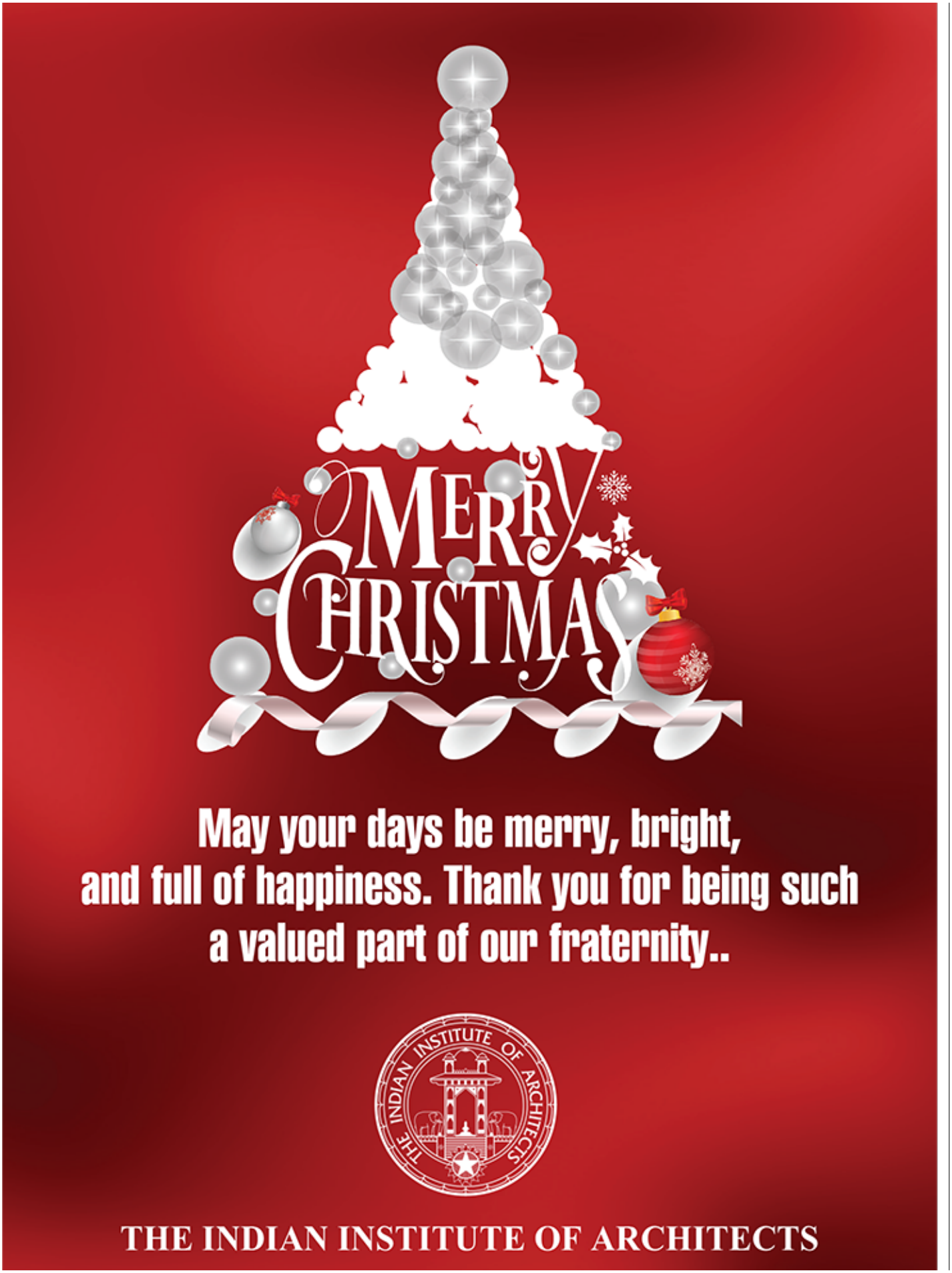
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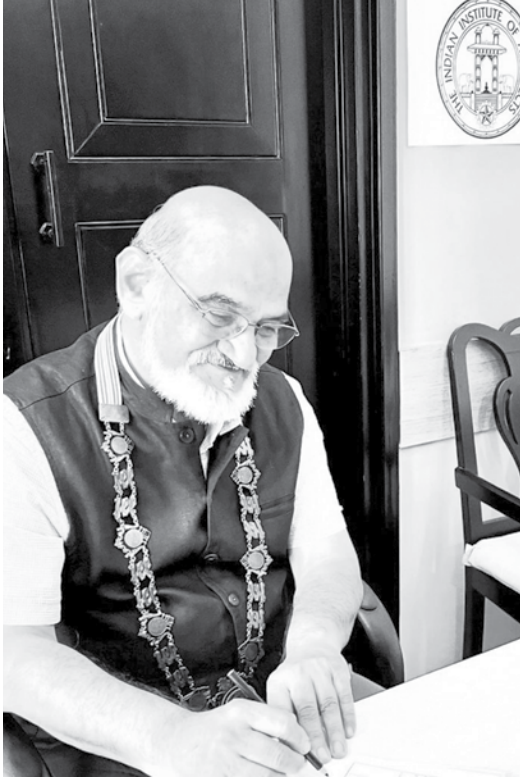
PRESIDENT'S MESSAGE



Dear Members,,

Warm greetings to all members of the IIA!

At the outset, I would like to place on record my sincere appreciation for the continued efforts of our Chapters, Centres, and Sub-Centres in strengthening the Institute through consistent professional activities and focused membership growth. I would like to particularly commend the Ghaziabad Sub-Centre under the Uttar Pradesh Chapter for successfully hosting the IIAPL Golf Tournament.

While we continue to expand our footprint and activities, I would also like to remind all Chapters, Centres, and Sub-Centres of the importance of Strict discipline of statutory requirements of IT , like Audited Reports etc. Timely filing of returns, adherence to applicable provisions, and prescribed deadlines are essential to avoid unnecessary notices or complications from the Income Tax Department. I urge all Chapters, Centres & Sub-Centres to treat compliance as a priority and ensure proper documentation and financial discipline.

On the professional front, I am pleased to share that the Indian Institute of Architects will be signing a Memorandum of Understanding (MoU) with the Institute of Indian Interior Designers (IIID). This MoU will focus on areas of mutual interest, including professional development, knowledge sharing, research, academic engagement, and best practices.

Looking ahead, we have an exciting calendar of events. The Indian Institute of Architects Premier League (IIAPL) will be held from 27-30 January, 2026, hosted by IIA Kerala Chapter at Kochi. The Rajasthan Architectural Festival is scheduled to be held from 5th to 6th February 2026, alongside the 19th Council Meeting of IIA. This important event is being sponsored by CDOS, an initiative of the Government of Rajasthan. Further, towards the end of February 2026, another Council Meeting will be held during the Municipalika Event in Delhi. IIA is also organising a design competition for its proposed Headquarters atBelapur, Navi Mumbai for which, I particularly look forward to enthusiastic participation from younger members, whose ideas and creativity will be invaluable in shaping this important institutional landmark.

At the international level, I am happy to inform you that the 23rd ARCASIA Forum is scheduled to be held in September 2026, spanning Delhi – Agra -Jaipur. This will be a prestigious regional event showcasing India's architectural heritage, contemporary practice, and professional leadership. In addition, the UIA World Congress of Architects 2026 will be held in June 2026 in Barcelona, Spain. Further, the Architects Association of South Asia (AASA) has announced the launch of its Logo Design Competition. I strongly encourage members to participate in large numbers in these initiatuves and make our presence felt on the world stage

I look forward to continued cooperation, enthusiasm, and commitment from all members as we collectively work towards strengthening the Institute.

With warm regards and best wishes.

Ar. Vilas Avachat
President
The Indian Institute of Architects

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EDITOR'S NOTE

As the year draws to a close, the December issue of *The Journal of the Indian Institute of Architects* offers an opportunity to reflect on the evolving responsibilities of the architectural profession in responding to complex societal needs. This edition brings together scholarly inquiry, applied research, and creative expression that collectively address the themes of livability, inclusivity, education, and social well-being.

Urbanisation and livability form a central focus of this issue, examining how rapid urban growth must be balanced with humane planning, equitable access, and environmental responsiveness. Complementing this discourse is a critical exploration of psychiatric healthcare facilities, highlighting the role of architecture in fostering dignity, healing, and mental well-being—an area of growing relevance in contemporary practice.

Equally significant is the article addressing social sustainability with particular reference to safety and security within school campuses. It underscores the responsibility of architects to design environments that nurture learning while ensuring protection, inclusiveness, and psychological comfort for future generations. Adding a forward-looking dimension are student works on "Redefining", which challenge established conventions and offer fresh perspectives rooted in innovation and sensitivity.

The issue is further enriched by evocative sketches on the sacred landmarks of Pune, capturing the layered cultural and spiritual narratives embedded within the city's urban fabric. Research articles on Outcome-Based Architectural Education provide timely insights into pedagogical frameworks that align academic outcomes with professional competencies and societal expectations.

We also take this occasion to apprise members of important forthcoming events. Preparations for the UIA Forum continue to gain momentum, strengthening India's presence in global architectural discourse. The IIAPL Golf Tournament, scheduled for 13th and 14th December 2025 in Ghaziabad, Uttar Pradesh, offers an opportunity for professional camaraderie and informal engagement. Looking ahead, the IIAPL Convention, to be held from 27th to 30th January 2026 in Kochi, Kerala, promises to be a significant platform for exchange, learning, and collaboration.

As we transition into the New Year, let us reaffirm our shared commitment to architecture that is ethical, inclusive, and future-ready. The challenges before us are complex, but they also offer immense opportunity, for leadership, innovation, and impact.

May new year 2026 be a year of strengthened dialogue, purposeful practice, and continued contribution to the nation and the global architectural community.

Ar. Vinit Mirkar
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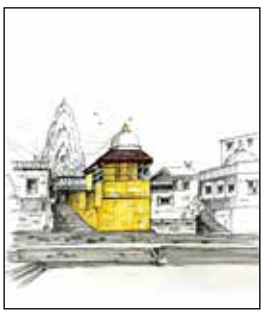
The Eternal Steps of Time

By Rutik Santosh Lakhe



The cover design captures the story of Banganga Tank, a place where history, faith, and the pulse of everyday Mumbai meet. Tucked within the narrow lanes of Walkeshwar at Malabar Hill, Banganga is a monument that lives through the breath and rhythm of the city.

At first glance, the temple structure at the centre stands out, its golden-yellow tone glowing warmly against the surrounding grey textures. This temple represents centuries of prayers, rituals, and quiet reflection. According to legend, this spring was born when Lord Rama, during his exile, shot an arrow into the ground to draw water from the holy Ganges for his thirsty brother. From that moment, this place has been a symbol of devotion and continuity, drawing people even today. The sketch shows houses, shrines, and narrow stairways, around the temple, all sharing stories of daily life. These have been homes of priests, pilgrims, and families who have lived around the tank for generations. Through simple architecture, deep roots of culture and community continue to shine. Every crack in the wall and step down to the water speaks of time, endurance, and belonging.

The steps leading into the tank hold a quiet poetry, having been worn out by the feet of children playing, devotees performing rituals, and elders feeding the fish. The distant spire of the Walkeshwar temple, rising beyond the scene, serves as a reminder that spirituality continues to stand tall even amid the rush of urban life.

Through this sketch, Mumbai is seen beyond its glass towers and traffic, as a place still carrying the heartbeat of its beginnings. Banganga stands today, older than the British-built fort walls, older even than the idea of 'Bombay', marking it as the convergence of the modern and mythical.

Lines of ink and a wash of yellow in the sketch mirror the binaries of living: pairing chaos with calm, devotion and modernity, and permanence with change. This illustration becomes a quiet tribute to Mumbai's living heritage. It reminds us that beneath the city's noise, there are places where time seems to pause, with stories from the past flowing effortlessly, endlessly, like water itself.

Rutik Santosh Lakhe is a second-year student at Rachana Sansad's Academy of Architecture (IIA Affiliated Institute). He explores how light shapes human experience and uses live sketching and model-making as mediums to express his architectural ideas and graphical explorations.
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JIIA Call
for Papers, Articles, Projects

The Journal of the Indian Institute of Architects invites original and unpublished contributions from members **ONLY** (academicians, practitioners and students) under the following FIVE categories. Submission in each category is strictly only through the respective google forms.

In order to be accepted for publication, all material sent in these categories should have the following components:

1. MS Word document file with text only. Please do not format it in anyway. The numbered captions for all the images will also be in this document.
2. Folder with all images (minimum 300 dpi), numbered according to the captions given in your text file
3. Photograph of the author/s (minimum 300 dpi).
4. Author biodata – Maximum 50 words.
5. PDF (optional)– showing the intended layout. This pdf should include text and all images, with numbered captions.

Category 1 : Articles

google form link: https://forms.gle/7pDFva1HDH4hfUyj8

Essays, interviews, articles (1500- 2500 words), book reviews (600 and 750 words), travelogues, sketches and photo-essays in the areas of architecture, planning, urbanism, pedagogy, heritage, technology, ecology, theory and criticism, visual design, practice or any other relevant subject pertaining to the built environment. (Details of the format will be available on the JIIA website).

- For a design project, please include the 'Fact File' with the following details : Project Name, Location, Plot area, Total built up, Structural consultants, Project completion. Also please give the photo captions and credits. Please ensure that the image is referred to within the text. For eg, "As seen in Figure 1…". This is essential for the layout.
- For design projects, plans and sections of the project are desirable along with the photographs.
- Book reviews should be only of books by Indian authors. please include the "Fact File" with the following details: book title, author name, publisher, year of publication, ISBN, language the book is written in, genre (technical/ fiction/ etc.), no of pages, dimensions (in cm), type (Kindle/ paperback/ hardback), available at (amazon.in/ flipkart.com/ others).
- Please send a write-up of about 200-300 words along with sketches and photo-essays.

Category 2 : Student Work

google form link: https://forms.gle/8wDCYFusLb7hWcpa6

Summaries of dissertations (2000-3000 words) at the level of B.Arch. & M.Arch., and theses at the Ph.D. level. The Guide for that work will be mentioned as the Co-author. (Format will be available on the JIIA website).

Category 3 : Contributions from Chapter Correspondents

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(a) *Chapter News:* This includes various interesting activities from the Centres of your Chapters (maxm. 500 words for the news from the *entire* Chapter).

(b) News of conferences by the academic institutes in your respective Chapters.

(c) *Obituaries :* Obituaries of IIA members should consist of the photograph of the departed soul, the dates of birth and death and a short 50-word note.

Category 4 : Research Papers

google form link: https://forms.gle/Z9YWQQMaw843N1eT6

Research papers (2000-5000 words) in the prescribed format. The research may be based on their ongoing or completed research. (Format is available on the JIIA website). All contributions in this category will be double blind peer-reviewed before being accepted for publication by academic experts of repute.

Category 5 : Cover Design

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Students from affiliated colleges are invited to design the cover page theme. This should be a graphic based on some aspect of Indian Knowledge Systems. The submission will include the graphic file (jpeg or corel draw); a theme note (with a title) of about 500 words explaining the concept of the graphic.

Please note that the image you send will be adjusted as per the layout requirements of the JIIA Cover.

Please note:

1. All submissions will be accepted only through google forms.
2. Submissions will **NOT** be accepted through email.
3. Any queries to be addressed to : jiiaeditorial@gmail.com.
4. When you correspond with us, please give your email id (that you regularly use) and your cell no. (preferably with WhatsApp).
5. It is compulsory to mention your IIA regn. No. Submissions will **NOT** be accepted from non-members.
6. The review process takes anywhere between 4-6 weeks. Since it may not be possible to respond to all authors who send in their work, we will definitely revert if and when your work is accepted.
7. JIIA does not charge any fees for publication of any professional or academic work.
8. It is understood that submission from an author is an original work, unpublished anywhere else, and that IIA and JIIA are in no way responsible for any matter or dispute arising out of the publication of the same.
9. All authors are requested to refer to further detailed information available on the JIIA website.

RESEARCH PAPER

Harmonising Street Furniture with Built Environments

Architectural Influence, Cultural Identity and Urban Functionality

by Sadanand Ambadas Rajugude and Ar. Ayush Prakash Hazare

Abstract

The relationship between existing architectural structures and street furniture plays a prominent role in shaping an urban space's aesthetic, cultural identity and functional needs. This research explores how surrounding buildings influence the design, materials and positioning of street furniture while also examining how enculturated street furniture enhances public spaces, substantiates local identity and improves usability. A mixed-method approach combines a comprehensive questionnaire and interviews with 60 practicing architects of various experience levels, alongside a design experiment at Kalbhairav Temple in Satara. The study acquires professional insights into the challenges and opportunities of harmonising street furniture with the built environment. The results highlight that architects, regardless of experience, recognise the importance of visual harmony, material consistency and cultural symbolism in street furniture design, especially in heritage contexts. The research further reveals that thoughtfully designed street furniture serves as a functional facility as well as a cultural and symbolic extension of nearby structures, enhancing the overall urban experience. By understanding these interactions at both micro and macro scales, this study aims to contribute valuable strategies for future urban design, confirming that street furniture becomes an integrated, meaningful and enriching part of the urban landscape fabric.

Key Words

Architectural integration, street furniture, urban design, cultural identity, heritage context

Introduction

"Street for nature" refers to permanent elements situated in public areas for communal use, necessitating unobstructed ground space to guarantee access in outdoor settings. These installations are frequently found in urban environments, often in substantial quantities. Although each piece may seem minor on its own, their collective presence plays a vital role in enhancing the quality of urban life and the experiences of its inhabitants (Davis, 1997; Dhaou et. al, 2022). Creus (1996) describes urban elements as "objects that are used and integrated into the urban landscape", a definition that aligns well with the concept of street furniture. This category encompasses a range of components, including benches, chairs, streetlights, flower boxes, bus shelters, bicycle racks and litter bins.

Street furniture serves more than a basic functional role; it significantly shapes the character and usability of urban thoroughfares. Beyond facilitating pedestrian traffic, well-designed street furniture enriches public areas by providing comfort, encouraging foot traffic and fostering a more inviting atmosphere (Radwan & Morsy, 2016). In contrast, the lack or improper placement of these elements can detract from the quality and appearance of urban spaces. The development of street furniture thus reflects wider urbanisation trends and the evolving needs of public environments (Miranda, 2019).

The layout and design of street furniture critically impact how accessible and attractive a street appears. Thoughtfully crafted components not only enhance physical comfort but also promote

interactions among locals and visitors, revitalising their engagement with the space. Street furniture can act as distinctive visual markers, helping to forge a unique sense of place that embodies the identity of a neighborhood or city (Patki, 2017).

Beyond functionality, street furniture carries cultural and scholarly significance. It encourages social interactions, fosters cultural expressions and acts as a tangible link between individuals and their environments (Yuan, 2024). In modern urban settings, street furniture increasingly contributes to urban identity, enhances visual appeal and enriches public life. Its design and positioning address practical needs while also reflecting emotional and symbolic dimensions, adding to the cultural story of the city (Wang et al., 2024). Occasionally, street furniture is influenced by pre-existing structures, negotiating their scale, role and cultural relevance. Concurrently, the integration of thoughtfully designed furniture modifies the urban fabric, shaping how individuals expect, navigate and engage with these environments (Askarizad & He, 2025).

As urban innovation grows, many cities, even those renowned for their historical and cultural richness, are focusing more on street furniture as a prominent representation (Xia et al., 2018). This unique quality enables street furniture to adapt into various forms that authentically portray users' lifestyles while addressing both material and spiritual needs. Consequently, furniture becomes a crucial medium for culture, highlighting aesthetic creativity and reflecting humanity's progress (Wu & Liu, 2019). Urban street furniture contributes to a city's cultural spirit, levels of civilisation and overall quality of life. For cities to harmonise with their surroundings, well-thought-out street furniture is essential. The fusion of cultural aspects and technology in design enhances the sense of belonging and identity in urban spaces, elevating the city's charm (Xia et al., 2018). Its cultural attributes reflect the diverse backgrounds of users across different eras and locations (Huang et al., 2025).

To investigate these changing roles, a thorough research method was utilised to explore the relationship between built structures and their adjacent street furniture. The study examines this connection at both the microscale (individual buildings) and the macroscale (broader urban settings), focusing on the alignment or lack thereof between architecture and its immediate street elements. Special emphasis is placed on the architect's viewpoint, underscoring how street furniture can either disrupt or enhance the aesthetic and functional flow of urban spaces.

This research is carried out using a multi-method approach, integrating qualitative and quantitative data collection. A comprehensive questionnaire and in-depth interviews were conducted with over 60 architects worldwide, encompassing a range of experience from 2 to 10+ years. These architects shared diverse insights into the challenges and opportunities of blending street furniture with the existing architectural language, addressing both functional presentation and aesthetic integration. Feedback across generations yielded valuable perspectives on evolving design philosophies concerning urban harmony.

Additionally, an empirical design experiment forms a part of this research. A custom street furniture intervention was designed specifically for the Kalbhairav Temple in Satara, Maharashtra, India. This experiment aimed to evaluate how culturally and contextually attuned street furniture could enhance the architectural significance of the temple while merging spiritual symbolism with modern usability. Practising architects / Academicians were invited to assess the proposed design, providing critical input on whether the furniture successfully enriched the temple's visual, functional and symbolic identity.

By combining theoretical analysis, professional perspectives and practical design experimentation, this study offers a nuanced perspective on the interaction between street furniture and built environments. It highlights strategies for improving harmony between street-level elements and architectural forms, fostering richer and more interconnected urban experiences. This reciprocal relationship, where existing structures shape street furniture design and vice versa, plays a pivotal role in anticipating the evolution of public spaces. Exploring this interaction helps to illuminate how cities strike a balance between functionality, identity and cultural continuity in their public areas.

Literature Review

The term street furniture refers to objects designed for interactive use within the urban landscape. Its origins can be traced back to the English term urban furniture and the French term *mobilier urbain*, which emphasise furnishing or decorating public spaces. According to Creus (1996), the word furniture conveys the idea of embellishing or enhancing a space, much like the Italian term *arredo urbano*, where *arredare* means to decorate. Montenegro expands on this, noting that street furniture also has a strong utilitarian aspect, designed to provide convenience and comfort, particularly for pedestrians. More than just practical elements, urban furniture helps shape

the overall environment, contributing to the visual identity of a city and responding to the socio-cultural and environmental context (G, 2005).

The attention given to urban spaces by designers increased significantly during the 20th century, with industrial designers creating not just furniture, but also playgrounds, parks and transportation systems (Kries, 2006). After World War II, the urgent need to rebuild cities gave further momentum to this design focus. Designers began to evolve from collaborators working alongside architects and planners to independent contributors, bringing their own creative vision to complement the functional priorities of Modernist urbanism (Kries, 2006).

In urban design, the strategic placement and thoughtful design of street furniture enhances visual harmony, leaving strong and lasting impressions on users. Urban furnishings play a dual role; they serve practical functions while also contributing to the aesthetic appeal and identity of a city (Güremen, 2011).To achieve effective integration into the urban fabric, each piece of street furniture must be designed with its specific location in mind, ensuring harmony between the object and its surroundings (Bayraktar et al., 2008).

When urban furniture complements the architectural character of a space, it becomes more appealing to users. Thoughtfully designed seating, trash cans, signboards and lighting fixtures can positively enhance the urban landscape. Over time, some well-designed elements even become iconic symbols of the cities they inhabit, such as London's red telephone booths or the elegant lighting on Paris' Notre Dame Bridge (Güneş, 2005).

Beyond aesthetics and function, the design of community public facilities, including street furniture, should also promote inclusivity, offering comfortable and accessible spaces for both the elderly and the young. By incorporating multifunctional elements, designers can foster intergenerational leisure and social interaction, strengthening community bonds (Zhang & Sun, 2024).

The definition of street furniture itself can vary depending on perspective. Broadly, it includes any elements that provide comfort and support for community activities, such as benches and shelters. However, the concept extends far beyond seating and shade, encompassing objects that enhance public space usability through comfort, protection, services, information, leisure opportunities and cultural enrichment (Arruda et al., 2017).

Lamas highlights that street furniture is not merely a secondary design consideration. When positioned at street level, it becomes a critical component of urban infrastructure, shaping spatial quality, organisation and the overall comfort of urban environments (Basso & Van Der Linden, 2010). Research supports this, showing that street furniture directly influences how people perceive and use specific streets. John (2012) mentioned that Kilicaslan, Malkoc and Turel conducted a comparative study of modern, traditional and revived streets, assessing their physical, visual and functional attributes. The findings revealed that street furniture played a key role in the way these spaces are experienced, with negative perceptions often linked to mismatches between furniture design and users' expectations.

To avoid such negative impacts, it is essential to balance aesthetic considerations with functionality. Designers are now increasingly focused on creating innovative and visually appealing street furniture that blends practical needs with imaginative design concepts. By thoughtfully using texture, structure, materials and colour, designers can enhance users' psychological comfort while also contributing to the visual appeal and overall beauty of the urban environment (Radwan & Morsy, 2016).

Methodology

The research was conducted to examine the relationship between built structures and their surrounding street furniture, focusing on the existence of this relationship and its significance in contemporary urban and architectural contexts. The study explores this interaction at both the micro (individual building) and macro (campus or urban) levels, identifying the architects' perspective on the absence of harmony between the two elements. It further examines the role of street furniture in maintaining harmony, evolving the aesthetic appeal and contributing to the narrative of the built structure. The research considers the functional and aesthetic qualities of street furniture, particularly how it can reflect and complement the narrative of the architecture of its surrounding environment.

To assess this relationship, an encyclopaedic methodology was employed, incorporating both qualitative and quantitative data. An extensive questionnaire and in-depth interviews were conducted with over 60 architects from around the world. The participants, with varying levels of experience (ranging from 2 to 10+ years), provided invaluable insights into street furniture incorporation with built structures. This diversity of expertise across multiple generations of architects offered a broad

spectrum of perspectives on why harmony is often lacking and how it can be achieved, highlighting both functional and aesthetic considerations.

In addition to surveys and interviews, a practical model experiment was conducted by designing seating and street furniture for the Kalbhairav Temple in Satara. This design aimed to explore how street furniture could harmonise with the temple's religious architecture while also reflecting its historical and cultural significance. Feedback and opinions from attending architects were collected to estimate whether the proposed street furniture aligned with the architectural identity of the temple, ensuring it complemented the structure both functionally and aesthetically.

Furthermore, a live study was conducted at the Chandigarh Complex, focusing on the evolution of furniture within the campus. This assessment, conducted in association with architectural academicians, examined parameters identified through detailed studies and a literature review. These parameters included visual harmony, durability, accessibility, safety, ergonomics, multi-functionality, material/texture, colour palette, cultural symbolism, shading/orientation, traffic flow and location. The study emphasised the role of street furniture, particularly seating, in not only enhancing the aesthetic appeal of campus design but also contributing to its functionality and other aspects.

This combined methodological approach facilitates a nuanced understanding of the interaction between street furniture (seating) and built structures, providing valuable insight into how these elements can harmonise to enhance the overall architectural experience. The study aims to enrich the discourse on urban design and campus planning by integrating theoretical perspectives with practical applications. It underlines the critical importance of thoughtful seating in campus design while accentuating the crucial need to create furniture that is sensitive to its cultural, local and historical context

A. Experimental Model

To explore the perspectives of various architects and designers on the cultural and historical connections between furniture and built historical structures, an experimental model was developed. This model was implemented at Karnavadi, Satara, near the Kalbhairav Temple (Figure 1), a site of significant cultural importance to the local community. The temple serves as a focal point for various activities, including marriages, cultural meetings and

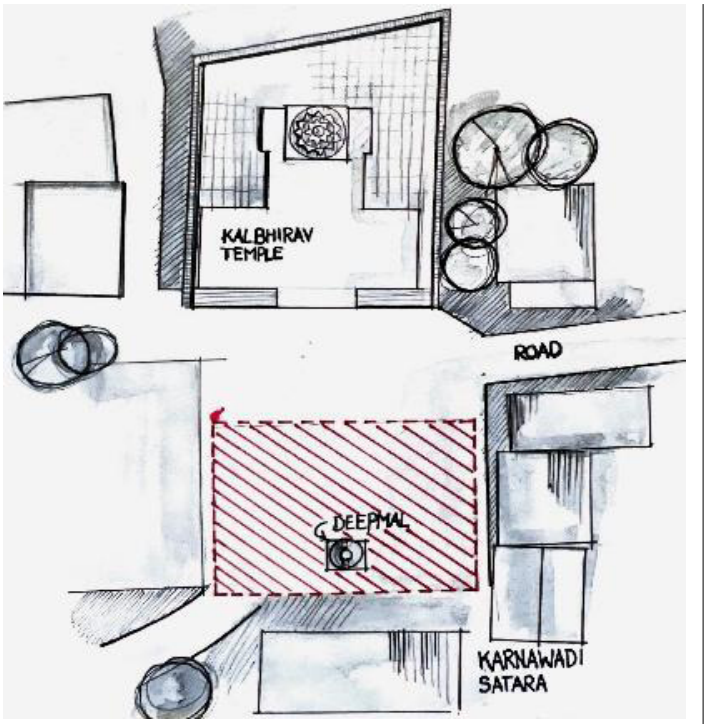


Figure 1: Site proposed for experimental model at Karnavadi, Satara, Maharashtra, India
Source- Authors

gatherings, making it a vibrant hub for people of all ages.

The existing seating arrangement lacked contextual alignment, resulting in a monotonous design that blended indistinctly with the structure, thereby diminishing the overall aesthetic and cultural integrity of the temple campus. The conceptualised seating design drew inspiration from the origin story of Kalbhairav and was crafted with careful consideration of the local religious and cultural beliefs. As shown in Figure 2, the model was designed to resonate with the context, embodying the glory of the three principal Hindu deities: Brahma, Vishnu and Mahesh (Shiva). Each deity's philosophical role, Brahma as the creator, Vishnu as the preserver and Mahesh as the destroyer, was symbolically represented in the seating arrangements.

Space Dedicated to Brahma (The Creator):

The seating in this section was designed as a series of wooden boxes with creepers installed on the ceiling. This arrangement symbolised growth, creativity and the essence of creation, offering a serene and inspirational space for users.

Space Dedicated to Vishnu (The Preserver):

The design incorporated comfortable swings for Vishnu, symbolising preservation, balance and liberation. This element provided the users a sense of relaxation and freedom, aligning with the deity's role as a sustainer of harmony.

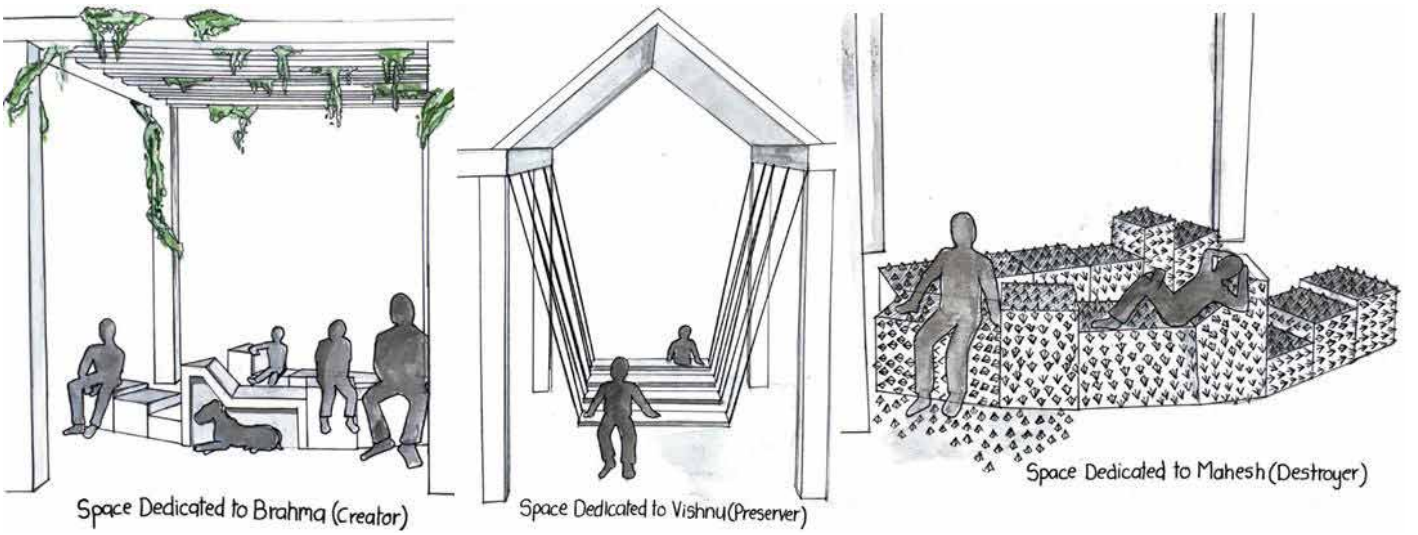


Figure 2: Species dedicated according to character Creator, Preserver and Destroyer
Source- Authors

Space Dedicated to Mahesh (The Destroyer):
Representing destruction without inflicting harm was a challenging task. Thus, to achieve this, seating embedded with acupressure points was installed. These points created a subtle feeling of disruption while offering health benefits, thereby conveying the transformative aspect of Mahesh's role.

Inclusivity and Symbolism
The seating design was also made animal-friendly by integrating niches beneath the furniture to accommodate small animals such as cats and dogs. This feature symbolised Kalbhairav's association with his vahan (vehicle), a black dog, thus reinforcing the connection between the design and the deity's legend.

The experimental model study highlighted the importance of considering cultural and historical contexts not only in the design of buildings but also in the associated furniture. By doing so, it is possible to foster a deeper sense of unity and connection within the built environment.

B. Case Study
A live case study was conducted to analyse the integration of outdoor seating in campus design, focusing on its planning within the built environment. Table 4 illustrates the various locations where the studies were carried out, considering the built environment. The assessment, conducted in collaboration with architectural academics, examined different seating installations across the campus using a comprehensive set of parameters. These included visual harmony, durability, accessibility, safety, ergonomics, multi-functionality, material and texture, colour palette, cultural symbolism, shading and orientation, traffic flow and location. The study revealed that seating designs play a crucial role in enhancing both the functional and aesthetic aspects of campus spaces. Key findings highlighted the importance of ergonomic and inclusive designs, the incorporation of cultural and historical symbolism, the use of sustainable and weather-resistant materials and strategic placement to ensure user comfort and accessibility. The case study emphasised how well-integrated seating contributes to the overall narrative and usability of campus environments, underscoring the need for thoughtful design practices that align with the cultural, local and historical context of the built environment surroundings.

Data Analysis
As illustrated in (Tables 1 and 2), this study investigates the perspectives of 60 architects, divided into four experience-based groups to get diverse perspectives on the research, which were as follows: less than 2 years, 2 to 5 years, 5 to 10 years and more than 10 year-on the relationship between street furniture design and architectural structures. When asked whether architectural structures influence street furniture design, most architects across all groups agreed, with responses heavily favouring Yes. Younger architects were slightly more inclined to consider the possibility (Probably) than their more experienced counterparts. Similarly, the majority of architects emphasised the importance of material consistency between street furniture and nearby buildings, though younger architects demonstrated some uncertainty in their responses.

Regarding the compatibility of simple street furniture, such as wooden benches, with architectural character, architects were divided, with

Table 1: Comparative opinion poll collected by a survey amongst scholars with divorce work experiences
Source-Authors

Question	Work experience less than 2 years			Work experience between 2- 5 years			Work experience between 5-10 years			Work experience of >10 years		
	Yes	No	Probably	Yes	No	Probably	Yes	No	Probably	Yes	No	Probably
Do you think existing architectural structures should influence the design of street furniture nearby?	32	0	7	5	1	3	3	0	0	6	1	0
How important is material consistency between street furniture and nearby architectural structures?	33	2	4	3	1	5	3	0	0	6	1	0
Would an item of simple street furniture, like a wooden bench, be compatible or complement a structure's integrity and character	14	23	2	3	5	1	0	3	0	3	1	3
How effective is incorporating symbolic elements (e.g., creation, balance, harmony) in street furniture design for cultural sites?	28	4	7	3	1	4	3	0	0	5	2	0

Table 2: Comparative perception survey examining how scholars of a different range of work experience agree or disagree with the subject (Harmonising street furniture with existing structures)
Source-Authors

Range of experience	Strongly Agree	Agree	Disagree
Work experience less than 2 years	8	14	7
Work experience between 2 to 5 years	3	4	2
Work experience between 5 to 10 years	2	1	0
Work experience of more than 10 years	2	4	1

scepticism being most pronounced among those with less than 10 years of experience. A significant number of less experienced architects and mid-level professionals viewed simple furniture as misaligned with architectural character, with many responding No to this question. In contrast, more experienced architects were more open to the idea, as reflected in their responses, which included yes and probably. This highlights how experience influences views on design compatibility and simplicity. Finally, the use of symbolic elements, such as balance and harmony, in street furniture for cultural sites was widely supported by architects of all experience levels. Younger architects, particularly those with less than two years of experience, showed the strongest support, with a notable number responding yes. The findings suggest that symbolic elements are valued as a means of enhancing the cultural and contextual relevance of street furniture. Overall, architects of all experience levels agree on the importance of aligning street furniture with its architectural surroundings, while experience significantly shapes opinions on design nuances such as simplicity and symbolism.

Table 3 analyses how architects' levels of experience influence their approach to blending street furniture with heritage settings. The table sought

Table 3- preferred approaches for integrating street furniture with existing structures or heritage settings
Source-Authors

	Work experience < 2 years	Work experience between 2-5 years	Work experience between 5-10 years	Work experience of 10+ years
Using the same materials as the structure, reflecting the design elements of the structure	30.7%	33.33%	66.67%	42.8%
Reflecting the design elements of the structure	56.4%	44.44%	33.33%	42.8%
Contrasting the structure to create visual interest, focusing on functionality without aesthetic considerations	5.13%	0%	0%	14.2%
Focusing on functionality without aesthetic considerations	7.69%	22.22%	0%	0%

Table 4-Observational study categorising the street for nature on various parameters in Chandigarh's capital complex
Source-Authors

LOCATIONS / IMAGES		Location -1 					Location-2 					Location-3 					Location-4 					Location-5 					Location-6 				
SCALE	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
PARAMETERS																														
Comfortability																														
Accessibility																														
Visual harmony																														
Ergonomics																														
Multi-functionality																														
Cultural symbolism																														
Orientation/ shading																														
Traffic flow																														

to evaluate the prioritisation of aesthetics versus functionality, providing insights into how decisions evolve with experience. Ultimately, it was designed to identify best practices and assess how architects balance practical and creative considerations when integrating street furniture into culturally significant environments. The analysis highlights four approaches to blending street furniture with heritage settings and checks their popularity amongst surveyed architects. The first approach, which uses the same materials and reflects design elements of nearby structures, was most favoured by mid-career architects (66.67%) and moderately supported by other groups, suggesting its value in maintaining harmony. The second approach, reflecting design elements without matching materials, was most popular among architects with less than 2 years of experience (56.4%), indicating younger professionals prioritise design continuity over material consistency. The third approach, contrasting street furniture with the structure for visual interest, had minimal support, with only 14.2% of architects with more than 10 years of experience favouring it, reflecting cautious adoption of bold designs. The final approach, prioritising functionality over aesthetics, was the least popular, with limited support from younger architects (7.69-22.22%) and none from more experienced professionals, underscoring the

importance of aesthetic considerations in heritage contexts.

This analysis explores the seating arrangements in the Capitol Complex, Chandigarh and how well they harmonise with the existing structures. The study evaluates different aspects, including comfort, accessibility, visual harmony, ergonomics, multifunctionality, cultural symbolism, orientation and traffic flow. Each seating option is rated on a scale from 1 to 5, helping to understand its functionality and integration within the space.

Comfort was assessed based on the available space for one person and the material used. Seating with adequate space and a comfortable material scored higher, while rigid or cramped seating received lower ratings. Accessibility considered whether the furniture was easy to reach and use, with well-placed seating receiving better scores and obstructed seating rated lower.

Visual harmony was a crucial factor in this study, evaluating how well the furniture blended with the surrounding architecture. Some seating arrangements fit naturally into the environment, but in cases like the third image, the furniture was added later, disrupting the overall aesthetic. Ergonomics focused on the seating's usability and comfort, with well-designed options scoring higher and less user-friendly ones rated lower.

Multifunctionality looked at whether the seating served additional purposes beyond sitting. Some furniture provided space underneath where people could store their bags or belongings, making it more practical. Cultural symbolism examined whether the furniture complemented the identity of the Capitol Complex, with seating that contributed to the architectural character receiving higher ratings.

Orientation was considered to see if the furniture was positioned in a way that welcomed visitors and directed them naturally. Seating that aligned with visitor movement and interaction received better ratings. Lastly, traffic flow was analysed to determine whether the placement of the seating helped guide pedestrian movement or created obstacles. Furniture that facilitated smooth movement was rated higher.

This study provides valuable insights into how seating can be better integrated into public spaces. Seating that blends well with its surroundings, offers comfort and serves multiple functions enhances the overall visitor experience. By considering these factors, urban furniture can be designed to improve both functionality and aesthetic harmony in public areas.

Results

The results derived from the questionnaire, conducted among a sample of 60 practicing architects, provide valuable insights into the relationship between existing structures and street furniture. (Figures 4 and 6) illustrate the opinions of architects regarding the influence of surrounding structures on street furniture and the importance of maintaining harmony between these elements. A significant majority, approximately 80% believe that integrating symbolic elements and emotional expressions through design is crucial in achieving coherence between street furniture and the architectural context in which it is

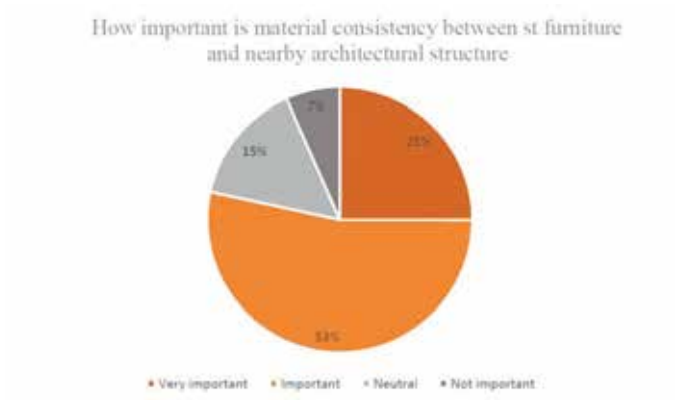


Figure 4: Scholars' opinions on whether existing structures should influence the nearby street for nature design
Source- Authors

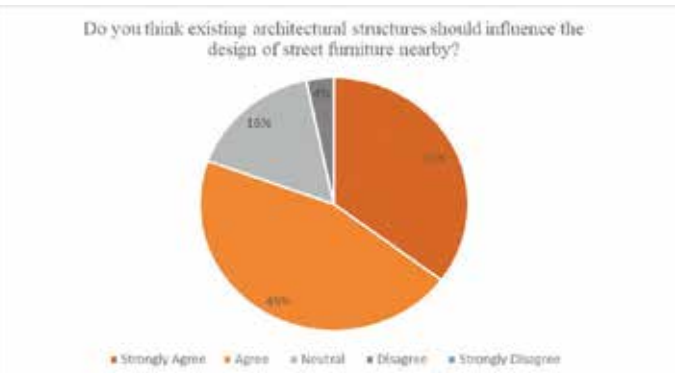
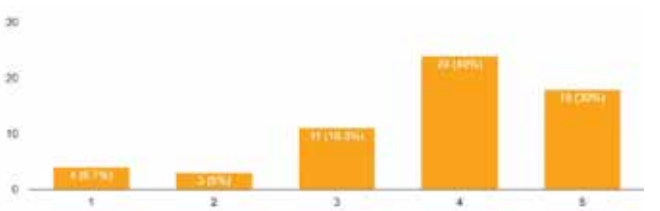


Figure 5: Scholars' views on the importance of material consistency to create harmony
Source- Authors



On a scale of 1 to 5, how effective is incorporating symbolic elements (e.g., creation, balance, harmony) in street furniture design for cultural sites? (1-least effective and 5-most effective)

Figure 6: Architects' approaches for integrating street furniture with the heritage site
Source- Authors

placed. This strong preference indicates a collective acknowledgment of the role that symbolism and contextual sensitivity play in urban design.

Beyond symbolism and emotional connection, visual harmony also emerges as a key factor in designing street furniture. Figures 2 and 5 highlight the role of aesthetics, particularly in terms of material selection, texture and overall appearance. According to the responses, around 80% of architects prefer that street furniture reflects the design elements of the surrounding built environment. This preference extends to the use of similar materials to those found in adjacent structures, reinforcing a sense of cohesion and continuity in urban spaces. By maintaining a consistent material palette, designers can ensure that street furniture does not appear as an isolated element but rather as an extension of the built environment.

On the other hand, Figure 7 reveals that architects strongly disapprove of any imbalance between street furniture and existing structures. The majority of respondents expressed a clear dislike for design choices that disrupt the visual and contextual relevance of street furniture in relation to its surroundings. This response suggests that while creativity and innovation are important, they should not come at the expense of coherence with the existing urban fabric. The results emphasise that a thoughtful, site-specific approach is necessary to ensure that street furniture seamlessly integrates with its context rather than appearing discordant or out of place.

The findings underscore a shared professional perspective that street furniture should not be designed in isolation but rather as a responsive element that enhances the urban environment by maintaining visual, material and symbolic harmony (Figure 8) with the structures around it.

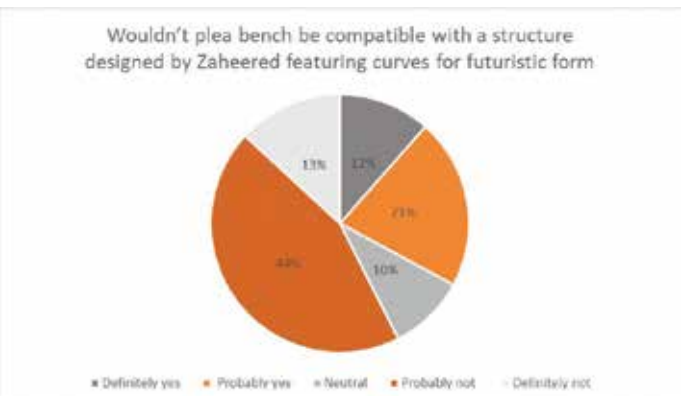


Figure 7: Scholars' opinions on the compatibility of street furniture with existing structures
Source- Authors

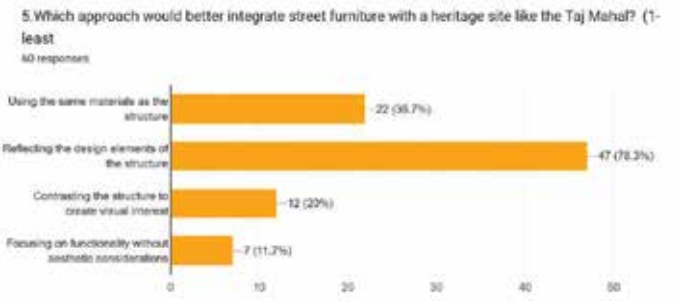


Figure 8: Scholars' ratings on the effectiveness of incorporating symbolic elements in the street for cultural design for cultural sites
Source- Authors

Discussion

The interaction between current architectural structures and street furniture significantly influences the aesthetics and functionality of urban environments. When street furniture is thoughtfully incorporated into the architectural backdrop, it can enhance public spaces, making them more inviting, visually appealing and culturally significant. This research paper highlights the necessity of recognising how existing buildings affect the design, placement and usage of street furniture, advocating for a harmonious urban landscape.

Architectural features, including façades, materials and spatial arrangements, establish the design principles that street furniture should follow. Successfully merging these components helps eliminate visual dissonance, resulting in a more organised and enjoyable streetscape. For example, in historic areas, using materials, colours and design themes that echo local heritage assures that the furniture feels integrated. In contrast, sleek and minimal designs may be more suitable for contemporary urban settings.

Another vital element examined in this study is the impact of cultural and social contexts on street furniture design. Public spaces serve a functional purpose but also embody cultural and symbolic meanings, which can be expressed through thoughtfully selected design features. Integrating locally significant patterns, motifs, or materials into street furniture can enhance community identity and promote a sense of belonging. Thus, street furniture evolves from mere functional objects into vehicles for cultural expression.

One main challenge, however, is incorporating modern street furniture into areas dominated by traditional or historical architecture. Designers often struggle to balance modern functionality with the preservation of historical aesthetics. Overly contemporary designs may clash with heritage

settings, while excessively traditional styles can stifle innovation and adaptability. Solutions require a nuanced approach that values architectural heritage while meeting modern demands.

Furthermore, engaging the public in the design process is crucial. Communities that utilise these urban features regularly should influence how these environments are shaped. Involving local stakeholders allows designers to gain insights into how street furniture will be utilised, maintained and regarded. This collaborative process not only enhances functionality but also builds community endorsement and pride in public areas.

The evolving nature of urban environments adds complexity to the relationship between architecture and street furniture. As cities change, so do their spatial requirements and design preferences. Therefore, creating adaptable and modular street furniture can address these changes without compromising overall visual consistency. Such versatility ensures urban spaces can progress while maintaining their unique character and sense of place.

In conclusion, achieving harmony between existing architectural structures and street furniture is vital for thriving, cohesive and functional urban environments. By honouring architectural context, celebrating cultural identity and involving the community, designers can create street furniture that fulfils practical roles and enhances urban life experience.

Conclusion

This study highlights the strong connection between architectural structures and street furniture, especially in urban areas rich in cultural and historical significance. When street furniture is thoughtfully designed to complement surrounding buildings, it transcends its utilitarian role, serving as a bridge between the physical environment and the cultural narrative of the area. Most surveyed architects expressed that nearby structures should inspire street furniture in terms of materials, shape and symbolic significance. This alignment with the context not only promotes visual harmony but also strengthens a sense of place, ensuring that public areas embody the identity and history of their surroundings. Additionally, the study identifies a subtle shift in design preferences related to architects' experience levels. Younger architects tend to embrace reinterpretation and abstraction in street furniture design, whereas more seasoned architects prefer consistency in materials and architectural coherence. This diversity of views reflects the ongoing conversation about heritage-sensitive design, balancing imaginative freedom with contextual awareness. Through the design intervention at the Kalbhairav Temple, the study further demonstrates how culturally relevant street furniture can improve both usability and the spiritual atmosphere of a location. By incorporating designs that mirror the temple's architectural style and symbolism, the proposed furniture significantly enhances the link between the built environment and street-level amenities. This practical experiment demonstrates that combining symbolism, material compatibility, and comfort can significantly enhance the user experience while honouring architectural heritage. Ultimately, the research emphasises the need to view street furniture as an essential element of urban design rather than separate objects. When carefully situated and designed in relation to existing structures, street furniture can improve pedestrian comfort, facilitate movement, encourage social interactions and contribute to the intricate narrative of urban life. By adopting this comprehensive perspective, designers and planners can develop public spaces that are visually cohesive, culturally resonant and functionally welcoming, thereby enhancing both the aesthetic appeal and practicality of urban environments in cities.

Recommendations

1. Utilising sustainable, durable and locally sourced materials ensures longevity while minimising environmental impact. Modular and prefabricated components can enhance flexibility and maintenance efficiency.
2. Guidelines should be established for placement, maintenance responsibilities and universal accessibility to promote long-term sustainability and equity.
3. Engaging local communities in decision-making processes ensures culturally resonant and contextually appropriate designs, fostering a sense of ownership.
4. Street furniture should activate spaces by creating social nodes, facilitating interaction, rest and engagement with the built environment.
5. Designers as well as planners should design Iconic seating designs that contribute to a city's visual identity, reinforcing the distinctiveness of public spaces. Custom-designed furniture, inspired by local culture, heritage, or contemporary architectural forms, fosters placemaking and civic pride.

6. By embedding seating street furniture within architectural, environmental and human-centric frameworks, designers and urban planners can elevate the quality of public spaces, fostering sustainable, inclusive and aesthetically engaging urban environments.

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RESEARCH PAPER

Outcome-Based Architectural Education

A Case of Integrating Washington Accord, Bloom's Taxonomy and Architectural Building Services

By Dr. Partha Sarathi Mishra and Dr. Mohan Kotamrazu

ABSTRACT:
This research paper focuses on how the Washington Accord graduate attributes and Bloom's Taxonomy can be combined to improve programme outcomes (POs) and course outcomes (COs), with a specific focus on courses in architectural building services. The Washington Accord provides an international benchmark for graduate competencies. Simultaneously, Bloom's Taxonomy offers a hierarchical structure for defining cognitive learning objectives. Therefore, this paper analyses current practices and presents a case study to highlight this synthesis, proposing twelve POs aligned with the Washington Accord and their translation into structured COs based on Bloom's Taxonomy. The results show that this integrated approach creates a more effective learning environment for graduates by fostering critical thinking, design competency with ethical awareness and preparedness for the architectural profession. The paper contributes to the development of a framework for architectural education by providing structured COs aligned with POs that bridge academic knowledge and professional practice.

Keywords: Washington Accord, Bloom's Taxonomy; Architectural Education; Program Outcomes; Course Outcomes; Building Services; Curriculum Development; Higher Education

1. INTRODUCTION

Architectural education stands at a critical juncture, facing a growing demand to align with global practice standards while maintaining its unique pedagogical identity. As architectural practice has become highly internationalised, educational programmes must prepare graduates to work across borders while responding to diverse international regulatory requirements. In this context, the Washington Accord was developed for engineering programmes; however, it is also relevant to architectural education and provides a valuable framework for defining graduate attributes for international recognition.

Simultaneously, various educational methodologies have evolved to emphasise clear and measurable course outcomes that reflect progressive cognitive development. Bloom's Taxonomy proposes a hierarchical structure of thinking skills that progress across levels. Lower-order skills, such as remembering and understanding and higher-order skills, such as applying, analysing, evaluating and creating, enable educators to promote the cognitive development of graduates.

Therefore, integrating the Washington Accord and Bloom's Taxonomy presents a promising approach for architectural education that addresses cognitive development alongside professional competencies. By aligning programme outcomes derived from the Washington Accord attributes and structuring course outcomes according to Bloom's cognitive levels, architecture educators can develop curricula that systematically build professional practice through knowledge, skills and abilities, while ensuring appropriate progression across cognitive levels.

This paper demonstrates how these contemporary frameworks can be effectively integrated into architectural pedagogy, with programme outcomes derived from the Washington Accord and course outcomes structured according to Bloom's Taxonomy. Through an examination of current educational

practices and a focused case study on the building services vertical, the study highlights the value of these integrated methodological frameworks in addressing the multifaceted professional nature of architectural curricula.

This research is significant due to its contribution to contemporary architectural education and its potential to enhance the effectiveness of syllabus design. By providing a structured framework for developing learning outcomes, this approach helps bridge academic knowledge and professional practice, ensuring that architectural graduates possess both theoretical and practical competencies to navigate architectural challenges in a global context.

2. LITERATURE REVIEW

2.1 Washington Accord for Professional Education

The Washington Accord, established in 1989, is an international treaty among agencies responsible for accrediting engineering and technology programmes. Initially focused on engineering education, its principles and graduate attributes have increasingly influenced related fields, including architecture, particularly as these disciplines seek greater international recognition and legitimacy (NAAB, 2025).

The Washington Accord specifies a set of graduate competencies that define the expected capabilities of programme graduates. These attributes encompass technical knowledge, problem analysis, design and development of solutions, investigation, modern tool usage, the engineer and society, environment and sustainability, ethics, individual and teamwork, communication, project management and lifelong learning (IEA, 2015). While architecture-specific international accords, such as the Canberra Accord (2014), exist, the Washington Accord's comprehensive attribute framework provides valuable guidance for defining architectural programme outcomes with international relevance.

Research by Stankov et al. (2004) demonstrates that educational programmes aligned with Washington Accord attributes show improved graduate employability and international mobility. Similarly, Patil and Codner (2007) found that curriculum development based on these attributes leads to more comprehensive educational outcomes that better prepare graduates for professional practice in global contexts.

2.2 Bloom's Taxonomy in Higher Education

Bloom's Taxonomy has been a cornerstone of educational design and assessment since its introduction in the mid-twentieth century. The original taxonomy, published in 1956 by Benjamin Bloom and colleagues, classified educational objectives into six cognitive domains: knowledge, comprehension, application, analysis and evaluation (Heer, 2012). In 2001, Anderson and Krathwohl published a revised version that transformed the nouns into verbs and slightly reordered the hierarchy, resulting in the current structure: remembering, understanding, applying, analysing, evaluating and creating (Anderson & Krathwohl, 2001).

Various studies have demonstrated the effectiveness of Bloom's Taxonomy in higher education settings. Athanassiou et al. (2003) found that the explicit use of the taxonomy in course design and assessment led to improved student performance, particularly in higher-order thinking skills. Similarly, Wilson (2016) argues that structuring courses according to the cognitive levels of Bloom's Taxonomy results in better outcomes in terms of knowledge retention and application among graduates.

2.3 Architectural Education and Competency Development

Traditionally, architectural education balances technical training with creative design development. Salama (2016) argues that a successful architectural programme can integrate multiple disciplines to foster critical thinking and problem-solving abilities. A similar perspective was earlier proposed in Boyer and Mitgang's seminar report (1996), which described architectural education as preparing graduates to navigate the complexities of professional practice through integrated learning experiences (AIA, 2006).

Various frameworks have been developed by accreditation agencies to outline expected outcomes in terms of knowledge, skills and entrepreneurial abilities among architectural graduates. These include the National Architectural Accrediting Board (NAAB) in the USA (NAAB, 2025), the Royal Institute of British Architects (RIBA) in the United Kingdom (RIBA Education, 2020) and the National Board of Accreditation (NBA) in India (IEA, 2015). These agencies largely align with international standards, namely the UNESCO–UIA Charter for Architectural Education (UNESCO–UIA, 2017), to ensure consistency in architectural competencies across countries globally.

2.4 Building Services in the Architectural Curriculum

Building services courses include heating, ventilation and air conditioning (HVAC), electrical services,

plumbing, fire safety and acoustical services, all of which contribute to architectural performance through technical specifications. Several studies have found that teaching building services within architectural programmes can be challenging, despite their significance in the building design process. According to Vassign and Chandler (2011), courses related to building services should address technical aspects, design aspects and their interrelationship within building systems. In a similar context, Soliman (2017) observed that architecture students consistently face difficulties in integrating technical systems skills into the building design process.

Soliman (2017) further found that problem-based learning in building services education led to improved outcomes in both technical knowledge and application skills. Similarly, NAAB (2025) suggests that building services should be taught at an appropriate cognitive hierarchy that integrates lower-order understanding with higher-order thinking and implementation skills.

2.5 Integrating Professional Standards and Cognitive Development in Architectural Education

While research on the specific integration of Washington Accord attributes and Bloom's Taxonomy in architectural education remains limited, several studies have explored related approaches. Öztürk and Türkkan (2006) demonstrated the value of mapping engineering course outcomes using the Washington Accord and Bloom's Taxonomy, finding that this combined approach resulted in more comprehensible curriculum development. Similarly, Fernandez-Antolin et al. (2020) examined how outcome-based education frameworks can be enhanced through explicit consideration of graduates' cognitive development.

Chakradeo (2010) demonstrated that courses structured according to cognitive progression showed improved student performance in technical subjects within architectural programmes, including building services. Earlier, Soliman (2017) proposed a framework for implementing cognitive development in architectural design courses, suggesting that explicit alignment of learning outcomes with cognitive levels enhances student learning and assessment processes.

Despite these promising findings, a gap remains in the literature and methodology concerning the comprehensive integration of the Washington Accord and Bloom's Taxonomy across architectural programmes, encompassing both programme outcomes and course outcomes. This paper therefore aims to address this gap by proposing a structured approach to integrating these frameworks into the architectural curriculum development process.

3. METHODOLOGY

This paper employs a mixed-methods approach to examine the integration of Washington Accord graduate attributes and Bloom's Taxonomy in architectural education, with a focus on mapping the POs and COs. This methodology consists of three primary components.

- First, a literature review on the Washington Accord, Bloom's Taxonomy, architectural education and building services was conducted to establish the theoretical foundation for the research. The review included academic policies, journals, accreditation standards and research papers related to architectural POs and COs of building services courses.
- Second, a content analysis of POs and COs from ten accredited architectural programmes across six countries, including India, the UK, the USA, Australia, Canada and Singapore, was performed to understand the current state of learning outcome development in architectural education. The architectural programmes were selected to represent various geographical regions, university types and methodological and pedagogical approaches. This analysis focused on both the graduate attributes of the Washington Accord and the cognitive levels of Bloom's Taxonomy.
- Third, a case study was developed to illustrate the application of Washington Accord attributes and Bloom's Taxonomy in building services courses. Based on feedback from expert faculty members from different universities and the authors' experience, the case example was developed. This case study demonstrates the alignment of COs with POs, considering the attributes of the Washington Accord and the cognitive levels of Bloom's Taxonomy.

The collected data were further analysed to identify patterns, challenges and opportunities in integrating the Washington Accord and Bloom's Taxonomy into the architectural curriculum. The results and findings are discussed in the discussion section of this paper.

4. PROGRAM OUTCOMES BASED ON WASHINGTON ACCORD GRADUATE ATTRIBUTES

4.1 Twelve Program Outcomes for Architectural Education

Twelve specific POs have been developed based on

the graduate attributes of the Washington Accord to meet the requirements of architectural practice aligned with international standards. These POs provide a comprehensive framework for curriculum development and assessment in architectural programmes.

PO1: Knowledge Base
To apply architectural fundamentals using mathematics, science and specialised knowledge of architecture to resolve complex architectural design challenges.

PO2: Problem Analysis
To identify, select and apply architectural knowledge-based principles by formulating, researching and analysing problems and to reach substantiated conclusions through critical thinking, scientific reasoning and design thinking methodologies.

PO3: Design Solutions
To develop innovative and responsive design solutions for complex architectural problems that appropriately integrate technical, aesthetic, social, cultural and environmental considerations, while meeting special needs with due attention to health, safety and welfare.

PO4: Investigative Skills
To investigate complex architectural issues through research methods, design experiments, precedent analysis, data interpretation and information synthesis in order to produce reliable findings that inform the design process.

PO5: Digital and Physical Tools
To develop, select and use appropriate methods, materials, advanced architectural tools and emerging technologies for complex design tasks, while recognising their capabilities and limitations within professional practice.

PO6: Architectural Context
To apply contextual knowledge to evaluate the implications of architectural works for society, health, safety, law, culture and heritage and to demonstrate responsibility towards diverse stakeholders in the built environment.

PO7: Sustainability and Resilience
To demonstrate an understanding of sustainable design principles and techniques and to assess the sustainability, resilience and environmental impacts of architectural solutions within social and environmental contexts.

PO8: Ethics and Professional Responsibility
To understand the legal responsibilities of the profession and the role of architects in society and to apply ethical principles while adhering to professional ethics, obligations and norms of architectural practice.

PO9: Collaboration and Leadership
To collaborate with a range of building professionals during the design and construction phases and to perform effectively as an individual, team member and leader within multidisciplinary contexts.

PO10: Communication Skills
To effectively communicate design concepts and building information using digital media, as well as through appropriate written, spoken and visual communication with professionals and the general public in complex architectural contexts.

PO11: Project and Practice Management
To demonstrate awareness of the roles and responsibilities of stakeholders, while exhibiting knowledge and understanding of architectural practice, business principles, project management, building economics, construction processes and project implementation.

PO12: Lifelong Learning
To recognise the importance of and demonstrate the ability to engage in autonomous professional development and lifelong learning in response to evolving technologies and changing architectural practice.

These twelve POs form the foundation for curriculum development and assessment in architectural programmes seeking international recognition and alignment with Washington Accord principles. Together, they provide a comprehensive framework encompassing the full range of knowledge, skills and abilities required for professional architectural practice in a global context.

4.2 Mapping Program Outcomes to Washington Accord Graduate Attributes

The suggested POs and the graduate attributes of the Washington Accord are directly aligned, as shown in Table 1.

This mapping illustrates how Washington Accord graduate attributes, originally developed for engineering education, can be effectively adapted to the architectural context while continuing to align with global standards.

Table 1: Mapping of Architectural POs with Washington Accord Graduate Attributes
Source: Author

Programme Outcome	Washington Accord Graduate Attribute	Corresponding Programme Outcome for Architecture
PO1	Engineering Knowledge	Knowledge Base
PO2	Problem Analysis	Problem Analysis
PO3	Design/Development of Solutions	Design Solutions
PO4	Investigation	Investigative Skills
PO5	Modern Tool Usage	Digital and Physical Tools
PO6	The Engineer and Society	Architectural Context
PO7	Environment and Sustainability	Sustainability and Resilience
PO8	Ethics	Ethics and Professional Responsibility
PO9	Individual and Teamwork	Collaboration and Leadership
PO10	Communication	Communication Skills
PO11	Project Management and Finance	Project and Practice Management
PO12	Lifelong Learning	Lifelong Learning

5. COURSE OUTCOMES BASED ON BLOOM'S TAXONOMY

5.1 Translating Program Outcomes to Course Outcomes

COs are the outcomes that students are expected to achieve upon completion of a particular course, whereas POs represent the competencies that graduates are expected to acquire by the end of the programme. Specific cognitive levels are associated with COs, which support graduates in acquiring competencies that contribute to and align with multiple POs.

Bloom's Taxonomy supports graduates in progressing from basic knowledge to complex application and creation, offering a useful methodological framework for developing COs at appropriate cognitive levels. Throughout the programme, faculty members design progressive learning experiences that enhance graduates' abilities by mapping COs to different cognitive levels of Bloom's Taxonomy.

The following processes are involved in translating POs into COs:

- Identify relevant programme outcomes: To determine which programme outcomes the course primarily addresses based on curriculum mapping.
- Determine appropriate cognitive levels: To consider the course's position within the curriculum sequence and students' expected prior knowledge in order to select suitable cognitive levels, from lower-order to higher-order, across the programme.
- Use appropriate cognitive verbs: Bloom's Taxonomy prescribes specific verbs for different cognitive levels to articulate clear and measurable course outcomes.
- Ensure specificity and measurability: COs should be clearly understood by students in terms of expected cognitive levels upon course completion and should be measurable and assessable by faculty.
- Align with course content and activities: CO statements should reflect the course content, learning activities and assessment methods included in the course.

This translation process ensures that course outcomes contribute meaningfully to programme outcomes while providing clear guidance for course design and assessment.

5.2 Bloom's Taxonomy Cognitive Levels and Associated Verbs

Bloom's Taxonomy offers a hierarchical framework of cognitive levels, each associated with specific verbs that can be used to articulate course outcomes (Athanassiou et al., 2003; Heer, 2012; Stankov et al., 2004; Wilson, 2016). These cognitive levels and associated verbs are included in Table 2.

By selecting appropriate verbs from these categories, educators can develop course outcomes that clearly communicate the expected level of cognitive

Table 2: Bloom's Taxonomy Cognitive Levels and Associated Verbs
Source: Author

Levels	Attributes	Words and Phrases for the Level
Level 1	Remembering (Knowledge)	Define, identify, list, name, recall, recognise, reproduce, state, outline, label, match, select, memorise
Level 2	Understanding (Comprehension)	Describe, discuss, explain, express, classify, interpret, locate, report, summarise, translate, paraphrase, compare, differentiate, distinguish
Level 3	Applying	Apply, demonstrate, illustrate, operate, schedule, sketch, solve, use, calculate, complete, examine, implement, show, modify
Level 4	Analysing	Analyse, appraise, categorise, compare, contrast, criticise, differentiate, discriminate, distinguish, examine, investigate, question, test, deconstruct, diagram
Level 5	Evaluating	Appraise, argue, assess, defend, judge, rate, support, evaluate, recommend, critique, justify, prioritise, select, validate, weigh, interpret
Level 6	Creating	Arrange, assemble, compose, construct, create, design, develop, formulate, generate, organise, plan, prepare, propose, devise, integrate, invent, synthesise

engagement and provide a foundation for aligned assessment strategies.

5.3 Examples of Course Outcomes for Building Services Education

The following examples illustrate how course outcomes for building services courses may be articulated at different cognitive levels of Bloom's Taxonomy, aligned with relevant programme outcomes.

Building Environmental Science (Year 2)

- To identify the fundamental principles of thermodynamics, fluid dynamics and heat transfer that govern building environmental performance. (Remembering, aligned with PO1)
- To explain the relationships between environmental factors, building design decisions and human comfort in various climatic contexts. (Understanding, aligned with PO1, PO6)
- To calculate basic parameters related to thermal performance, natural lighting and acoustic properties using standard methods and equations. (Applying, aligned with PO1, PO5)
- To examine how different building envelope configurations affect energy performance and indoor environmental quality. (Analysing, aligned with PO2, PO7)

Building Services and Systems (Year 3)

- To analyse the interactions between mechanical, electrical, plumbing and fire protection systems and their implications for architectural design. (Analysing, aligned with PO2, PO3)
- To compare alternative building service systems based on performance criteria, spatial requirements, energy efficiency and implementation challenges. (Evaluating, aligned with PO3, PO7)
- To demonstrate appropriate selection and integration of building service systems for specific building types and functional requirements. (Applying, aligned with PO3, PO5)
- To investigate how innovative building service technologies can contribute to improved environmental performance and user comfort. (Analysing, aligned with PO4, PO7)

Integrated Environmental Design (Year 4)

- To evaluate building environmental performance using appropriate simulation tools and performance metrics and to interpret results in order to inform design decisions. (Evaluating, aligned with PO5, PO7)
- To develop comprehensive environmental design strategies that integrate passive and active systems to achieve sustainability targets while enhancing architectural quality. (Creating, aligned with PO3, PO7)
- To justify environmental design decisions through quantitative analysis and qualitative reasoning, addressing technical, social and

ecological considerations. (Evaluating, aligned with PO2, PO6, PO7)

- To design innovative building service integration solutions that resolve technical challenges while contributing to spatial quality and user experience. (Creating, aligned with PO3, PO5)

These examples demonstrate how course outcomes can be articulated at different cognitive levels of Bloom's Taxonomy while maintaining clear alignment with programme outcomes derived from Washington Accord attributes. This alignment ensures that courses contribute meaningfully to the overall educational goals of the programme while providing clear guidance for course design and assessment.

5.4 Constructive Alignment in Course Design

Constructive alignment, a concept developed by Biggs (1996), highlights the importance of aligning teaching strategies, learning objectives and assessment techniques to create a cohesive educational experience. When course outcomes based on Bloom's Taxonomy are constructively aligned with teaching and assessment strategies, there is a greater likelihood that students will achieve the intended learning outcomes (Soliman, 2017).

In architectural education, the following principles underpin constructive alignment:

- Clear articulation of outcomes: Using verbs associated with appropriate cognitive levels of Bloom's Taxonomy, COs should specify what students will be able to achieve upon completion of the course.
- Aligned teaching activities: Students should be provided with opportunities to practise and develop the specific cognitive abilities outlined in the COs through instructional activities.
- Appropriate assessment methods: Assessment tasks should evaluate students' achievement of course outcomes at the intended cognitive levels.
- Consistent feedback: Feedback should be linked to the course outcomes and provide clear guidance for improvement.

For example, for a CO at the applying level: To apply principles of natural ventilation to design appropriate passive cooling strategies for different climatic contexts. Instructional activities, such as case studies or design exercises, should provide students with opportunities to explore the application of these principles. Rather than relying on a multiple-choice examination, assessment methods should use a design project to evaluate students' application of the concepts. Feedback should address how effectively students have implemented the principles and offer suggestions for improvement.

This alignment ensures that every component of the course supports students' attainment of the intended learning outcomes.

6. CASE STUDY: BUILDING SERVICES COURSE SEQUENCE

6.1 Context and Curriculum Structure

In this case study, an approved five-year Bachelor of Architecture programme at an international university examines the use of Bloom's Taxonomy and Washington Accord–aligned POs to create a coherent sequence of building services courses. Three courses are distributed across the curriculum in the following sequence:

- Building Environmental Science (Year 2): An introduction to the scientific principles governing heat, light, sound and air in buildings.
- Building Services and Systems (Year 3): A comprehensive exploration of mechanical, electrical and plumbing systems in buildings.
- Integrated Environmental Design (Year 4): An advanced study of sustainable building services and environmental design strategies.

Prior to curriculum revision, these courses were primarily lecture-based, with limited integration of design applications. Feedback from students indicated challenges in applying technical knowledge to design studio work, highlighting a disconnect between theoretical knowledge and real-world implementation. The revised curriculum explicitly incorporated the twelve programme outcomes and Bloom's Taxonomy to address this gap and to create a progressive learning experience that develops both technical knowledge and higher-order cognitive skills.

6.2 Alignment with Program Outcomes

The building services course sequence was designed to address several of the twelve programme outcomes, particularly:

- PO1: Knowledge Base
- PO2: Problem Analysis
- PO3: Design Solutions
- PO5: Digital and Physical Tools
- PO7: Sustainability and Resilience

These programme outcomes provided the foundation for developing course outcomes that address appropriate cognitive levels while contributing to the broader educational goals of the programme.

6.3 Course Outcomes and Cognitive Progression

The revised course sequence employs Bloom's Taxonomy to create a deliberate progression of cognitive skills across the three courses while maintaining alignment with the relevant programme outcomes (Table 3).

Building Environmental Science (Year 2)

- CO1: To identify the fundamental principles of thermodynamics, fluid dynamics, acoustics and lighting that influence building performance. (Remembering, aligned with PO1)
- CO2: To explain how environmental factors affect human comfort, energy consumption and architectural design decisions. (Understanding, aligned with PO1, PO7)
- CO3: To calculate basic parameters related to thermal performance, daylight factors and acoustic properties using standard methods and equations. (Applying, aligned with PO1, PO5)
- CO4: To examine the relationship between building form, orientation and environmental performance through simple analysis techniques. (Analysing, aligned with PO2, PO7)

Building Services and Systems (Year 3)

- CO1: To analyse the interactions between building service systems and architectural design decisions in various building types. (Analysing, aligned with PO2, PO3)
- CO2: To compare alternative building service solutions based on performance criteria, spatial implications, energy efficiency and implementation challenges. (Evaluating, aligned with PO2, PO7)
- CO3: To apply appropriate technical knowledge to select and integrate building service systems for specific architectural requirements and site conditions. (Applying, aligned with PO3, PO1)
- CO4: To use digital tools to visualise and communicate building system integration in architectural projects. (Applying, aligned with PO3, PO5)

Integrated Environmental Design (Year 4)

- CO1: To evaluate building environmental

Table 3: Mapping of Programme Outcomes with Course Outcomes for Building Services Courses
Source: Author

Course / CO	PO1	PO2	PO3	PO4	PO5	PO7
Building Environmental Science (Year 2)						
CO1	Y					
CO2	Y					Y
CO3	Y				Y	
CO4		Y				Y
Building Services and Systems (Year 3)						
CO1		Y	Y			
CO2		Y				Y
CO3	Y			Y		
CO4				Y		Y
Integrated Environmental Design (Year 4)						
CO1				Y		Y
CO2			Y			Y
CO3		Y				Y
CO4			Y		Y	

performance using simulation tools and performance metrics and to interpret results in order to inform design decisions. (Evaluating, aligned with PO5, PO7)

- CO2: To develop innovative approaches to environmental design that enhance sustainability, user comfort and architectural quality in integrated building solutions. (Creating, aligned with PO3, PO7)
- CO3: To justify environmental design decisions based on quantitative and qualitative criteria, including technical performance, user experience and ecological impact. (Evaluating, aligned with PO2, PO7)
- CO4: To design comprehensive building service integration strategies that address technical requirements while contributing to spatial and experiential quality. (Creating, aligned with PO3, PO5)

This progression ensures that students develop from foundational knowledge to complex application and innovation, building cognitive skills that support the effective integration of building services in architectural design while contributing to the achievement of the programme outcomes.

6.4 Teaching Strategies Aligned with Cognitive Levels

The teaching strategies for each course were designed to align with the cognitive levels addressed in the course outcomes.

Building Environmental Science (Year 2)

To support remembering and understanding, this course employs illustrated lectures, physical demonstrations of environmental phenomena and guided laboratory experiments. To develop application skills, the course includes calculation exercises and simple performance prediction assignments. Analysis skills are developed through case study examinations and small-scale environmental investigations.

Building Services and Systems (Year 3)

To develop analysis and evaluation skills, this course incorporates case studies of integrated building solutions, system integration workshops and technical site visits to buildings with visible service systems. Students undertake comparative analyses of alternative systems for specific architectural scenarios and develop technical integration proposals that require the application of knowledge within design contexts.

Integrated Environmental Design (Year 4)

To foster evaluation and creation skills, this course employsperformancesimulationexercises,innovative precedent analyses and a comprehensive design project. Students participate in interdisciplinary workshops with engineering students and engage in peer critique sessions in which they evaluate design proposals based on multiple performance criteria. The culminating project requires students to develop and justify innovative environmental design strategies for a complex architectural project.

6.5 Assessment Methods and Student Performance

Assessment methods were carefully aligned with the cognitive levels addressed in each course and the relevant programme outcomes.

Building Environmental Science (Year 2)

- Concept identification quizzes to assess remembering of fundamental principles (CO1)
- Written explanations of environmental phenomena to assess understanding (CO2)
- Performance calculation assignments to assess application skills (CO3)
- Case study analysis reports to assess analytical skills (CO4)

Building Services and Systems (Year 3)

- System integration diagrams and analyses to assess analytical thinking (CO1)
- Comparative assessment reports on system alternatives to assess evaluation skills (CO2)
- System selection and integration exercises to assess application skills (CO3)
- Technical visualisation assignments to assess tool usage (CO4)

Integrated Environmental Design (Year 4)

- Performance simulation and evaluation reports to assess evaluation skills (CO1)
- Environmental design strategy proposals to assess creative thinking (CO2)
- Technical justification presentations to assess evaluation and communication skills (CO3)
- Integrated design projects with documented system integration to assess creative synthesis (CO4)

Following the implementation of the revised curriculum, student performance showed significant improvement in several areas:

- Enhanced ability to transfer technical knowledge to design studio projects, with students demonstrating more sophisticated integration of building services in their design work

- Improved performance in higher-order cognitive tasks, particularly in analysing system interactions and evaluating alternative solutions
- Greater confidence in technical decision-making and justification of design choices related to building services
- More effective use of digital tools for environmental analysis and system visualisation
- A deeper understanding of the relationship between architectural value and technical systems

Student surveys indicated increased satisfaction with the building services curriculum, with particular appreciation for the clear progression of cognitive challenges and the explicit connections to design applications.

6.6 Lessons Learned and Implications

The case study revealed several key insights into the integration of Washington Accord–aligned programme outcomes and Bloom's Taxonomy in building services education:

- Explicit alignment of course outcomes with programme outcomes creates a clearer connection between technical courses and broader educational goals, helping students understand the relevance of building services to their professional development.
- Bloom's Taxonomy supports architectural programmes by integrating basic technical knowledge into critical design thinking across different cognitive levels.
- Alignment of cognitive levels, assessment methods and feedback processes enables effective evaluation of student learning, supporting improvement in both technical knowledge and design thinking abilities.
- The introduction of interdisciplinary courses is crucial for developing and strengthening the connection between technical concepts and design applications, requiring regular communication among faculty members across different courses.
- Students are able to examine and assess environmental relationships through the use of digital technologies, particularly building performance simulation software, which corresponds to higher-order cognitive levels.

Based on these findings, aligning course outcomes derived from Bloom's Taxonomy with programme outcomes defined by the Washington Accord enhances building services courses within architectural programmes and has the potential to be extended to other technical courses associated with architectural education.

7. DISCUSSION AND RECOMMENDATIONS

7.1 Benefits of Bloom's Taxonomy in Architectural Education

Based on the research and case study, this paper highlights several advantages of incorporating Bloom's Taxonomy and the Washington Accord into architectural curricula and the formulation of COs:

- First, by offering a methodological framework for creating COs that address various cognitive levels, Bloom's Taxonomy ensures that architectural education fosters the development of both fundamental and higher-order abilities. This approach is particularly beneficial in courses that require both technical knowledge and innovative problem-solving skills.
- Second, the explicit articulation of cognitive levels in learning outcomes enables more effective teaching, learning and assessment strategies by setting clearer expectations for both faculty and students. When students understand the cognitive skills they are expected to develop, they can approach learning more strategically, while faculty can design better-aligned teaching and assessment activities.
- Third, a key challenge in architectural education is the progressive development of cognitive skills. Bloom's Taxonomy supports this progression by helping to bridge gaps between technical knowledge and design application. By intentionally designing courses that advance from foundational knowledge to more complex application, educators can support the development of integrative thinking required for effective architectural practice.
- Fourth, Bloom's Taxonomy facilitates clearer communication among faculty members, administrators and accrediting agencies by providing a shared vocabulary for curriculum development and assessment. This common language enables stakeholders to better understand the intended learning process, thereby supporting more effective curriculum planning and programme evaluation.

7.2 Challenges in Implementation

Notwithstanding these advantages, several challenges remain in incorporating Bloom's Taxonomy into architectural education, as outlined below:

- First, faculty members must be sufficiently knowledgeable about both the taxonomy and course content to formulate effective COs across different cognitive levels. Many architectural instructors may be unfamiliar with Bloom's Taxonomy or may find it difficult to articulate learning outcomes at specific cognitive levels.
- Second, aligning teaching and assessment methods with cognitive levels requires considerable pedagogical expertise and resources. Traditional lecture-based approaches may be insufficient for developing higher-order thinking skills, necessitating more participatory and problem-based teaching strategies that often require additional planning and resources.
- Third, faculty members teaching different courses must collaborate closely to maintain coherent cognitive progression across the curriculum. Designing cohesive learning pathways that progressively enhance cognitive skills can be challenging in many architectural programmes where courses are developed and delivered independently.
- Fourth, assessing higher-order thinking skills can be complex and time-consuming, requiring more sophisticated assessment methods than those used in conventional tests or assignments. Faculty members may need additional support and resources to design and implement effective assessment strategies for analysis, evaluation and creation.

7.3 Recommendations for Practice

The following recommendations are proposed for the application of Bloom's Taxonomy in architectural education, based on the findings of the research.

Faculty Development

To support faculty members in understanding Bloom's Taxonomy and developing effective learning outcomes across cognitive levels, workshops and practical tools should be provided. Discipline-specific examples from architectural education should be used to demonstrate the application of the taxonomy in context. Investment in faculty training and industry partnerships, such as collaboration with MEP consultants and BIM groups, is recommended to address capability and resource gaps.

Curriculum Mapping

Curriculum mapping should be undertaken to examine how cognitive skills develop across the programme. This mapping can guide curriculum revisions that result in more coherent learning pathways. Outcome-Based Education (OBE) should be treated as a means to make studio outcomes visible rather than to mechanise creativity, with upper levels of Bloom's Taxonomy used to preserve creative thinking. It is advisable to begin with building services by integrating one studio and measuring attainment as a pilot mapping exercise, documenting outcomes and scaling the approach across the curriculum where appropriate.

Diversification of Teaching Strategy

Teaching methods should be selected to support different cognitive levels, ranging from lectures for foundational knowledge to design challenges for creative application. Architectural education should broaden its teaching strategies to incorporate more active and problem-based approaches that foster higher-order thinking skills. Prescribed guidelines may be adopted selectively, with some used as NBA references and others as process templates rather than direct transplants. While the Washington Accord's outcome-based focus is valuable, it should be adapted to architectural education and COA requirements.

Assessment Alignment

Assessment techniques should be developed to reliably evaluate student performance across a range of cognitive levels, ensuring constructive alignment between teaching activities, learning objectives and assessment approaches. Consideration should be given to enhancing conventional assessment methods, such as design reviews, to better capture cognitive abilities.

Integration of Interdisciplinary Courses

Clear connections should be established between design studios and technical courses to support interdisciplinary knowledge and skill development. Group projects or integrated assignments may be introduced to encourage students to apply technical expertise within design contexts.

Progressive Complexity

Curricula should be structured to progressively increase cognitive complexity, enabling students to move from foundational knowledge to advanced application over the course of their education. Early courses should provide sufficient opportunities to practise lower-order skills before introducing more complex tasks.

Feedback Mechanisms

Regular feedback systems should be established to evaluate the effectiveness of learning objectives and

to identify areas requiring pedagogical or curricular improvement. Data on student performance across different cognitive levels should be systematically collected and reviewed.

7.4 Future Research Directions

This study identifies several promising directions for future research:

- Longitudinal studies examining how the application of Bloom's Taxonomy influences the academic achievement and professional preparedness of architecture students.
- Comparative evaluations of different approaches to incorporating Bloom's Taxonomy into architectural education across diverse cultural and institutional contexts.
- Examination of the relationship between architecture students' design thinking capabilities and the development of their cognitive skills.
- Development of specialised assessment systems and criteria that accurately measure student performance in architectural contexts across different cognitive levels of Bloom's Taxonomy.
- Exploration of how Bloom's Taxonomy may be applied to other learning domains relevant to architectural education, such as affective domains related to social responsibility and professional ethics and psychomotor skills related to model making and representational techniques.

These research directions would contribute significantly to the continued development of architectural education strategies that effectively prepare students for the complex challenges of professional practice.

8. CONCLUSION

This study investigates the use of Bloom's Taxonomy in architectural education, with particular emphasis on programme outcomes and course outcomes related to building services. The results indicate that the taxonomy provides a useful framework for developing comprehensive learning objectives that span a range of cognitive levels, from basic knowledge to complex creative application.

The case study of a building services course demonstrates that deliberate progression across cognitive levels can enhance student learning and address recurring challenges in architectural education. By structuring courses to move beyond memorisation and comprehension towards analysis, evaluation and creation, educators can support the development of both technical proficiency and the ability to apply this knowledge in innovative design solutions.

Clearer learning objectives, improved alignment between teaching and assessment, a more coherent learning progression and the development of higher-order thinking skills are among the key benefits of applying Bloom's Taxonomy in architectural curricula. However, successful implementation requires interdisciplinary integration, curriculum mapping, diversified teaching approaches, faculty development initiatives and aligned assessment strategies.

As architectural education continues to evolve in response to changing professional demands and educational methodologies, Bloom's Taxonomy offers a structured framework to ensure that graduates acquire the full range of cognitive skills required for professional practice. By explicitly addressing different levels of thinking within programme outcomes and course outcomes, architectural educators can design learning experiences that enable students not only to understand architectural principles but also to apply them creatively in addressing the complex challenges of the built environment.

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Redefining Psychiatric Healthcare Facilities

Regional Mental Hospital, Yerwada, Pune

By Ar. Shruti Thorat and Dr. Vasudha A. Gokhale

1. Introduction

An estimated 197.3 million people suffer from mental disorders in India, where the majority of the population has either no or limited access to mental health services. Psychiatric health facilities in India face tremendous challenges and criticism, including stigmatisation, abuse, overcrowding, lack of resources and inadequate architectural design (Meghrajani, et al., 2023). Patients' aggressive behavior in psychiatric hospitals is a serious problem that is increasing worldwide (Amoo & Fatoye, 2010). It is stated that the architectural design of psychiatric facilities and the quality of living space are essential aspects of the healing process and thus affect the outcome of medical care. Research in environmental psychology suggests that designing psychiatric facilities to reduce stress and aggression should prominently include environmental features that enable patients to seek privacy, regulate interpersonal interactions, avoid stressors and experience a sense of calm (Ulrich & Lundin, 2012). There is a lack of mental hospitals in India that properly consider patient and staff needs and, as a consequence, lack the 'optimism' and 'atmosphere of peace and comfort' of a truly 'therapeutic milieu'. Given the importance of architectural design in healing mentally ill patients, this project aims to design a psychiatric healthcare facility by understanding and responding to the unique human needs of the patients, creating an appropriate built environment leading to the fast recovery of the patients. Women, in particular, face unique challenges and are more vulnerable than men to mental health problems and various psychological disorders (Figure 1). This design, thus, includes a specially designed facility for the female cohort (Rej & Sasi, 2023).

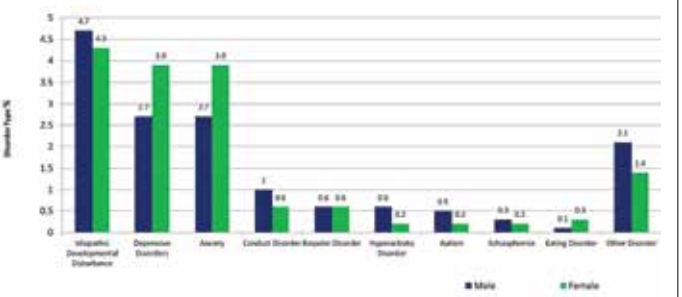

Figure 1: Psychological Disorders
Source: Author

2. Therapeutic Environment and Human Behavior

According to crowding theory, crowding stress and related aggression are linked to inadequacies in the physical environment that constrain the ability to regulate relationships with others and avoid stressors such as noise and arguments. A refreshing physical environment encourages appropriate behavior where design features can reduce the possibility of suicide by avoiding elements that might support hanging or self-injury (Ulrich & Lundin, 2012).

Aggression is a severe problem in psychiatric wards and has significant consequences for patients as well as staff working in mental healthcare. Research indicated that the design of a psychiatric unit plays a significant therapeutic role in stabilising and comforting effects, where the design of the building must be suicide-proof. It is necessary to secure open spaces to prevent runaways, remove all sharp or hanging features and maintain visual connectivity to keep them safe from physical harm. It includes providing ligature resistance, referring to architectural features that do not have points where a cord, rope, bed sheet, or other material can be looped or tied for self-harm or loss of life (Ahmad &

Hossain, 2010). Many architects have come up with innovative ideas to render a space ligature-resistant (Figure 2).

Figure 2: Psychiatric hospital Baltimore
Source: https://www.bizjournals.com/

3. Role of Architectural Features

Implementing 'safe, effective and personal' care is complex and necessarily seeks a balance between embedding safety and risk management with therapeutic provision (Kennedy, 2002). Outdoor gardens and rooms with views of nature serve as positive distractions, shortening recovery times, reducing the need for pain medication and mitigating patients' psychological distress. Research has revealed that certain design factors, such as good sight lines and an overall view, are associated with reduced aggressive behaviour. Additionally, the ward environment should support patient autonomy and spontaneity and should be orderly and well-organised. Courtyards and outdoor spaces are essential for mental hospitals, as many patients are unable to leave for prolonged periods (Mcintosh, Marques, & Jenkin, 2022). Staff must be able to monitor all patients to ensure that they do not harm themselves or others. At the same time, mental health issues come with many stigmas attached and a lack of privacy can further affect mental health. The design began with a literature review and discussions with experts to gain an understanding of mental disorders, their causes, types and patient profiles. The inferences from four case studies, including the existing Yerwada Mental Hospital in Pune, Vidya Sagar Institute of Mental Health in Amritsar, National Institute of Mental Health and Neurosciences (NIMHANS) and Al Amal Psychiatric Hospital in Dubai, helped in conceptualising the design.

3.1 Site Analysis

The Government of Maharashtra's proposal includes the redevelopment of the Yerwada Regional Mental Hospital, located on a 4,04,686 sq. m site, to house 600 male and 400 female patients. This project designs a 400-bedded facility for female patients. A comprehensive analysis of the project site, including its physical characteristics, context, climate, topography, vegetation and existing structures was performed to help in identifying site-specific opportunities or challenges (Figure 3).

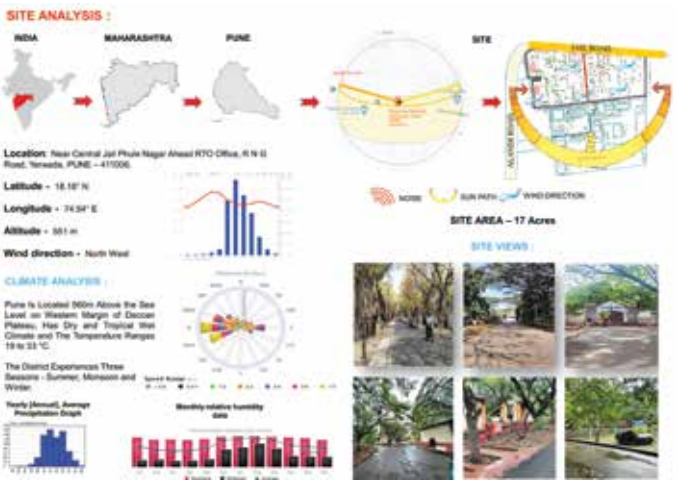

Figure 3: Site Analysis
Source: Author

Literature indicates that the focus should be on treating mental illness by providing psychiatric assessments, prescribing medications and offering therapies. The design aimed to create a healing and therapeutic environment, considering three aspects, as shown in Figure 4. In addition to Yoga and meditation located in the Ayush ward, well-equipped spaces are provided to house twelve different therapies identified below.

1. Pharmacotherapy
2. Psychotherapy
3. Electroconvulsive Therapy
4. Cognitive Behavioral Therapy
5. Stimulus Control Therapy

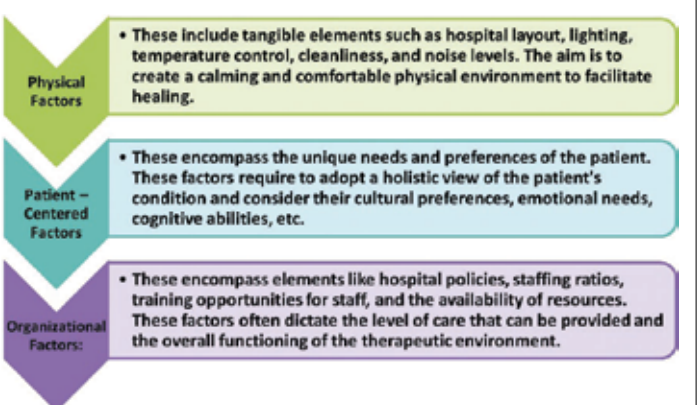

Figure 4: Factors for Creating a Therapeutic Environment
Source: Author

6. Exposure Response Prevention Therapy (ERP Therapy)
7. Behavioral Therapy
8. Relapse Prevention Management
9. Dialectical Behavioral Therapy
10. Recreational Therapy
11. Anger management therapy
12. Group therapy

4. Salient Design Features

The project involves highly complex functions linked to different activities. Each functional space that includes inpatient ward therapy areas needs a different spatial environment that considers psychological aspects and caters to the needs of a diverse patient cohort. The spatial, psychological, safety and medical/legal needs of patients, which are different, is studied and wards are designed and located on the site accordingly. The wards are designed for ten types of patients having peculiar spatial needs and a typical facility used for various therapeutic treatments. The ward assigned for a particular patient type and their spatial requirements are shown in Table 1.

4.1 Safety Requirements

As per research, security needs, climatic comfort, visual surveillance and psychological aspects must be considered. Different levels of safety are needed, ranging from highly supervised and not left alone to areas where patients may spend time with minimal supervision. The entire campus is divided into three zones based on security needs and each ward is designed to cater to the corresponding security level, as shown in Table 2. Observation kiosks are placed at strategic locations facilitating twenty-four hours of surveillance. The layout plan shows the placement of various wards (Figure 5).

4.2. Visual Connectivity

Visual connectivity from the nursing station is crucial, but each ward requires it in a different manner. For example, a high degree of visual surveillance is necessary in criminal wards, so nursing stations are

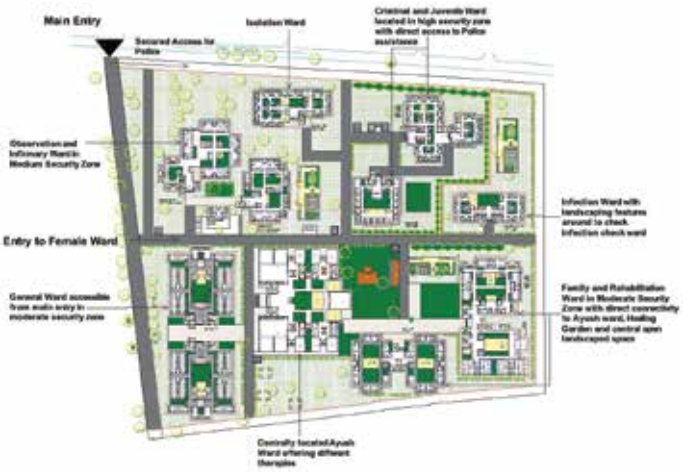

Figure 5: Layout Plan
Source: Author

equipped with twenty-four-hour visual surveillance capabilities. The doors have viewing panels, allowing staff to observe the patient's activities as needed. An adjustable viewing panel is used for toilets, as in the past, most suicidal cases happened in toilets. Similarly, each ward is designed with the necessary visual connectivity, ensuring patients' privacy needs are protected.

4.3. Specially Designed Interior Spaces and Furniture

Interior design is about providing comfort, safety and a refreshing indoor environment. Five significant design aspects are considered, including ligature risk, weaponisation, concealment, check against aggression and acoustics. The details are shown in Figure 6.

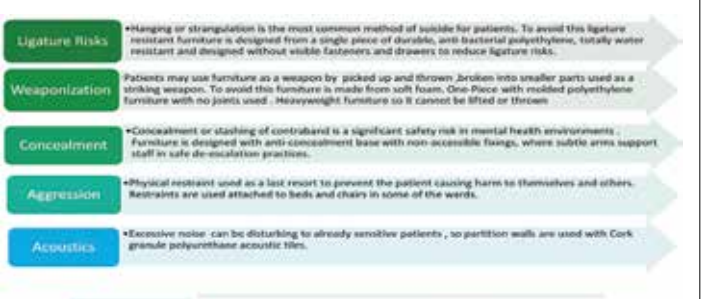

Figure 6: Interior design Features
Source: Author

Table.2: Ward level Security
Source: Author

MEDIUM SECURITY	MODERATE SECURITY	HIGH SECURITY
Observation Ward	General Ward	Criminal Ward
Infirmary Ward	Family Ward	Infectious Ward
Seclusion Ward	Rehabilitation Ward	Juvenile Ward
	Geriatric Ward	

Table 1: Wards Details
Source: Author

Sr. no.	PATIENT TYPE	WARD ASSIGNED	SPATIAL REQUIREMENT
1	**Disturbed psychiatric patient**	**Seclusion Ward**	Isolation Calming down hostile patients a robust locked room Ligature safe windows and doors Ligature safe furniture Visual connectivity to nature
2	**Acutely psychiatrically ill patient**	**Observation Ward** .	Secure, safe and quiet environment Frequent access for patients having emergency requirements. Acoustical barriers
3	**Physically ill patient**	**Infirmary Ward**	Connectivity to specially designed healing garden. Connectivity to the space for various therapies
4	**Patient with short term stay and medium psychiatric treatment**	**General Ward**	Direct connectivity to Ayush block, outdoor garden. Nursing stations Easy access and visual Surveillance
5	**Patient stay with their family member**	**Family Ward**	Facilities for patients stay with their family members. Ample indoor open, semi covered and covered activity space for patients and family members.
6	**Elderly patients with dementia or cognitive impairment**	**Geriatric Ward**	Direct connectivity to nature from each room, more space for easy movement. Secured indoor, semi open activity spaces. Access to healing garden and yoga center and other therapies at Ayush ward.
7	**Individuals with persistent and serious mental illness**	**Rehabilitation Ward**	More activity spaces. Connectivity to geriatric ward and family ward to promote social interaction. Direct connectivity to Ayush ward, yoga, healing garden
8	**Adolescents with mental illness aged under 18** It also houses criminal children	**Juvenile Ward**	Secured indoor and outdoor playing, therapeutic facilities. Surveillance, direct connectivity to police Common dining Courtyard Children play area
9	**Individual with Infectious diseases**	**Infectious Ward**	Biophilic design Buffer spaces to check the spread of infection. Ample light, cross ventilation to check bacterial growth. Oriented in a way that wind flow pattern do not help in spreading infection to other spaces
10	**Patient with criminal offense**	**Criminal Ward**	High security and surveillance. Direct connectivity to twenty hour police assistance Space for police on duty. No place of hideouts
11	**Common facility**	**Ayush Ward**	Therapeutic treatment Walking Organised indoor activity Organised outdoor activity Socialisation Yoga

A healing environment is created with the integration of indoor and outdoor spaces. Each ward features courtyards, semi-open spaces and corridors that help manage stress and facilitate early recovery. Visual connectivity to the maximum number of patients from their beds to the outdoor environment is provided. Large windows that overlook the landscape and open activity spaces contribute to the biophilic design. Patients and visitors have universally accessibility indoors and outdoors, with wide corridors facilitating the movement of ambulatory patients. High ceilings give spaciousness, catering to the safety needs. Any hanging object, such as a ceiling fan or light fixture, can pose a safety threat.

Wards are designed considering the diverse spatial, psychological, physical and safety needs of different patient cohorts. The criminal and infection wards are designed with high-level security, anti-climbing and ligature-resistant grills to ensure safety and facilitate airflow throughout the ward interiors. Secured day-activity spaces adjoining secured outdoor landscaped spaces provide a refreshing environment, helping in stress reduction. The strategic location of nursing stations facilitates constant visual surveillance and is designed to avoid hideout spaces. The patient's area is separated from the public and staff areas, which could be locked in an emergency. The interior is specially designed with built-in, ligature-free furniture, allowing patients to connect with nature visually through large, ligature-free windows. Wide doors with vision panels facilitate handling violent patients (Figure 7). The observation ward has a single-bedded and ten-bedded facility where central courtyards are used to house day-activity spaces, facilitating visual connectivity and modifying indoor climate (Figure 8).

The seclusion ward, located away from the other wards, has more nursing units with surveillance

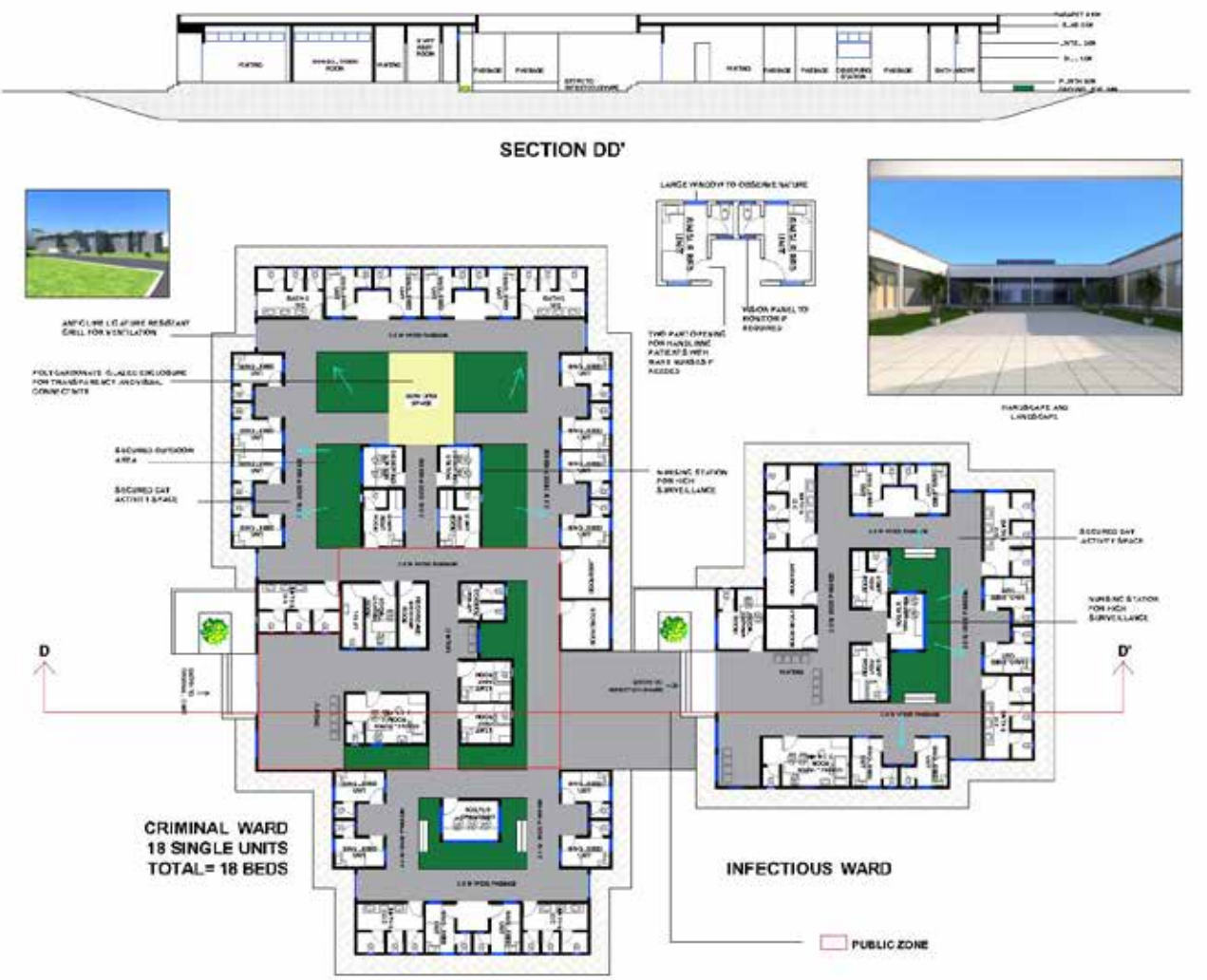

Figure 7: Criminal and Infectious Ward
Source: Author

Figure 8: Observation Ward
Source: Author

rooms and staff rooms to facilitate staff rest, as taking care of patients who need seclusion is a highly stressful and intense activity. Each room has visual connectivity to the outdoors through large ligature-free windows to reduce aggression (Figure 9).

4.4 Climatic Consideration

The climatic considerations included in the design are as follows.

- Screening with trees to check harsh sunlight interior
- Layout to facilitate movement of fresh air through courtyards and corridors
- Thick masonry construction with low maintenance natural stone cladding providing insulation
- High ceiling with ventilators for cross ventilation
- Polycarbonate-glazed, enclosed semi-open spaces, designed to offer visual connectivity, transparency and ample light.

5. Biophilic Design

The most important factor is providing open spaces to relieve stress. The entire campus seamlessly integrates open and built spaces, ensuring that each patient has access to nature according to their specific needs. There are four types of open spaces – secured courtyards, informal open spaces, outdoor green spaces and healing gardens. Adequate safety measures are in place, considering the potential threats posed by the patient's unpredictable behavior. From a planning perspective, each ward is designed to avoid doubly loaded corridors, achieving clear sight lines. Following the concept of biophilic design, three levels of connectivity to nature are achieved

Figure 9: Seclusion Ward
Source: Author

- Visual connectivity is needed so patients can see nature outside from their beds and the indoor courtyards
- Patients can feel nature in semi-covered spaces, corridors
- Direct connectivity to healing gardens and other outdoor green spaces

5.1 Landscape design

The landscape design involves carefully selecting and placing soft and hardscape elements, taking into account visual, environmental and safety aspects. Low-height shrubs are selected so no one can hide behind them. Trees are not planted near boundary walls as they can help patients run away. Trees with purification potential and medicinal plants are planted around the infectious ward. Climb-proof hedges are used all over, from a dense, impenetrable mass of conifer to a treacherously thorny barrier. It is used for security due to its natural deterrent against climbing while maintaining visual connectivity and a visually soothing therapeutic environment. Heavyweight outdoor seating with low back minimise ligature risk. The plant materials used include aromatic, medicinal, flowering and trees with religious significance. The healing gardens are strategically located, facilitating easy access to patients. Trees with long trunks are provided to prevent them from acting as a visual barrier. The landscape design features can be seen in Figure 10.

6. Conclusion

Architectural design of healthcare facilities often

Figure 10: Landscape Design Features
Source: Author

neglects essential design considerations, including the psychological effects of environmental aesthetics. This project is designed to strike a balance between a sense of freedom and the required level of control of the patients by staff by employing transparency and openness to permit staff to monitor the patients. An intelligent use of courtyard spaces sought to mitigate the adverse effects of complete enclosure by linking various spaces visually to the outside world. The design facilitates and encourages passive interaction, where the patients can socialise spontaneously. For instance, the circulation routes are more than mere connections between highly specialised spaces serving as an important social space. Some of the significant design features are establishing 'sightlines' for monitoring patients, removing potential ligature points and minimising the potential for weaponising the environment. The project exhibits that the built environment can be therapeutic. From providing a visual connection to green spaces to adequate sightlines for staff, the whole built experience can enhance recovery. Ligature resistance is one of the first design aspects to consider in a behavioral health environment. The design is without points where a cord, rope, bed sheet, or other fabric/material can be looped or tied to create a sustainable point of attachment, resulting in self-harm or loss of life.

Architectural interventions can play a significant role in designing the mental hospital to optimise patient safety and security and maximise the observational duty of the supporting staff sensitive to the emotionally vulnerable patients who inhabit the building. The built environment assists doctors and supporting staff in delivering services timely and effectively. The surroundings should be aesthetically pleasing, appropriate for the patients and safe and secure. At a time when patients are at their most vulnerable, the environment should offer them a space that feels comfortable, safe and peaceful, a space that allows recovery to take place. This project redefined psychiatric healthcare facilities, creating a healing environment that has a positive impact and ensures that empowered staff has a pleasant place to work and deliver effective services that enable patients' journey to recovery.

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ARTICLE

The Era of Gen Z and the Challenge of Dealing With Academic Hiccups

By Ar. Dhiraj N. Salhotra and Ar. Smit Goghari

An academic year break during the under graduate program is not the time to drop out, but relaunch with greater vigour and pull a career trajectory that sets you apart. The challenge is bigger today with the Gen Z's around.

The Gen Z fact file

As per an article on the websites of varthana.com, edumania.com and amberstudent.com, dedicated to addressing the 'Mental Health and Well-being: Addressing Gen Z's needs in Colleges', some of the areas of fallout are listed below:

- As Gen Z students are navigating the transition from adolescence to adulthood, which involves increased responsibilities, decision-making, and independence, this transition is found to be challenging and contributes to feelings of uncertainty and anxiety amongst them. Though Gen Z is more open to discussing mental health issues, it is often viewed by society as a stigma as there is lack of access to appropriate resources that poses significant barriers. Mental health challenges, such as anxiety and depression, can affect academic performance and overall well-being. In the light of aforementioned, it is notable that UGC has made mental health support mandatory in all higher education institutions (Figure 1). As per the mandate all colleges are required to appoint qualified counselors, ensure safe infrastructure, and avoid discriminatory academic practices.
- Some of the other initiatives include, sensitisation sessions, capacity building programs for teachers to deal with such cases, conducting orientation as well as counselling sessions, adopting administrative framework that ensures early detection mechanisms,

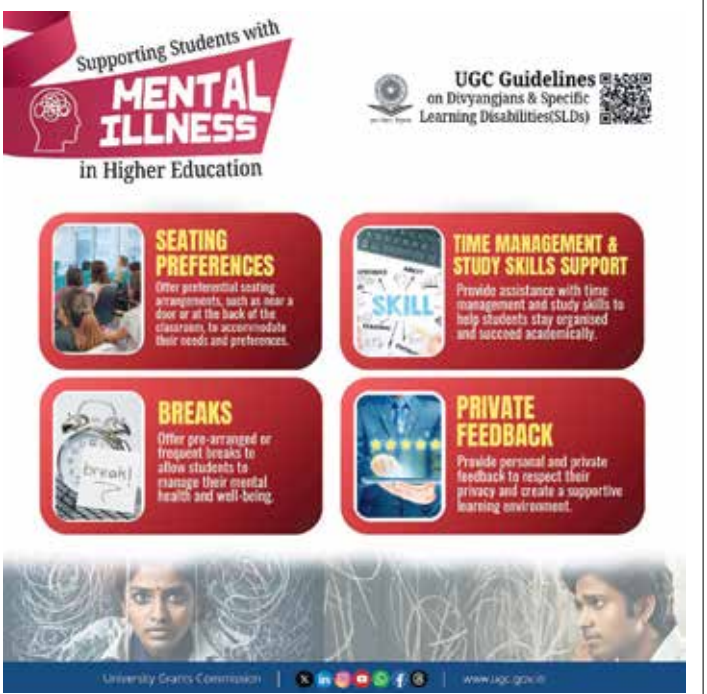

Figure 1: UGC posters highlighting challenges with Mental Health
Source: ugc.gov.in

while developing Standard Operating Protocols and creating a buddy mentor support system, along with team building initiatives and speedy redressal mechanisms. The institutions are also recommended to increase focus on activities of physical fitness such as yoga, initiatives under NSS or NCC and others (Figure 2).

- The pressure to excel academically is a significant source of stress for Gen Z students. This pressure can lead to anxiety, depression and burnout, particularly when combined with the fear of not meeting expectations or securing a stable career. Students also because of various lifestyle choices struggle with managing time,

Figure 2: UGC posters highlighting Sports to address mental challenges
Source: ugc.gov.in

submissions and co-curricular activities, leading to an imbalance in the final outcome.

The Supreme Court has recently issued clear directives on institutions to refrain from engaging in batch segregation based on academic performance, public shaming, or assignment of academic targets disproportionate to students' capacities.

Some of the other challenges faced by the Gen Z apart from the academics are:

Addiction to excessive social media exposure: Excessive social media use can negatively impact mental health, leading to feelings of inadequacy, low self-esteem and fear of missing out (FOMO). Constantly comparing themselves to others on social media can exacerbate stress levels. It also leads to attention difficulties and significantly impacts performance.

Financial challenges to match the life styles with other expenses: Students often face financial burdens, including student loan debt, tuition fees and living expenses that sometimes are an outcome of peer pressure. Financial concerns can lead to anxiety, depression and decreased ability to focus on academic pursuits. To add to this, there is a tremendous amount of unmeasured peer pressure on living a lifestyle in tune with times.

Sleep Deprivation due to late night outs and social gatherings: Disrupted sleep patterns, often caused by excessive screen time, binge watching, doom scrolling or irregular schedules, can impair concentration, decision-making and overall well-being.

Substance Abuse: It may sound weird but is true, youngsters are in the grip of substance abuse. While some may be in a state of mind, while others are coping with pressures, emotional distress is getting into drugs or alcohol to cope with. This can lead to impaired cognitive function, poor academic performance and worsening mental health (Figure 3).

Sometimes these distractions, as a cumulative effect, can eventually lead to academic hiccups like semester drops or year drop.

Gen Z challenges and Drop in an Architecture program

These hiccups in an already attentively complex life of a student can feel painful and like a setback from which there is no coming back. Although it may seem an insurmountable challenge, if tackled strategically, it can change into a launch pad for greater success in the career. Architectural education is a minimum of 5 years of formal education dealing in subjects of aesthetics, design, history, building construction and services and more. The program and the courses it deals with allows for a lot of variability, which in turn leads to diverse points of view to look at solutions and beyond. This can easily lead a student to get overwhelmed and lose their direction or motivation. If and when this leads to an academic gap, it is important that all the stakeholders involved, namely the student, parents and institution attempt to recover the lost ground.

Use the time for immersive field work: The diversity and variability of architecture education allows for

Figure 3: UGC posters highlighting addiction impact with social issues and challenges
Source: ugc.gov.in

greater flexibility and the industries' application to solve how the real world profession works. This inherent advantage of learning on the field can become an important game changer. Education in architecture and field work in architecture comes with their own learning curves, concepts and applications that may not be fully understood in the classroom and can be absorbed more easily on the field. There are many discussions on the difference between theory and practice and nothing holds more truth than this in the field of architecture. Students facing academic gaps should develop a keen understanding of their gap and start looking for internship opportunities in offices and practices that they feel that can help them fill the gaps. There is a reason why working in architecture is called a practice, it requires concentrated effort over years for one to hone in on their skills.

Challenge versus advantage of immersion work experience: The only ingredients missing from the students' outlook are working as an intern, the demanding nature of work. Sometimes the real world can seem harsh and difficult, although it is not as easy as being home, however it is not impossible with the right frame of mind. Working as an intern or a trainee will also be monetarily frugal in its compensation, but an exposure in a right office can give students and parents the confidence to understand the field better, gain clarity and re-enter the academics with new rigour and insights into the course.

Industry holds the hand and a life transformed with a comeback: With several years of institutional experience as a mentor and incharge of placement cell, it has been found that the practicing architects of the industry are more than eager to give a helping hand and are able to offer the empathetic understanding as well as the emotional support that is needed. We have found most of the offices empathetic and inclusive for allowing the students with a drop to focus in this interim period as an intern, some have also contributed back for financially weak students with support, just to ensure they gain the necessary momentum back. The second chance or this opportunity is an ideal platform to build a launch pad for a comeback. We have witnessed, transformation of individuals into remarkable professionals, through a rigorous situation that is a mind testing period, when invested in hibernative learning.

Conclusion

Ultimately, architecture is a practice and like any practice it will demand rigour, focus and discipline. There will be no replacement for these qualities to have successful outcomes during academics and in their future career. On another plus, these qualities directly help tackle the challenges of attention and lack of focus.

As an end note message 'these qualities sometimes are learnt on campus or sometimes off it. Instead of being disheartened, placing yourself in a rigorous and determined environment can train you to be a more successful professional albeit a few months later than planned, at the end of your academic career, it can become a launching pad for a more stable and successful career'. A point to remember here is that 'in any situations as these, the best part of being in the program of architecture is you belong to a fraternity that is ready to help. Just find the alumni, senior and appropriate support from faculty, course in-charge, placement head or the institutional head with a determination and commitment to turn the loss for complete benefit and the transformation will happen'.

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ARTICLE

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Significance of Study on Social Sustainability Concerning Safety and Security in School Campus

Understanding Broad Strategies Through Literature Review

By Prof. Manjusha Kale and Dr. Pervar Padmavathi

1. Introduction:

Every child has the right to live free from violence, exploitation and abuse. At home and in school, in the community or public, every child has the right to grow up in a safe and inclusive environment. Despite several measures taken in the Country, physical safety and security of children is growing societal concern, which could make it more difficult for our society to foster strong, healthy adults in the future and this in turn affects social sustainability in this world.

Parents typically enquire how the school will support their child's mental, creative and physical development through various programs, curriculum and initiatives when they visit schools to apply for their child's admission. However, hardly anyone ask the school administration, "How safe is my child in your school?" A comprehensive assessment of abuse in a school environment in an Indian city indicated a high incidence of physical, emotional and sexual abuse (Manoj Therayil Kumar, Sebind Kumar, Surendra P. Singh, Nilamadhab Kar, Aug.2017). Increasing cases of School children facing abuse and violence impacting social sustainability, calls for strong measures by multiple disciplines, Childhood abuse is known to have long-lasting negative consequences on the mental, physical and social wellbeing of children (Kelly-Irving et al., 2013, Flaherty et al., 2006), which is harmful for social sustainability. While other academic fields, including the medical sciences and sociology, have drawn attention to this problem, "the results indicate that the topic of school safety is absent in architecture academia and most prevalent in the fields of psychology and education" (Michael Nowak). This gives an indicator that the field of architecture needs to lay emphasis towards this crucial component of design. The challenge now is: Can designers provide a built environment that is safe and secure? Hence the answer is unquestionably yes, as research indicates, "There is a connection between design and crime" (Jeffrey 1971; Newman 1973; Crowe 2000).

1.1 Aim:

To develop comprehensive design guidelines for creating secure and protective school environments to safeguard school children from potential threats within school settings**.**

1.2 Objectives

- To study and understand the relationship between the built environment and its influence on safety and security of various spaces within school premises.
- To explore parameters on safety and security in association with characteristics of different spaces involved in school settings in interest of social sustainability.

- To identify and evaluate various factors affecting School children's safety and security through literature study.

2. Literature Review

DEFINITIONS

School safety and security are critical aspects of creating a conducive learning environment, where students and staff feel protected from harm and able to thrive ensuring social sustainability. The concepts of safety and security are often defined in relation to the presence or absence of threats, with each having unique nuances and implications in the educational context.

William (2008) defines security as "most commonly associated with the alleviation of threats which threaten the survival of a particular reference object," while Stone (2009) expands on this by stating that "security is about freedom from threat and the ability of states to maintain independent identity and their functional integrity against forces of change, which they see as hostile." These definitions underscore the importance of protecting against external threats that may destabilise the school environment.

Safety, on the other hand, focuses on the protection of individuals from harm. According to Safeopedia (2021), "safety is the condition of being protected from harm or other non-desirable outcomes," while Morgan (2021) defines it as "the feeling of being protected from the factors that cause harm." Michael Nowak further distinguishes between safety and security, stating that "safety is protection from hurt or injury resulting from unintentional, non-human caused events," whereas "security is protection against hurt or harm from human-caused intentional acts."

In the school context, safety and security are foundational to fostering a positive educational climate. Roy H. Walton, Jr. (2011) defines school safety as "an environment in which all users of a building feel safe and comfortable." This involves ensuring that school facilities, defined as "buildings and grounds, parking lots, playing fields and fixed equipment that are used for educational purposes," are secure and properly maintained. Safety features, defined by The Free Dictionary as "features of a building that are added to ensure a user's safety," play a critical role in this effort.

The design and upkeep of school facilities also contribute to safety outcomes. A "new school building" refers to a school facility constructed within the past five years, while an "old school building" is one constructed 20 or more years ago. "Renovated school facilities" are those that have undergone updates within the past five years. Each of these facility types can incorporate specific

school design elements, defined as "individual structural elements that can be separately added to or deleted from the design of a school building," to enhance safety and security.

Ensuring school safety also requires addressing issues of school violence, which the Center for the Prevention of School Violence (2002) defines as "any behavior that violates a school's educational mission or climate of respect or jeopardises the intent of the school to be free of aggression against persons or property, drugs, weapons, disruptions and disorder." A safe school is one where "the total climate allows for staff, students, administrators and visitors to interact in a way that is positive and nonthreatening," with clear expectations for student behavior that are "articulated, consistently enforced and applied fairly."

The culture of a school is integral to its safety and effectiveness. As Karadag and Oztekin-Bayir (2018) note, "school culture is defined as the common values and beliefs, the signs and symbols and the understanding shared among the members of a school." Grunert (2005) adds that school culture reflects "the guiding beliefs, assumptions and expectations that are apparent from how a school functions." A strong, positive school culture contributes to school effectiveness, which Mortimore (1991) defines as a school where "students progress further than might be expected from consideration of its intake." Effective schools show improvement in student outcomes, in contrast to ineffective schools where little change occurs.

Addressing school safety also involves mitigating specific risks, such as bullying, which is identified by Olweus (1978, 2013) as a harmful behavior with significant developmental consequences for children. The National Centre on Safe Supporting Learning Environments defines school safety as "schools and school-related activities where students are safe from violence, bullying, harassment and the influence of substance use." School safety can be categorised into five sub-categories: physical safety, emotional safety, bullying/cyberbullying, imbalance of power and repetition.

Physical safety involves "the protection of all stakeholders, including families, caregivers, students, school staff and the community, from violence, theft and exposure to weapons and threats," while emotional safety refers to "an experience in

which one feels safe to express emotions, secure and confident to take risks." Bullying is a form of aggressive behavior that involves a "real or perceived power imbalance" and typically occurs repeatedly. Bullying can manifest as physical, verbal, or social aggression and when facilitated through electronic devices, it is referred to as cyberbullying.

In higher education, campus safety refers to the "practices and policies in place to promote a secure and protected environment at institutions of higher education," ensuring that students are safeguarded from violence, harassment and other emergencies. This holistic approach to safety and security is essential for creating environments that support learning and personal growth.

SITE DESIGN:

Oscar Newman's theory of "Defensible Space" emphasises three key features to enhance security in the built environment: Territoriality, surveillance and symbolic barriers.(1972) However, the concept of Territoriality, as discussed in the "Designing Safe Schools: Considerations for Secure High School Campuses" report, points out that "the impact of visual and psychological effects of security measures may also create a sense of exclusion and anxiety among students and the community." The report suggests that creating a safe and secure perimeter should be done using the building itself rather than relying on fencing, to avoid such negative effects.

The location and configuration of schools also play a crucial role in their safety. "Sprawl" schools, often situated near highways and arterial roads for the convenience of automobiles, present unique challenges, as Chian-Yuan and Xuemei Zhu note (2015). They also emphasise that "little attention has been devoted to the impacts of school locations and surroundings on traffic safety around schools." David Satcher adds that "there should be land use regulations to exclude stores selling substances, such as cigarettes, drugs, or alcohol, within a reasonable distance from elementary, middle and high schools." Moreover, the "absence of safe and accessible recreational spaces" can negatively affect sexual behavior and health outcomes, according to Satcher.

The physical security of schools can be compromised by various vulnerabilities, as outlined in "Safe School Design: A Handbook for Educational Leaders" by Tod Schneider, Hill Walker, Jeffery Sprague (2000). These vulnerabilities include the height of windows, the number of entries and exits, the location and design of bathrooms, patterns of supervision, traffic patterns and their management and lighting.

The school garden wall should also be "heightened enough to prevent dangerous attacks and infiltration by unwanted persons," as suggested in the study by Fatma Ozmena, Ceyhun Durb and Tulin (2010).

Additionally, the overall effectiveness of physical security measures heavily depends on site and building design features. As stated in "A Systems Approach to Physical Security in K–12 Schools," thoughtful design can "enhance surveillance capabilities, control access point and integrate security technologies seamlessly into the school environment." The built environment not only protects schools from undesirable events like vandalism, physical violence, sexual offenses and accidents but also influences the broader safety and security factors of the school setting.

Finally, the report School Fencing: Benefits and Disadvantages (2013) states the importance of perimeter fencing and limited number of entry points (Fig1). Which states that perimeter fencing should include at least two points of entry in case one is blocked during a crisis. Additional access points should be considered if students would be potentially in harm's way circumnavigating an uninterrupted fence line. Access points should be wide enough for ground maint

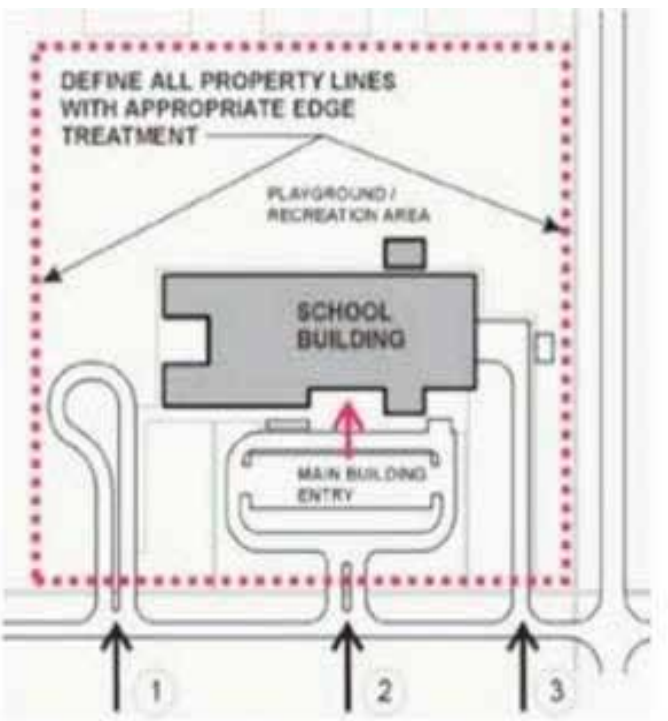

Figure 1: Fenced perimeter with limited entries
Source: https://r.search.yahoo.com/_ylt=AwrKFjbM0ldp8wEAOiO7HAx.;_ylu=Y29sbwNzZzMEcG9zAzIEdnRpZAMEc2VjA3Ny/RV=2/RE=1768572877/RO=10/RU=https%3a%2f%2fwww.sciepub.com%2fportal%2fdownloads%3fdoi%3d10.12691%2fajcea-6-6-5%26filename%3dajcea-6-6-5.pdf/RK=2/
RS=UygBRh9k3joo72GynWTfKf_K2Xo-

BUILDING DESIGN

Building configuration plays a crucial role in the functioning of the built environment. Polyvatseva (2019) emphasises that "extroverted buildings with open first floors will actively involve citizens in action," thereby fostering engagement and enhancing security. This approach aligns with Louis Sullivan's design principle, "Form follows function," which promotes functionality without compromising aesthetics. Randall Atlas expands on this by asserting that "Form follows function" should also be applied to integrate security as a fundamental function of the building.

However, not all design choices contribute positively to safety. Jacinta Francis explains that "visibility could be compromised by obstructive building configurations and architectural designs, as well as natural elements, such as trees, hidden corners within school corridors and buildings, unclear pathways, lack of signage, [and] under-utilised areas of the school," which are often hotspots for bullying. This highlights the need for thoughtful design that prioritises both functionality and safety.

The challenges of ensuring security are particularly evident in older school buildings. The report The Design of Safe, Secure & Welcoming Learning Environments by the Committee on Architecture for Education (2018) states that retrofitting older schools is necessary because "older schools were designed when security from violence was not a priority." Many of these schools have "blind spots and a general lack of visibility," with nooks, closets and small rooms requiring more transparency and security. The report also recommends that "there should be a clear line of sight from the front office to the main entryway as well as a transitional space beyond the front entrance." However, these renovations face significant budget constraints, as "even seemingly simple solutions such as changing out locks can be expensive."

Research conducted by Roy H. Walton, Jr. in "Physical Designs for Safe Schools" (2011) underscores the importance of controlling access to buildings. Many principals in the study stated that "by controlling access to the building, you can create a safe environment." This insight reinforces the idea that thoughtful design and strategic modifications are key to ensuring safety in school environments, whether in new constructions or retrofitted older buildings.

INDIVIDUAL SPACE DESIGN

"While physical safety is of utmost importance, care should be taken while placing furniture, where children may climb near windows or balconies," say Xiao Lini and Ma Yingnan (2010). Proper attention to these details helps prevent accidents and ensures a safer environment for students.

Moreover, the "creation of play spaces that cater to all students regardless of physical abilities or social standing can reduce instances of bullying." Mostafa Mastour (2023) emphasises that "features such as visibility, layout and equipment can contribute to bullying," highlighting the need for thoughtful design in school environments to promote both safety and inclusivity.

It is also necessary to provide evacuation routes in the schools and these routes should be connected to each classroom; Classroom design should provide several ways of evacuation for students in an emergency. No furniture or equipment should be placed near the emergency egress routes (Providing Safe School Environments: Crime Prevention Through Environmental Design) (Fig 2).

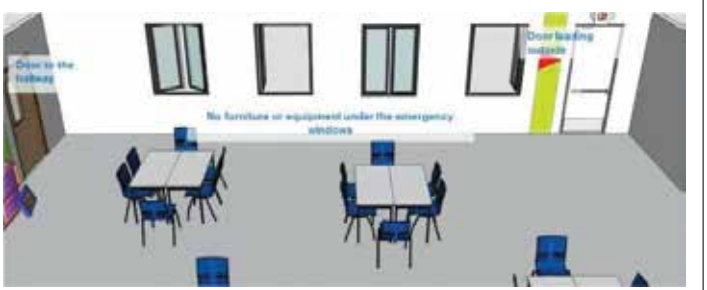

Figure 2: Furniture arrangement to not block emergency routes
Source: https://ippsr.msu.edu/sites/default/files/MAPPR/Kim_Providing%20Safe%20School%20Environments_Final.pdf

BUILDING ELEMENTS

Windows serve a vital role in providing light and ventilation in buildings, but their design must also consider safety during emergencies. Xiao Lini and Ma Yingnan (2010) suggest that "window grills over fixed grills should be preferred, keeping in mind windows as escape ways during fire." This recommendation highlights the dual function of windows in ensuring both everyday comfort and emergency egress.

Similarly, Arthur M. Wendel, in his research, specifies that "physical injury at the building level can be caused by falling out of open windows, off rails, on stairs, off roofs, etc.," as well as "physical abuse and crime-related violence." These risks underline the importance of carefully considering window design and placement to prevent accidents and enhance security.

The importance of well-lit spaces in promoting safety is also emphasised by researchers (Fig 3). Ahmed Tarek advises "avoiding deep super blocks (width-wise) which would become poorly lit and ventilated,"

Figure 3: Use of lighting over exterior wall and entrances
Source: https://ippsr.msu.edu/sites/default/files/MAPPR/Kim_Providing%20Safe%20School%20Environments_Final.pdf

stressing that proper lighting and ventilation are critical for creating safe environments.

Additionally, school fencing plays a significant role in maintaining a secure environment. A paper on "School Fencing: Benefits and Disadvantages" (2013) suggests that "designating the school grounds as well-defined, carefully maintained spaces enables surveillance by school staff and law enforcement." It also emphasises "limiting access to areas that are not highly visible" and "restricting entry and exit points to a few easily monitored areas." Furthermore, the importance of providing a safe landing for students who exit through emergency windows is highlighted in" Providing Safe School Environments: Crime Prevention Through Environmental Design," where the right landscaping, such as shrubs, can prevent outsiders from accessing classrooms (Fig 4).

There is an inherent contradiction between the safety provided by window grills and the need for emergency exits. While "window grills over fixed grills" are recommended to enhance security and prevent unauthorised entry, they can also hinder the quick evacuation of occupants during emergencies, such as fires. The challenge lies in balancing the security benefits of window grills with the need for accessible escape routes. To address this, designs should consider solutions like easily removable grills

Figure 4: Use of shrubs to prevent intruders from entering
Source: https://ippsr.msu.edu/sites/default/files/MAPPR/Kim_Providing%20Safe%20School%20Environments_Final.pdf

or alternative escape routes that do not compromise security but ensure that occupants can evacuate safely in an emergency. This balance is crucial in creating environments that are both secure and safe for all potential scenarios.

BUILDING MATERIALS

In creating safer and more effective school environments, several design principles must be considered. According to guidelines from *Providing Safe School Environments: Crime Prevention Through Environmental Design*, ensuring pedestrian safety is critical. They recommend that "for students' safe walking and running, the sidewalk is a minimum five feet wide with smooth surface materials." Additionally, "a buffer zone should be provided between the sidewalk and parking spaces," which enhances the protection of pedestrians in school zones (Fig 5).

Moreover, the use of glass in school design can have profound social benefits. As noted in *Social Exchanges Found in Collaborative School Space Design* by Julie C. Sluyter (2020), "incorporating glass proved surprisingly impactful for study participants." The transparency "created a wider social structure, developing a sense of community along with student and staff accountability."

When it comes to securing school perimeters, fencing material also plays an essential role. The recommendation is that "fencing material should not be easy to vandalise, cut, or climb." In such cases, "ornamental fences, such as wrought iron, are the best" because of their durability and resistance to tampering.

SYSTEMS AND SERVICE DESIGN

The *Invitational Theory* by Myers and Monson (1992) emphasises the importance of creating schools that students are eager to attend. This theory identifies five factors that enhance the appeal and safety of schools: "people, places, policies, programs and processes." By improving these areas, *Invitational Theory* claims that schools become "more socially appealing and safe."

Figure 5: Use of shrubs to prevent intruders from entering
Source : https://ippsr.msu.edu/sites/default/files/MAPPR/Kim_Providing%20Safe%20School%20Environments_Final.pdf

On the other hand, CPTED (Crime Prevention Through Environmental Design), introduced by criminologist C. Ray Jeffery (1971), provides a framework for enhancing security through four principles: "Territorial reinforcement, Natural Surveillance, Access Control and Maintenance and Management." Polyvantseva further builds on this by advocating for safety through a "3 step defense levels," including the "outer perimeter, inner perimeter and building block level."

David Bowman (2023) highlights a critical gap in school safety planning by stating, "Absence of standardised security building codes indicates that building planners lack clear guidance on integrating multiple layers of protection." His theory of safety guiding principles outlines two prevalent security approaches: "Outside-in: Hardens building exteriors" and "Inside-out: Creation of safe internal havens."

In addressing the dynamics of safety, R. Polyantseva underscores the importance of understanding the root causes by posing the question, "What makes the space unsafe?" The need for robust emergency communication lines is echoed by Fatma Ozmena, Ceyhun Durb and Tulin (2010), who argue that "an emergency communication line should be built to communicate with the necessary units and organisations to receive timely support and help in threatening situations."

Furthermore, the physical security of schools is paramount. According to Ozmena, Durb and Tulin (2010), "the physical conditions of the schools should be renewed," including the installation of "cameras with night vision outside and inside of the school buildings" and ensuring that "the school garden wall should be heightened enough to prevent dangerous attacks and infiltration of unwanted persons."

In ensuring preparedness, *AFT Teachers Educational Issues Department* (2003) recommends that "routine school fire drills must be enhanced with drills that walk school staff and, when necessary, students through various scenarios such as intruder alerts, school lockdowns and appropriate responses to natural disasters and bio-chemical emergencies." These drills should also verify that "necessary communication channels with outside agencies such as police, fire and hospitals are fully functional."

Finally, school safety can be further enhanced through a combination of active and passive security measures. Shamus P. O'Meara, in his paper *School Security Design: Planning to Mitigate Risk and Avoid Liability*, suggests the need for "active: cameras and alarms" and "passive: natural surveillance, territorial reinforcement" strategies. Ibrahim H. Cankaya (2019) also supports this by noting that "there should be safety cameras to check inside and outside school premises."

3. METHODOLOGY

3.1 METHODOLOGY FOR LITERATURE REVIEW

A systematic literature review was undertaken to develop a comprehensive understanding of safety and security in school design. The review process commenced with a rigorous definition of the core terms, 'safety' and 'security', through an in-depth analysis of scholarly research. This involved examining multiple studies to capture diverse perspectives on these concepts.

To grasp the breadth and depth of existing research on safety and security in school design, a wide-ranging review of research papers, articles and reports was conducted. Each piece of literature was subjected to a detailed analysis to understand its research objectives, methodologies, findings and conclusions.

To identify patterns and underlying factors, influencing safety and security in school settings, the reviewed literature was systematically categorised into seven primary criteria:

1. Definitions: Clarifying and comparing different conceptualisations of safety and security.
2. Site Design: Examining the role of site planning and layout in enhancing safety and security.
3. Building Design: Analysing the impact of overall building configuration on safety and security.
4. Individual Space Design: Evaluating the design of specific spaces (classrooms, corridors, etc.) for safety and security implications.
5. Building Element Design: Investigating the contribution of individual building components (doors, windows, etc.) to safety and security.
6. Building Materials: Exploring the role of materials in enhancing or compromising safety and security.
7. Systems and Services Design: Assessing the impact of building systems (fire protection, surveillance, etc.) and services on safety and security.

By categorising the literature in this manner, the study aimed to identify key parameters, variables and qualitative measures that contribute to a safe and secure school environment.

3.2 METHODOLOGY FOR DATA COLLECTION

Secondary data was primarily sourced from online news articles published by various newspapers. To identify relevant incidents threatening social sustainability, a systematic search was conducted using specific keywords related to safety and security in schools. The focus was on incidents involving school stakeholders, such as students and staff and encompassed a range of events including violence, accidents and sexual abuse to know its relevance with respect to the built space.

The collected data was meticulously organised into categorisation tables. These tables employed a structured format to classify incidents based on several key criteria:

- Incident Type: Detailed categorisation of the event, such as physical assault, bullying, theft, vandalism, fire, natural disaster, etc.
- Location: Precise identification of the incident location, including inside the school, outside the school, school bus, or other relevant places.
- Victim Profile: Detailed information about the person affected by the incident, such as student, teacher, staff, or visitor.
- Perpetrator Profile: Information about the individual responsible for the incident, if known, including student, outsider, or unknown.
- Date and Time: Accurate recording of the incident occurrence to enable temporal analysis and trend identification.

By employing this categorisation framework, the data was transformed into a structured format suitable for further analysis and interpretation.

4. DATA ANALYSIS AND FINDINGS

4.1 DATA ANALYSIS FROM LITERATURE STUDY

Through an extensive review of existing literature, a pattern of findings and observations emerged that enabled the precise identification and categorisation of variables and attributes related to school building design. This exploration of variables provides a robust framework for measuring the qualitative aspects of built form and its influence on safety and security. By incorporating these refined variables into research, we can gain deeper insights into how school design can contribute to a positive and supportive learning environment.

4.2 Data analysis of the secondary data (Published news from newspaper)

This analysis examined the distribution of **adverse events** within a school campus to identify high-risk areas and inform targeted safety interventions to preserve social sustainability. By categorising **occurrences** based on their location, valuable insights into the school's safety profile can be gained.

Key Observations:

- Classrooms and school premises have the highest frequency of adverse events, indicating a critical need for enhanced safety measures in these areas.
- Restrooms and parking lots represent a moderate risk, requiring attention to potential hazards and mitigation strategies.
- School buildings, playgrounds, main entries and administration offices generally have lower risk levels, but continued vigilance is necessary.
- Courtyards, vehicle drop-off areas, stairs, rooftops and utility areas exhibit the lowest frequency of adverse events.
- Exterior walkways, lobbies, receptions, corridors, labs, recreation areas, locker rooms, auditoriums and food courts: Notably, data for these locations was unavailable. This lack of data limits the ability to draw definitive conclusions about their safety profile.

5. RESULTS AND DISCUSSION

Site design plays a crucial role in ensuring the safety and security of school children. By carefully considering factors such as orientation, topography, proximity to hazards and traffic management, schools can create environments that minimise risks and foster a sense of security. Based on Literature review following key points can be addressed ensuring social sustainability:

Schools located in areas with minimal exposure to hazards, such as busy roads or industrial zones, can reduce the risk of accidents and injuries. Well-planned traffic management can control access to the school grounds and deter unauthorised entry, this may involve creating separate pedestrian walkways, implementing traffic calming measures and limiting vehicle access to certain areas. Factors such as crime rates, natural disasters and transportation infrastructure should be carefully considered during site selection. Thus, site design is a critical component of school safety and security. By carefully considering factors such as orientation, topography, proximity to hazards and traffic management, schools can create environments that are not only safe but also conducive to learning and growth.

A well-designed building layout can facilitate circulation, emergency evacuation and supervision.

Table 1: Variables, Attributes and Inferences for Site Design
Source: Author

Variables, Attribute and Inferences for Site Design		
Variable	**Attributes**	**Inference**
Site Layout		
Orientation	North-south, east-west	Sunlight exposure, energy efficiency
Topography	Flat, sloped, hilly	Accessibility, drainage, building placement
Proximity to hazards	Roads, railway, industrial areas	Safety risks, noise pollution
Building Placement		
Location within the site	Central, peripheral	Accessibility, visibility, security
Distance between buildings	Adequate spacing	Fire safety, emergency response
Traffic Management		
Vehicle access points	Entrances, exits	Congestion, security
Pedestrian walkways	Separate paths, crosswalks	Safety for students, staff
Parking areas	Location, capacity	Convenience, security
Playgrounds and Open Spaces		
Size	Adequate area for activities	Physical activity, social interaction
Surface materials	Rubber, grass, sand	Safety, durability
Fencing	Height, material	Security, containment
Utilities and Infrastructure		
Water supply	Quality, accessibility	Sanitation, drinking water
Power supply	Reliability, backup systems	Essential services, safety
Drainage systems	Storm water management	Flooding prevention
External factors		
Surrounding environment	Residential, commercial, industrial	Crime rates, traffic, noise
Government regulations	Zoning laws, building codes	Compliance, legal protection

Table 2: Variables, Attributes and Inferences for Building Design
Source: Author

Variable, Attributes and Inferences for Building Design		
Variable	**Attributes**	**Inferences**
Building Layout		
Classroom design	Open-plan, closed plan	Flexibility, acoustics, privacy
Corridors and stairways	Width, accessibility	Circulation, safety during emergencies
Emergency exits	Number, location, signage	Evacuation efficiency, visibility
Entry Points		
Number	Multiple entrances, exits	Accessibility, security
Location	Visible, easily accessible	Security, wayfinding
Security measures	Controlled access, surveillance	Unauthorised access prevention
Visibility		
Interior visibility	Corridors, classrooms	Supervision, wayfinding
Exterior visibility	Windows, surveillance cameras	Monitoring, deterrence
Security Features		
Access control	Doors, locks, security systems	Unauthorised access prevention
Surveillance systems	CCTV cameras, alarms	Monitoring, deterrence, evidence collection
Safe rooms or lockdown areas	Design, accessibility	Protection during emergencies
Ventilation and Lighting		
Natural light	Windows, skylights	Student comfort, visual learning
Artificial lightning	Type, placement	Visibility, student heath
Accessibility		
Ramps, elevators	Access for students with disabilities	Inclusivity, compliance with regulations
Door widths, bathroom facilities	Accessibility for all	Inclusivity, compliance with regulations
External Factors		
Surrounding environment	Residential, commercial, industrial	Crime rates, traffic, noise
Government regulations	Building codes, safety standards	Compliance, legal protection

Clear sightlines and accessible corridors can enhance safety and security. Controlled access points, such as locked doors and security systems, can deter unauthorised entry. Multiple emergency exits should be provided to facilitate evacuation in case of an emergency. Clear sightlines within the building can aid in supervision and the detection of potential threats. Safe rooms or lockdown areas can provide a secure refuge in case of an emergency. Adequate ventilation and lighting can improve indoor air quality, student comfort and visibility.

6. CONCLUSIONS AND RECOMMENDATIONS

Based on the study conducted on literature review, here are specific recommendations regarding school campus design safeguarding social sustainability:

- Ensure clear lines of sight throughout the school, particularly in classrooms and common areas, to deter potential threats and facilitate quick intervention.
- Utilise natural surveillance principles by designing the campus to promote visibility and discourage hiding places.
- Implement controlled access points, such as gated entrances and security checkpoints, to restrict unauthorised access.
- Design restrooms with adequate lighting, ventilation and clear visibility. Consider using non-locking restroom doors or implementing automatic flushing mechanisms to reduce potential risks.
- Design parking lots with adequate lighting, clear traffic flow and ample surveillance. Consider using speed bumps or other traffic-calming measures to reduce the risk of accidents.
- Ensure playgrounds are well-maintained, free of hazards and comply with safety standards. Consider using soft surfaces to mitigate the risk of injuries.
- Design school buildings with secure entrances, emergency exits and fire alarms. Consider using materials that are resistant to vandalism and graffiti.
- Create open spaces within the campus to promote a sense of community and discourage isolation.
- Incorporate natural features, such as landscaping and trees, to enhance the aesthetics and safety of the campus.
- Design the campus with emergency preparedness in mind, including evacuation routes, assembly points and first-aid stations.

By implementing the design recommendations outlined in this study, schools can significantly enhance the safety and well-being of their students and staff. It is imperative to tailor these recommendations to the specific needs and characteristics of each school community. To gain a more comprehensive understanding of school safety, further in-depth case studies are recommended. These studies should employ a qualitative approach to measure safety outcomes and explore the user experience of different school spaces. By examining specific case studies, researchers can derive valuable insights and develop evidence-based design strategies that prioritise safety and security on school campuses. While the current analysis provides valuable insights, it is inherently limited by the available data. A more comprehensive picture could emerge with data on incident severity and details for missing locations. Expanding the analysis to include these factors would enable a more nuanced understanding of school safety and facilitate the development of targeted prevention strategies.

In conclusion, this study highlights the importance of designing school campuses with safety and security in mind. By implementing the recommended design strategies and addressing data limitations, schools can create safer, more socially sustainable environment that foster learning and growth.

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Urbanisation and Liveability

Evolving Guidelines for Self-Reliant Cities in Western Maharashtra

By Ar. Rajshree Jadhav-Patil, Dr.Madhav Kumthekar, Dr. Parag Govardhan Narkhede and Dr. Anil Kunte

Introduction

India is experiencing one of the most rapid urban transitions in the world, with urbanisation rates projected to reach 40% by 2030 (McKinsey, 2010). By then, India is expected to have 68 cities with populations exceeding one million. While this growth brings opportunities for economic dynamism and improved infrastructure, it also magnifies challenges such as haphazard sprawl, pollution, inadequate services and socio-economic inequities. Urbanisation in India has largely manifested in an unplanned manner, leading to environmental degradation, deteriorating liveability and an overburdening of infrastructure in metropolitan centres. Migration from rural to urban regions, while a driver of growth, has accentuated disparities. Class II and Class III cities in Western Maharashtra are particularly significant in this regard, as they are becoming the new magnets of industrial and service activity due to affordable labour, land and resources. Yet, without comprehensive planning, these centres risk replicating the problems of metros.

Need for the Study

Class II cities across India often display urbanisation rates surpassing the state average. These centres, originally intended to serve local populations, are now facing immense pressure to meet rising demands in food, housing, clothing and infrastructure. The quality of life has consequently taken a back seat. The McKinsey report underscored that Indian cities perform poorly on nearly all quality-of-life indicators, making the study of liveability critical. Existing schemes like the Smart Cities Mission and AMRUT have attempted to address these concerns. However, their focus on digitalisation and rebranding older projects has failed to adequately meet the liveability needs of citizens. Thus, a policy framework tailored to Class II and Class III cities is urgently needed. Such a framework must transform the negative consequences of urbanisation into opportunities by addressing physical infrastructure, socio-economic needs, cultural vitality and environmental sustainability.

Literature Review

A wide range of research emphasises both the promise and perils of urbanisation. Studies reveal how rapid expansion leads to sprawl, peri-urban growth and weak governance structures (Ramachandra et al., 2012; Shekhar, 2004). Literature highlights the importance of a regulatory framework that decentralises growth and strengthens class II and class III cities to reduce migration pressures on metros (Mohan, 1996; Denis et al., 2013). Research also establishes the correlation between urbanisation and liveability indices, underscoring that unregulated growth adversely affects social well-being (Sharma & Sharma, 2017). Recent discussions on smart cities (March & Ribera, 2016; Bibri & Krogstie, 2019) emphasise technology but caution against ignoring inclusivity and sustainability. This body of work guides the present study's focus on inclusive planning and self-reliance.

Research Aim and Objectives

Aim

To examine the impact of urbanisation on liveability and to propose guidelines for making class II and class III cities in Western Maharashtra self-reliant.

Objectives

1. To assess the impact of urbanisation on the quality of life.
2. To analyse the socio-cultural, economic and political determinants of city development.
3. To evaluate central and state government schemes addressing urbanisation.
4. To review guidelines issued by the Ministry of Urban Development concerning liveability.
5. To study the role of stakeholders in shaping urbanisation outcomes.
6. To identify gaps between expected and actual liveability standards.
7. To employ geoinformatics for tracking urban sprawl and development dynamics.
8. To develop context-specific guidelines for self-reliant cities.

Methodological Approach

The study adopts a multi-stage methodology:

- Identification of research areas: selection of class II and class III cities in Western Maharashtra.
- Analysis of development patterns: examination of spatial and morphological growth using geoinformatics over the past decade.
- City-specific issue identification: assessment of challenges such as sprawl, service inadequacies and governance deficits.
- Data Collection: combination of secondary sources (plans, reports, policy documents) and primary surveys (questionnaires, interviews, observations).
- Comparative analysis: use of statistical tools to evaluate liveability factors across selected cities.
- Demonstration studies: identification of representative areas for detailed proposals and guideline formulation.

Discussion

The findings highlight multiple tensions in urban growth. While industrialisation and service expansion attract investment to smaller cities, the absence of integrated is planning results in sprawl, inadequate infrastructure and environmental decline.

- Social impacts include strained housing, slum proliferation and weakened community structures.
- Economic impacts reveal both growth potential and widening inequalities.
- Political and institutional challenges underscore weak governance, fragmented planning and ineffective scheme implementation.
- Environmental consequences—deforestation, water stress and air pollution—further erode liveability.

The analysis also reveals a gap between policy intentions and citizen needs. While schemes promise modernisation, they often ignore ground realities like sanitation, affordable housing and equitable public services.

Conclusion and Evolving Guidelines

India's urban future lies not just in its metros but in its smaller, fast-growing cities. For class II and III cities in Western Maharashtra, the transition to self-reliance requires:

1. Inclusive planning: integrating physical, social, economic and environmental dimensions.
2. Decentralisation: shifting focus from metros to tier-II/III centres to balance growth.
3. Liveability-centric policies: prioritising housing, sanitation, green spaces, healthcare and education.
4. Stakeholder engagement: ensuring citizen voices, local governance bodies and private actors collaborate.
5. Geospatial monitoring: using GIS and geoinformatics to track urban sprawl and plan efficiently.
6. Resilience and sustainability: framing guidelines that anticipate climate risks and resource scarcity.

Only through context-specific guidelines and holistic approaches can smaller cities evolve into self-reliant, sustainable and liveable urban ecosystems.

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POEM

DEAR FICUS BENGALENSIS

By Dr. Abhijit Natu

Dear Ficus bengalensis,
You behold the promises
Of marriages yet to come
In the next seven lives,
Wound around thee
The threads of ties.
'Cause you are the epitome,
A long-lasting legend.
So truly and surely, keep thy promise
Of culture and of future.
Dear O Ficus,
The long-living legend.

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Ananthyam Resort in Yelagiri

A Tectonic Shelter with a Sense of Tactility

By G. Vijay Krishna and Shalini Kumari

Fact File

Typology: Hospitality - Resort

Location: Yelagiri

Built-up Area: 24,350 sq.ft

Site Area: 58,690 sq.ft

Capacity: 9 cottages and 16 rooms

Design Firm: Vision Architects and Interior Designers

Design Team: Vijay Krishna, Vikraman, Rajarajan, Shruthi, Aishwarya and Nirmal

Introduction

When busy moving cars and flying metros dominate the weekdays of bustling cities around the world, people seek a life where nature touches them with its breeze and lush green spaces. The contours of hills not only offer the mind a path to stillness and serenity but also awaken a deeper connection to the rhythms of the earth and the simplicity of being. Amid the quiet folds of the Yelagiri hills lies Ananthyam Resort, a modern retreat woven into the natural rhythm of its setting. On a modest 1.35-acre parcel, the architecture of Ananthyam does not overwhelm the land—it listens, adapts and reciprocates. Figure 1 established the site details and sectional details. The design began with a mindful process of working in harmony with nature and embracing sustainability. Preserving the existing trees, respecting the contour lines to accommodate the buildings and choosing textures that blend with the natural colours of the landscape – these are basic thumb rules followed in this site. Naturally, the 'less is more' philosophy of Mies van der Rohe, along with the minimalism, added depth and clarity to the design approach.

Figure 1: Site plan and site sections
Source: Authors

Visual Perception at Site Level

The site is flanked by roads on two sides. Whether viewed by passing vehicles, walking couples or bike riders, the design offers a clear panoramic view of the buildings and the front parking area (figure 2). The buildings are positioned on either side, with a central plaza organised for functions and weekend programs, making the space vibrant (figure 3). Access roads are limited to the periphery; interior pathways encourage walking and interaction. It is as though the silver oak and teak trees—95% of which have been preserved—graciously made room for human shelter, allowing the architecture to nestle quietly between their trunks and canopies, where life unfolds beneath their shade (figures 4 and 5). As pedestrians walk along the pathways, the rooms to their left are partially revealed through the vertical rhythm of tree trunks—glimpses softened by nature's filter. For those staying in the rooms, the dense canopy and dappled by light offers a serene sense of privacy.

At the macro scale, the visitors are often astonished by the cohesiveness of architectural and natural elements—the openness of the central plaza, the tiled sloping roofs that echo the surrounding hills and the tactile richness of rough stone cladding on the walls. Complementing those are the short flowering plants that line the base of the rooms, acting as a delicate skirting that softens the built edge.

Spatial Grammar at Building Level

Whether one is entering the site, inquiring about the restaurant during mid-day, or looking to book a stay, the amenities are thoughtfully placed in visible locations. Clear signboards guide visitors, seamlessly aligning with the natural flow of movement across the site. Public zones like the restaurant (Block A) and recreation areas (Block M) anchor the experience, while private cottages are scattered in linear combined cluster arrangement responding to the site's contours. The twin-sharing and premium cottage offers a variant in accommodation in each block - B, C, D, E, J, K and M. The vista meanders through the green lush garden, leafy trees and sloped terrain. Figure 6 shows the details of B and JJ blocks.

Vocabulary in Building Details

The inclined columns support the roof in villas, covering the sit-out but still making visual ambience in a dramatic way (figure 7). A sloping roof at the built level—whether cottages or restaurants—the overlay of the sloping roof, with a longer side at one end and a shorter side at the other, along with terracotta tiled roofing, makes the building bend, fold and climb the earth to reach the horizon in its design language.

Figure 2: Panoramic view from the access road
Source: Aanthyam management

Figure 3: Rooms overlooking the central plaza
Source: Aanthyam management

Figure 4: View of trees from access roads
Source: Aanthyam management

Figure 5: View of trees from pathways
Source: Aanthyam management

Figure 6: Plan and sectional details of type B and type JJ facilities
Source: Authors

Figure 7: Details of the villa and the colour palettes
Source: Aanthyam management

Colour Palettes
Table 1 describes the colour palettes used in the project.

Environmental Psychology in Practice
The resort's design supports comfort, relaxation and a natural connection with the surroundings.

Place Attachment: Each unit opens to a green space, helping guests feel connected to nature.

Behaviour Setting: Low height stone walls, garden paths and a coffee kiosk create calm, everyday spaces to enjoy.

Wayfinding: Natural elements like trees and stones make it easy to navigate the site.

Arousal Theory: Active areas energise visitors while quiet rooms and gardens help them unwind.

Interior Privacy and Material Palette
Each unit is designed to breathe through its open planning, large operable windows and louvered vents. This ensures that light and ventilation flow through the space. The materiality at Ananthyam is humble and expressive. Stone masonry articulates the wall surfaces while brick textures, terracotta-tiled roofing and textured lime plaster dominate the palette. These choices not only reference local building traditions but also serve functional purposes such as thermal insulation, acoustic buffering and low maintenance. Deep overhangs and exposed rafters emphasise each space. Fluted wooden panels, laminate finishes, beige paint finishes and slate sunny textures enrich the palette, while warm earthy tones dominate the colour scheme, blending effortlessly with the surrounding greenery. The false ceiling in the sit-out areas, finished in a soft, off-white tone, adds subtle charm with its deep reddish-brown hue. Externally, deep overhangs and exposed rafters not only define architectural expression but also protect against harsh sun and rainfall, further emphasising the resort's connection to climate-sensitive design. Together, these materials create a tactile and visual coherence, reinforcing Ananthyam's core philosophy of "less is more" by allowing natural textures and context-driven elements to shape the spatial experience.

Lighting Scheme and Visual Experience
Table 2 discusses the lighting consideration

Embedded Sustainability
Water management includes rooftop collection and channelling systems that recharge the groundwater. Green spaces are minimally manicured to preserve biodiversity. Materials are locally sourced wherever possible, reducing the carbon footprint. The existing trees shed their flowers and dried leaves, offering a natural welcome to the inmates. Perhaps the most subtle success of Ananthyam is how it frames its context. Not through monumental gestures but by careful placement—each view, each doorway, each bench is positioned to capture light, air and landscape. The contextual harmony is maintained by minimising cut-and-fill operations.

Conclusion: A Gesture of Stillness and Sensibility
In an age where hospitality often means maximalism, Ananthyam Resort is a reminder of architectural restraint and sensory intelligence. It does not perform—it participates. It does not dominate—it adapts. The resort becomes an interface between the built and unbuilt, structure and silence. Through the intelligent interplay of spatial organisation, environmental psychology and material honesty, it

Table 1: Colour Palettes
Source: Authors

Element	Description
Roof	Terracotta tiles with a deep reddish-orange hue, adding rustic charm
Walls	Natural stone tones (beige to light brown) for an organic appearance
Wooden Elements	Window frames and doors in warm brown shades, complementing the facade
Windows	Large glass windows reflecting greenery, enhancing openness and connection
Courtyard	Paved with earthy red and brown tiles, harmonising with the building's palette
Greenery	Lush plants and trees create a fresh contrast to the warm building tones
Modern Touches	Dark grey features (e.g., lamp posts, wall accents) add balance and modernity

Table 2: Lighting Design
Source: Authors

Lighting Type	Light Colour / Effect	Purpose
Uplighters	Warm white, pink tones	Create dramatic illuminance around trees
General Illumination	Warm white	Provides ambient lighting
Swimming Pool Lighting	Blue light	Highlights water effects with visual depth
Directional Wall Lights	Focused beam	Accentuates textures with theatrical contrast
Omni-spread Wall Lights	Soft, even spread	Balanced wall illumination
Task Lights	3000K (warm white)	Focused lighting for comfort and productivity
Toilet Lighting	5700K (cool white)	Crisp, clear lighting for visibility and function

Figure 8: Collage of frames depicting exterior and interior design features
Source: Aanthyam management

fosters not just relaxation but reconnection—with nature, with space and with the self. The resort is more than a destination. As seen in figure 8, it is a living, breathing diagram of what happens when design truly listens to the place it inhabits.

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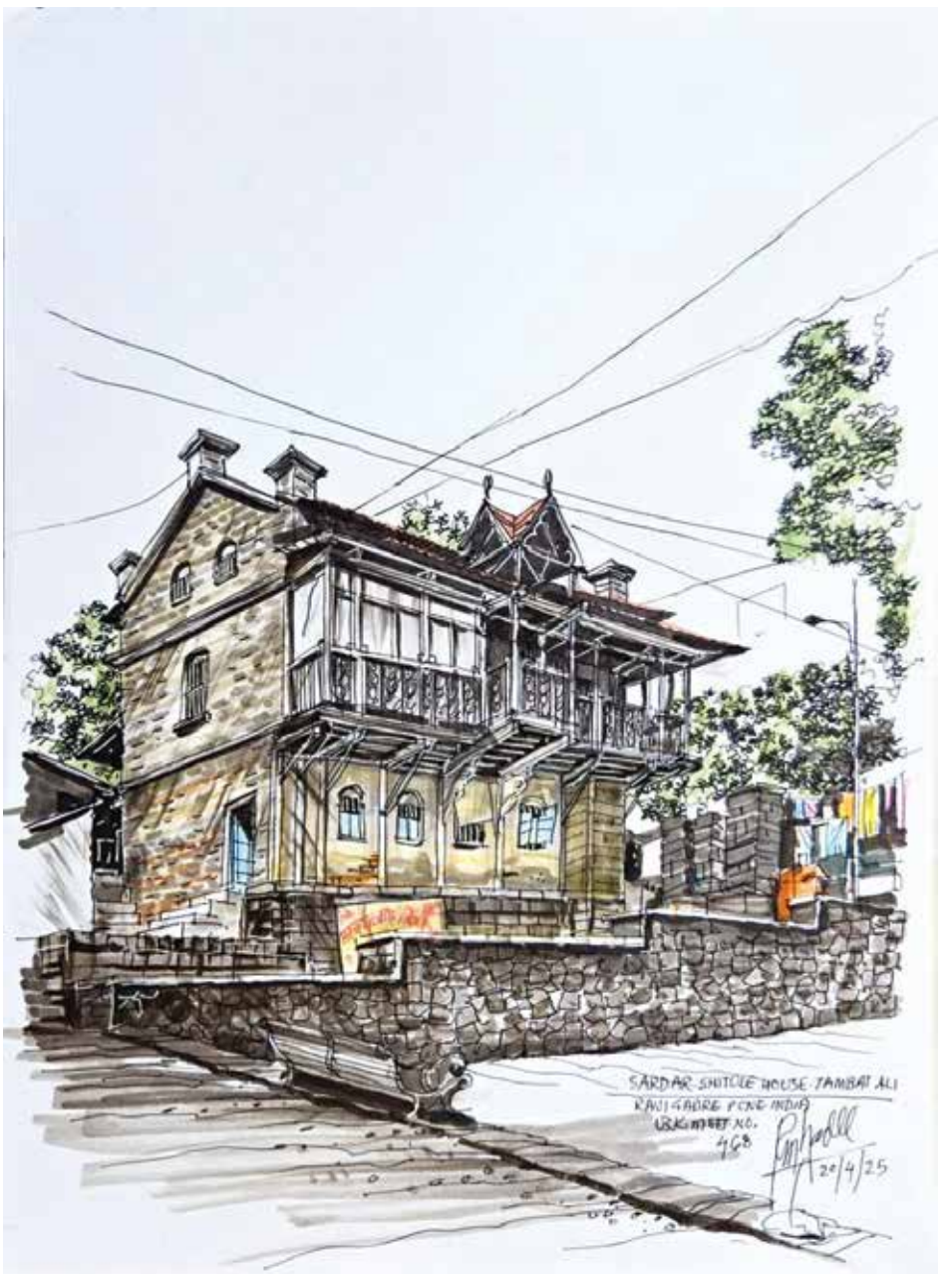
Landmarks of Pune

By Ar. Ravi Gadre

Sketching prominent landmarks both in and around the city of Pune allows me to share timeless stories and narratives: of Structures and people.

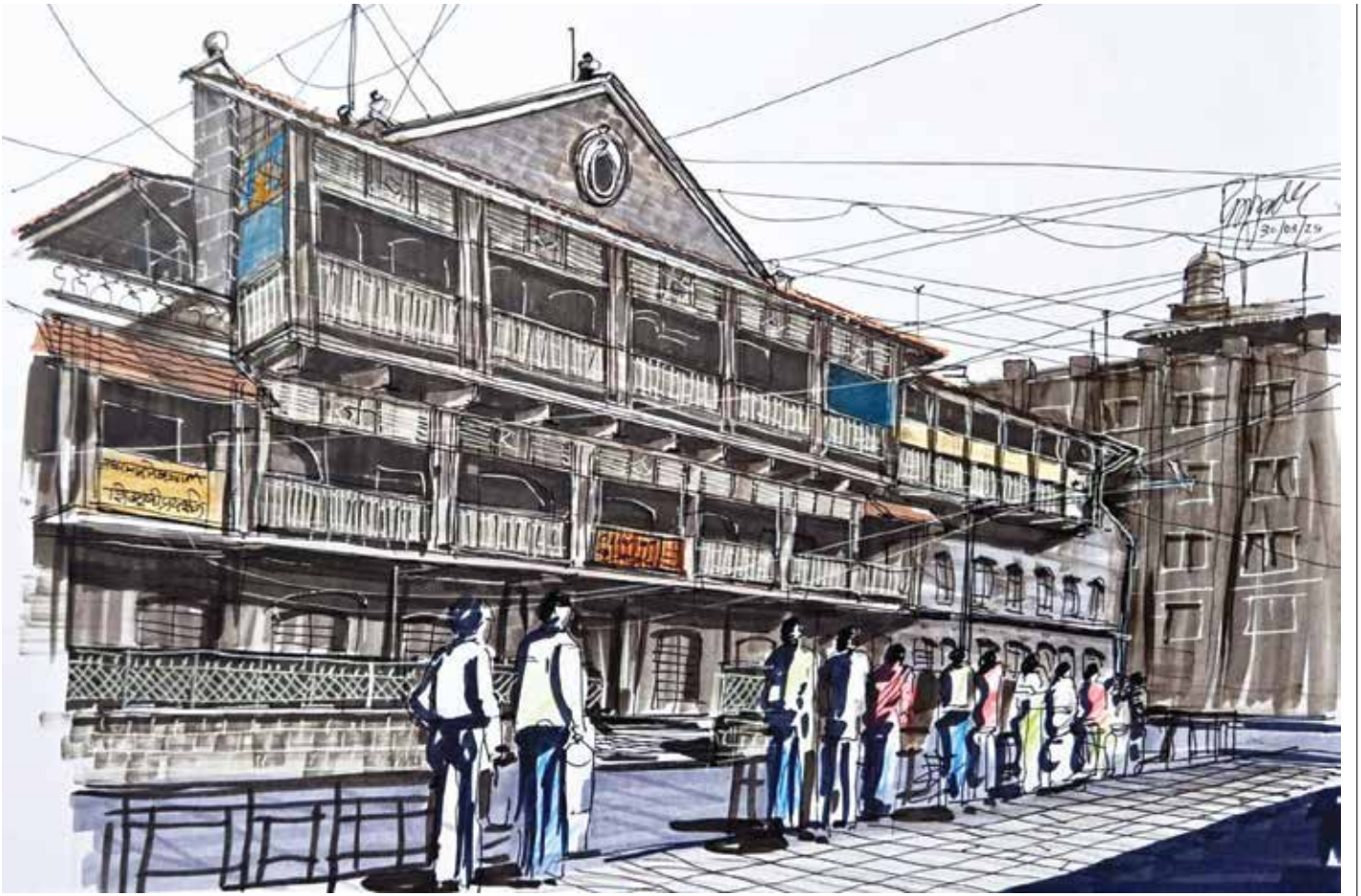
My architectural thought process is informed through this exercise through the many layers of materiality, heritage, regional identity behind them.



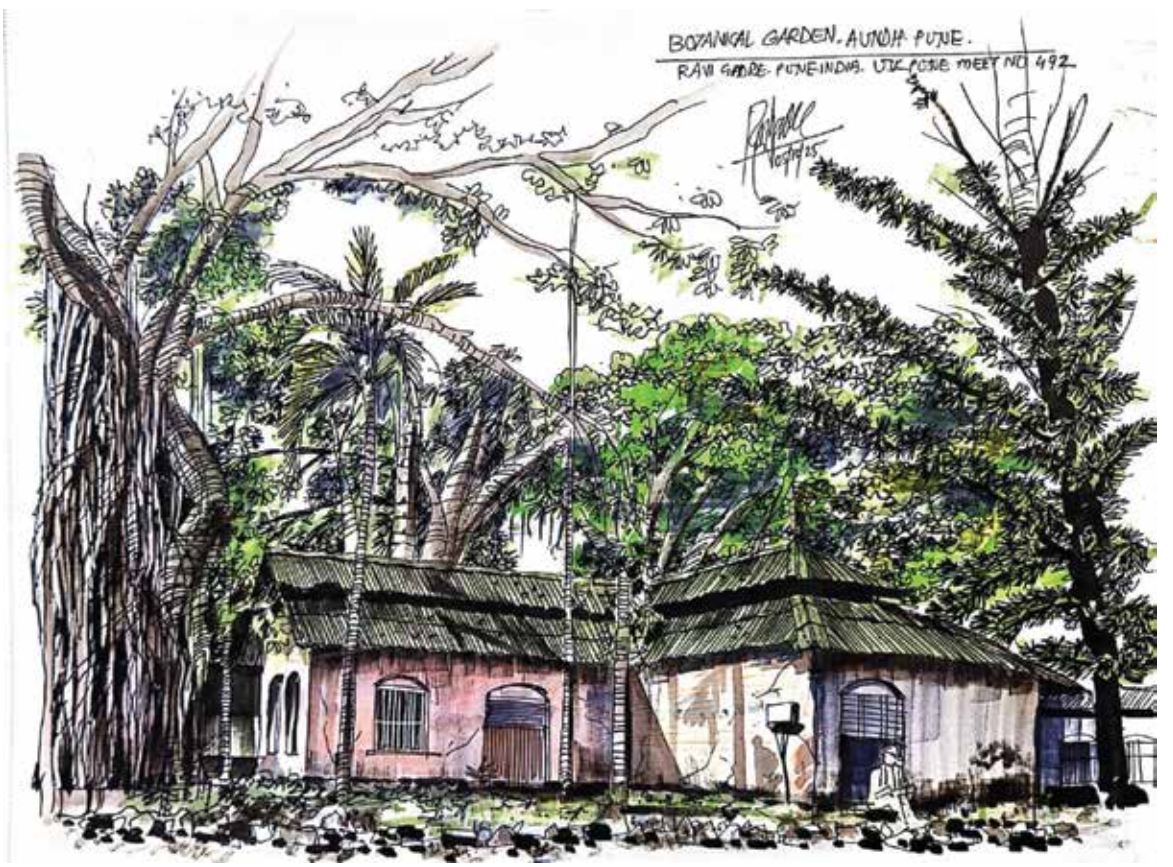
Sardar Shitole House, Tambat Ali

Nana Wada at Rajmata Jijamata Chowk near Shaniwar wada, Pune.

Main building of Fergusson College, Pune

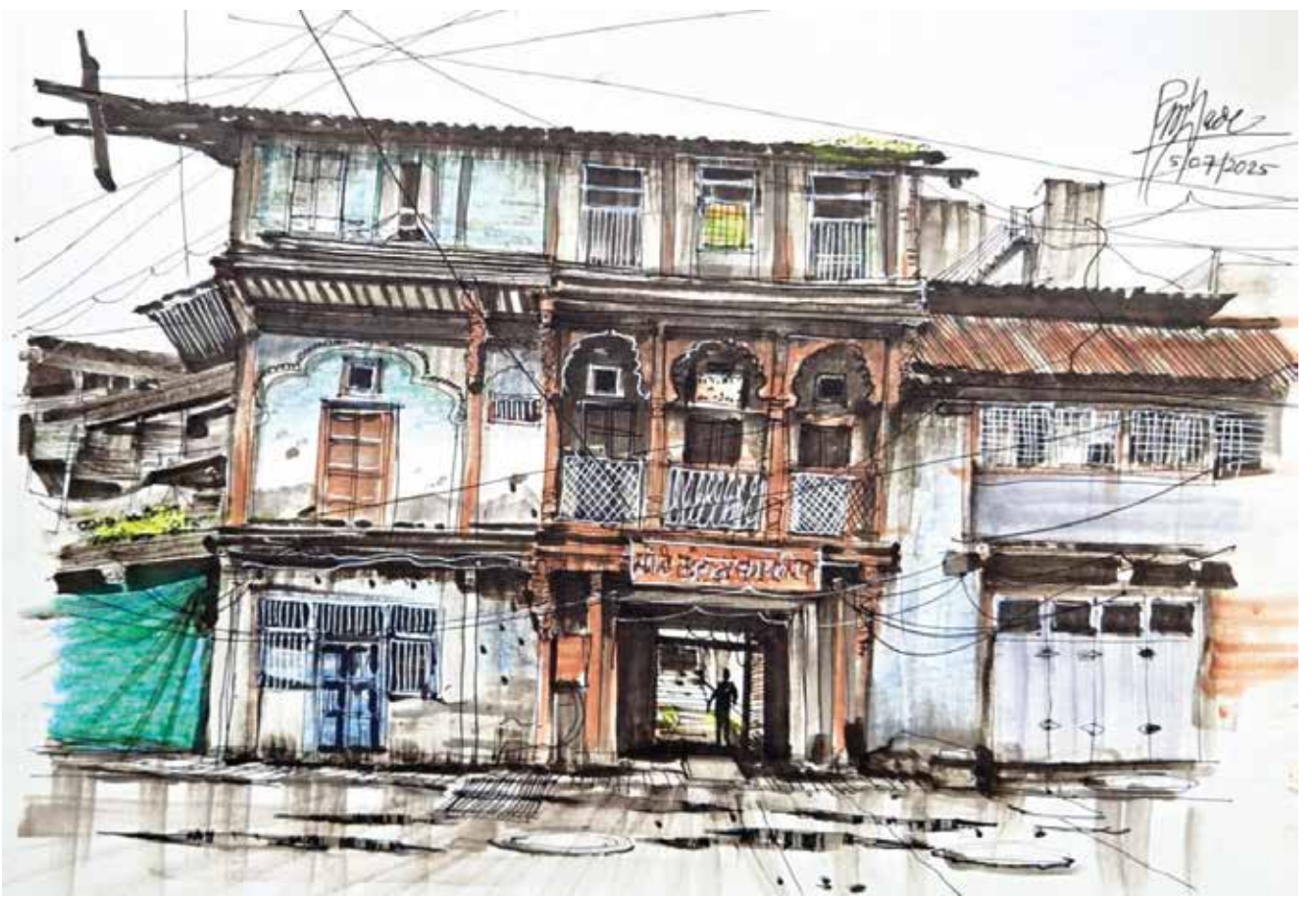


Southern façade of Vishrambaug Wada, Bajirao Road, Pune



Botanical Garden, Aundh, Pune

Kakakuwa Mansion, Laxmi Road, Pune



Mote Mangal Karyalaya, Kasba Peth, Pune

City Post, Budhwar Peth, Pune

All Images Courtesy: Author

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INTERVIEW

Dialogue with Dr. S.S. Bhatti

By Dr. Aradhana Jindal

Dr. Aradhana Jindal [AJ] in conversation with Dr. S.S. Bhatti {SB].

Dr. S.S. Bhatti (F-895) celebrated as Chandigarh's 'Mr Versatility', is an architect, author, poet, painter, singer and educationist of global renown. With three PhDs, he served 35 years at Chandigarh College of Architecture, influencing generations through his original, multidisciplinary vision. His pioneering works span architecture, literature, spirituality and the arts, earning international recognition in journals, exhibitions and symposia. A cultural historian and creative humanist, Dr Bhatti occupies a unique place in modern Indian history as a rare synthesis of intellect and artistry.

Dr. Aradhana Jindal [AJ]: ***What influenced you to take up architecture 70 years back, especially when this particular career option was not so popular?***

Dr. S.S. Bhatti [SB]: My father, a self-taught man of remarkable versatility, worked on the Assembly Building in Lahore in 1934. Watching the British architect on site, he told a colleague, "If I had a son, I'd make him an architect." I was born four years later, an architect in spirit even before birth.

During my school years in Amritsar, the Inspector of Schools visited Ramgarhia High School. My drawing teacher showed him my sketches, even though drawing wasn't my elective. Among them was a watercolour, copied from a children's book. It was so well done that the Inspector doubted it was my work. He asked me to paint on a new theme in his presence, and I did so effortlessly. In the school log book, he wrote: *"There are potentialities in this boy."* My father, with his usual foresight, had the remark attested and later used it to secure my admission to Government High School.

In 1955, with great determination and limited means, my father managed my admission to the prestigious Sir J. J. School of Art in Bombay, which was the best in Asia. I travelled third class on the Frontier Mail, carrying all my drawings. The Dean, Mr. Gondhalekar, who was also art director of *The Times of India*, was so impressed that he suggested I take up the art course. But my path was already decided.

I entered architecture, not only as a profession but as the fulfilment of my father's dream, which he had nurtured since the mid-1930s, and the journey he had envisioned for me long before I was born.

AJ: ***Your FB posts tell a lot about your obsession towards creating pieces of art since your college days in J.J. School of Architecture. Tell us about this passion and how it helped you to grow into a seasoned architect?***

SB: From my childhood, I began learning drawing and painting, which is the graphic language of art and architecture. I began tracing figures in books through carbon paper to train my hand. My father, a gifted artist, was my first teacher. By thirteen, I was painting watercolours; one landscape, mistakenly entered in the professionals' section of the National Exhibition of the Indian Academy of Art, earned me a "Highly Commended" certificate. At Sir J. J. College of Architecture in Bombay, my teachers encouraged me and called me "artist-architect" despite criticism from my classmates that my work was "artistic", not "architectural". By the time I left Bombay in 1960, I had created a large collection of watercolours, which on their instance I gave to my friends. At Chandigarh College of Architecture, the founder Principal A.R. Prabhawalkar, who was close to Le Corbusier, made me his freehand drawing assistant. I taught students that sketching should be a primary language of design. With no teaching aids, I illustrated historic buildings on large sheets to teach the subject of *History of Architecture* and progressed from copying to creating, amassing over 2,000 works.

At Bombay, world-class master perspectivist, Professor M.M. Vijayakar trained me in Sciography and Perspective. Once, he challenged me to condense both disciplines into two drawings as teaching aids, which I did using coloured inks that he greatly admired. Throughout my career, I showed students that art and architecture are inseparable. Without skills in drawing, painting, sculpture, and model-making, an architect cannot truly excel, just as Le Corbusier's greatness was rooted in his painterly mastery, much like Picasso's influence on art.

AJ: ***"Architecture is just art we live in." Do you think that architecture is just art or something much beyond it?***

SB: Architecture has been defined in many ways by master architects worldwide, including Gio Ponti, who wrote an entire book praising it. After reading these works, I found them beautiful and diverse, yet not quite what I feel architecture truly is. I wrote a poem in Urdu where architecture speaks of itself, as in my English poetic rendering of it:

In the vast emptiness of space, it creates habitations,

Forms that lie hidden under dust become manifestations,

Fig No. 1: Watercolour painting by Dr. S.S. Bhatti

Fig No. 2: 'Save me, I'm a tree': Painting by Dr. S.S. Bhatti

When I like blood course through the veins of stone,

Taj and Ajanta emerge as beautiful configurations.

Calling architecture only an art is limiting- it is the matrix of civilization. Furthermore, architecture never dies; as long as humans exist, it lives, and when it ends, it becomes archaeology, telling the story of civilizations long past dead. Unlike terms

like 'engineer' or 'doctor' which can be misused, 'architecture' retains its integrity. Today, its meaning has expanded to terminology like computer architecture or architect of the nation. Thus, architecture is far beyond art. It is an enduring, living force woven into the DNA of Humanity.

AJ: ***You have been nicknamed as 'Chandigarh's Mr. Versatility' by The Indian Express, India's popular English newspaper. Can you please tell us the reflections behind this?***

SB: Journalist Nirupama Dutt first called me "Chandigarh's Mr. Versatility" in the mid-1970s, after my American award, remarking that such a man would be hard to believe without an official record. Versatility is in my lineage. My father was a wrestler, classical singer, painter, sculptor, and psychologist, while our ancestors built Lahore's royal mosque over 300 years ago. In 1978, my article *"The Scourge of Specialisation"* in *The Times of India* reflected my belief that knowledge should not be confined to narrow domains. Earlier, skills were inherited legacies woven into the family's DNA, unlike the market-driven choices of today's IT era. I see human endeavour expressed in four realms; humanities, art, science, and technology alongside culture and religion, understood through four tools: theory, practice, research, and pedagogy. Without these, life's wholeness, especially in art, culture, and religion remains elusive.

As a student in Bombay, I avoided most architecture books, preferring philosophy, sociology, economics, and metaphysics. This breadth later shaped my teaching of architecture, opening horizons of creativity and contemplation. Knowledge, to me, is an organic whole springing from the same source: the human brain. Hence, disciplines must not be isolated.

AJ: ***Your voyage into art and architecture opened up new realms for you into the research in allied disciplines. Can you throw light on another face of Dr Bhatti that is of a critic and a researcher?***

SB: I was inspired by the Nobel Laureate TS Eliot's belief that criticism cannot exist independently of creativity unless the artist and critic are the same person. This taught me that only a creative practitioner can offer authentic critique, as they understand the intent, process, and challenges behind the work. My role as the official Art Critic for *The Tribune* from 1977 to 1997, with over 400 exhibition reviews to my credit, deepened this conviction. Artists valued my insights because I could identify techniques and issues others overlooked, a skill rooted in my own artistic practice.

Fig No. 3: Literary-Visual-Performing Arts: Painting by Dr. S.S. Bhatti

I once wrote a book on Delhi-based artist SK Sahni using only insights drawn from his paintings, which was praised sky-high as authentic and criticism—free from unrelated personal interpretations by Padma Vibhushan Ibrahim Alkazi, the redoubtable Director of Delhi School of drama who mentored nearly every hero in the film industry of yesteryears. Genuine criticism, I learned, is grounded in the artist's reality—the Act of Creation, not the critic's imagination—armchair speculation. Creativity must be paired with theory, practice, research, and pedagogy; otherwise, or ideas remain untested. Like Thomas Alva, Edison's thousands of experiments before succeeding in inventing the tungsten filament lamp, shows that persistence and investigation validate creative concepts. Research reveals why some works succeed and others fail, ensuring knowledge evolves rather than stagnates.

An American study showed that only 17% of knowledge is original; the rest is recycled, and without research, it lacks authenticity. I have applied this method to fields as varied as the Golden Temple, Japji Sahib, and the Great Chandigarh Experiment in Modern Urbanism, and found that the same principles work across disciplines.

AJ: ***You founded First Friday Forum 25 years ago to create an awareness of art, architecture and culture in the region. Has the forum been successful in fulfilling its ideology?***

SB: During my 12 years in the Panjab University Senate, I proposed post-retirement intellectual gatherings in public spaces to counter social stagnation. Though colleagues abandoned the idea, I pursued it with support from an IndusInd Bank manager who offered space for my first exhibition, which drew an overwhelming response. Encouraged, I launched the First Friday Forum in October 1999 to host discussions on diverse themes. Despite initial struggles, the Forum has, over 25 years, presented more than 200 talks on subjects ranging from rainwater harvesting to classical music—an achievement unmatched by any university. A scholar once suggested this work could qualify Chandigarh as a "learning city" under a UN programme. In 2006, I introduced an annual theme oration on seminal issues, beginning with *Chandigarh as Modern Heritage*, which later earned me a place on a Government of India committee in 2010 chaired by the Punjab Governor-cum-Administrator of Chandigarh.

The Forum also honours unsung achievers, recognising over 100 individuals from varied fields, including internationally acclaimed professionals. Even during COVID-19, it continued online, reaching its 14th annual event. Last year, we celebrated its Silver Jubilee. The Forum's true strength lies in fostering open dialogue, inclusivity, and shared reflection.

AJ: ***With the endless works of Art; more than 5,000 poems in English, Urdu, Punjabi, and Hindi; articles written on various topics ranging from anatomy, spirituality to architectural education and nearly 50 books…Are there still miles to go or has Dr Bhatti, a Polymath achieved the aim of his life after having lived a prolonged creative and successful career into the inherited field of Indian art and cultural tradition?***

SB: Although my pace has slowed due to age and no assistance, I continue compiling my books and pursuing creative work. I taught myself one-finger typing, eventually achieving good speed, which helped me complete my two-volume Chandigarh thesis—over 1,500 pages and 5 lakh words—based on 30 years of research covering planning, architecture, urban design, and more. This depth distinguishes my work from journalism, as it comes from direct experience and application. Alongside research, I have written nine anthologies each in Urdu and English, with over 20,000 Urdu couplets—

Fig No. 4: Punjab Kala Bhawan

Fig No. 5: Memorial Museum in honour of Shaheed-e-Azam Bhagat Singh at Khatkar Kalan (National Design Competition Project)

the largest by any Indian Urdu poet—and more than 2,500 quatrains.

My artwork has been acquired in major galleries, including the National Gallery of Modern Art, and in several other establishments. I believe that genuine work, done quietly without chasing fame or money, will be recognised, as proven by my early support of now-famous Bengali painter Ganesh Pyne who I located and promoted as Art Critic. My biography notes my ability to identify genius from afar, which I attribute to a disciplined questioning process—what Marx called "dialectic"—and the integration of intellect into wisdom. I have written extensively on the nature of research, arguing that originality can be expressed in as little as 20 pages if the insight is fresh. An internationally known physicist Prof HS Virk, who writes on science and spirituality praised my article on research as universally applicable across disciplines. Ultimately, my aim is to use all that I have done so far to create meaningful, enduring work that inspires others.

Fig No. 6: Typical bridge access at the first floor of Guru Tegh Bahadur Bhawan, PU Chandigarh

AJ: ***After staying in Chandigarh for almost six decades till now, what is your major contribution towards the upliftment of art, architecture and culture of this region?***

SB: My greatest contribution was convincing the government to classify Chandigarh as modern heritage, despite the rule of Archaeological Survey of India that only 100-year-old buildings or sites could qualify for honorific title. Beginning with my 2006 annual oration, I rallied experts and argued that even a young city like Chandigarh must be preserved as Modern Heritage. In 2010, with my FFF Annual Oration of 2006, I was appointed as a main member of the Chandigarh Heritage Conservation Committee by the Government of India. I stressed that focusing on only three buildings of the city – the Secretariat, the Legislative Assembly, and the High Court as Heritage would distort the historic significance of the Great Chandigarh Experiment in Modern Urbanism. Le Corbusier's architectural marvels have value only within the context of the entire city.

Based on my JIIA-award winning 1991 research, I prepared a comprehensive report in a committee which had my students from CCA too, that was approved by the Government of India, leading to official heritage declarations. As an art critic and educator, I nurtured many artists who later became celebrities. As principal, I expanded my college's faculty from three to about 40 visiting professors by persuading and training reluctant professionals. I campaigned against the Punjab Government's plan to build Anandgarh almost in continuity of Chandigarh; my weekly articles in the Indian Express Chandigarh Newsline urging protection of Chandigarh's surroundings eventually succeeded. One such article convinced the Chief Secretary to drop the project, saving farmers' land. I also fought against proposed Tata Towers near the Secretariat, with the Supreme Court eventually stopping the project. Today, I advocate for an active professional group to address Chandigarh's traffic and unplanned urban sprawl from nearby areas like Zirakpur.

AJ: ***Architectural education is standing at crossroads in contemporary times, with the standards of education going down. Being the ex-Principal of Chandigarh College of Architecture, what's your advice to the educationists as well as students to bring the glory of the profession back?***

SB: The architecture course should be shortened to half its current length, as much of the learning can now be acquired through YouTube and other resources, making prolonged classroom time unnecessary. Opponents, particularly politicians, may argue that early graduations will cause job-seeking pressures, but this is not a valid reason to keep courses long. Many subjects, like construction, can be better taught by inviting industry experts to lecture rather than relying on outdated textbooks such as Building Construction by W.B. McKay. Practical teaching methods, such as recording site processes on film and integrating lectures with site visits and studio work, help students learn faster and understand construction as a form of design, not just assembly of building materials.

My own experience in designing my house under budget constraints revealed that design decisions, such as reducing the number of doors or using innovative frameless shutters, could drastically cut costs. Educating craftsmen on such innovations not only improved the work but also boosted their confidence and creativity, sometimes leading them to surpass my own ideas. This kind of hands-on learning leaves a lasting impact, equipping workers and students with problem-solving skills they can apply anywhere. Just as medical colleges have hospitals for practical training, architecture colleges should have ongoing live projects where students work

during their course. The gaps in current education are clear, but the challenge lies in finding committed, knowledgeable individuals to lead such reforms. Only with such leadership can the system shift from outdated theory-heavy methods to practical, design-oriented, and industry-linked education.

AJ: ***With the technological advancements into every field in the present times, Artificial Intelligence has also intruded into the architecture profession. How do you envision AI impacting architecture education and profession in the future?***

SB: Artificial Intelligence is not merely a technological tool—it is, in essence, an "ALTER-ed INCLINATION," a catalyst for expanding human consciousness. In Architecture, it will not replace the human imagination but will augment it, liberating designers from mechanical drudgery so they can focus on creativity, cultural sensitivity, and sustainability. In Architectural Education, AI can become a Socratic mentor—personalising learning, integrating cross-disciplinary insights, and reviving the spirit of the polymath architect.

The challenge is to *humanise* AI so that it serves as a partner in holistic design thinking, ensuring that buildings remain not just smart but become soulful, responsive to both the planet (Mother Earth) and the people who inhabit it.

All Images Courtesy: Dr. S.S. Bhatti

Ar. (Dr.) Aradhana Jindal [F-8993] is currently the principal architect in her own firm, AJ Architects, in Ambala. She has done her graduation in architecture from University of Roorkee, Roorkee (Now IIT Roorkee) in 1989 and has done PhD from DCRUST, Murthal, Sonepat. She has 20 years of professional and 16 years of academic experience. She headed MM School of Architecture, MMU, Ambala for 10½ years. She was awarded a 'Merit Certificate' in architectural journalism from A3 Foundation Chandigarh. She has also been awarded First Friday Forum award for creative excellence in recognition of her valuable services to architectural education. She was felicitated by The Times of India group and IIA Punjab and Haryana Chapters for her invaluable contribution to architectural education. Her research papers are published in many national and international journals.
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NEWSLETTER DECEMBER

IIA MAHARASHTRA CHAPTER

The Municipal Corporation of Greater Mumbai (MCGM), with the efforts of BJP MLA Shri Mihir Kotecha, has named a *chowk* (crossroads junction) in Mumbai after late Ar. Ashvin Mathuradas Popat (1943-2021), who was a was a visionary and a notably successful architect in Mumbai. Having designed over 100 buildings in Mulund, he went on to successfully execute quality projects and gain recognition in the building industry. He was the man behind the first few highrise landmarks of Mulund such as *Antriksh Towers*. Additionally, he was on the advisory board of several educational institutions. He was a passionate mountaineer and the first Indian to travel to Antarctica with his family, including his architect daughter, Urmi. He was a great promoter of Kutchi art from his native village. He was also a philanthropist who served social causes in tribal areas. He is remembered for his kindness among the many students he helped, as well as the mountaineering and business community.

Ar Urmi Popat, daughter, holds portrait of Late Ar Ashvin Popat, alongside the newly named Chowk Signage Plaque.

Ar Urmi Ashvin Popat and BJP MLA Shri Mihir Kotecha

New Members elected at the IIA 18th Council Meeting of the Term 2023-2025 held Online on 27 December, 2025

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