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Presents

ANVESHAN

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29 – 31 August 2024

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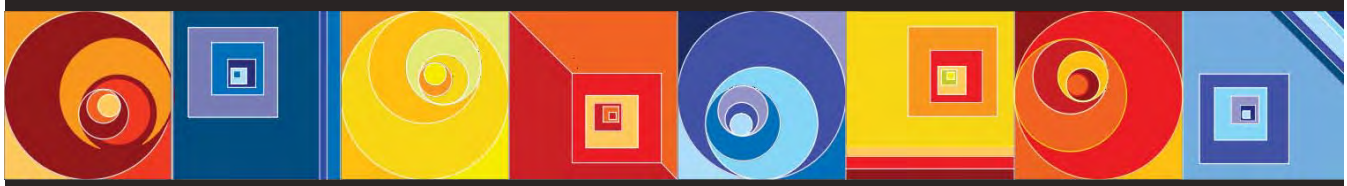

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KUALA LUMPUR | 15-19 November 2024

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Sub-theme 2
Density and Sustainable Growth

Sub-theme 3
Equity and Ecology

EXTENDED DEADLINES

NEW EXTENDED KEY DATES

- 01 July 2023: Open call for papers submission;
- **31 December 2023: Deadline for abstracts submission;**
- 31 January 2024: Notification of abstracts acceptance;
- **30 April 2024: Deadline for Full Paper submission with abstract;**
- 31 May 2024: Notification of Acceptance / Authors receive feedbacks;
- 30 June 2024: Deadline for authors to submit revised papers if asked to do so by peer reviewers;
- **31 August 2024: Final paper submission by authors;**
- 15 – 19 November 2024: Presentation of Paper at the UIA 2024 International Forum Kuala Lumpur

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+91 22 22046972 / 22818491 / 22884805
iiapublication@gmail.com
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Editor Ar. Lalichan Zacharias
Kakkamthottil, Jaya Nagar, Marudu P.O., Pachalam S.O., Maradu, Dist-Ernakulam, Kerala-682304.
R.N.I. No.9469/57
lalichanz@gmail.com

Advisors : **Ar. Mukul Goyal**

Printer's Email
arihantdigiprint.offset@gmail.com
krish.graph2021@gmail.com

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EDITOR'S NOTE

Dear Fellow Members of the Indian Institute of Architects,

The month of the summer solstice, embarking the peak of working daytime of the year, is named after the Roman goddess Juno. We celebrate 1 June as the *Global Day of Parents*, appreciating parents worldwide for their selfless commitment Looking at a sustainable way of urban transportation, 3 June is promoted as *World Cycling Day,* and we celebrate *World Environment Day* on 5 June and *World Oceans Day* on 8 June for the conservation of Earth's invaluable ocean resources. And not to forget the Indian contribution to holistic health benefits worldwide, *International Day of Yoga* is celebrated on 21 June. We, at IIA and the architectural community strive to towards the responsibility of awareness and action for sustainability.

The June issue of JIIA has a narrative which starts with a very innovative cover design, where an image has been created through *cyanotype* as an artistic printing technique representing the subterranean structure of a step-well, an icon of traditional Indian water conservation.

Our experience continues to be enriched by looking at interesting research-related transitional spaces in architecture schools followed by engaging articles of stone architecture of Karnataka. This issue further explores the journey of urban habitat conservation along with interpreting architecture dimensions of profession in the perspective of habitat transformation. Further understanding the user experience through spatial connectivity was explored through students' work along with understanding progression to innovation with the lens of biomimicry. We acknowledge the annual initiative of essay writing competition by Avani Institute of Design, Kerala featuring the best essays written by architecture and design background students.

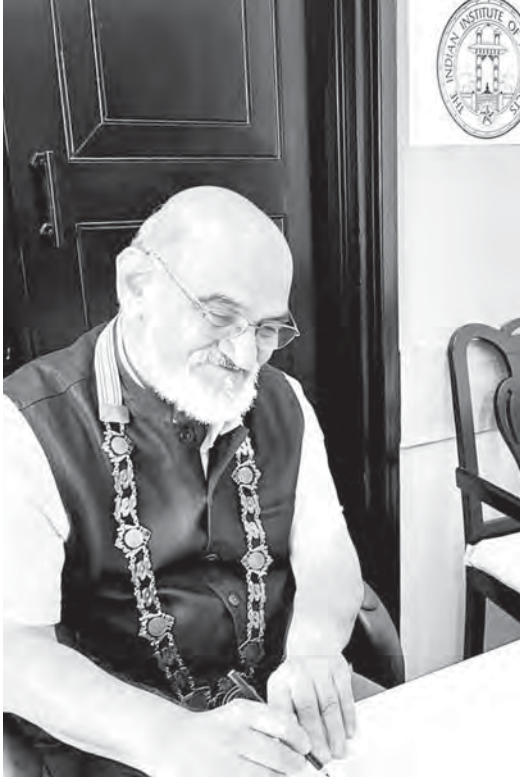
We at IIA, want to thank all the participants for their overwhelming response for submission of abstracts of the research papers in great numbers. It is very encouraging for IIA that we see more than 200 entries for our first upcoming International Research Conference, ANVESHAN, scheduled to be held on 29-31 August 2024 at MCAP, Thiruvananthapuram, Kerala. We hope and urge participants to register to present their research work in terms of paper presentation and poster presentations as well at ANVESHAN. We also look forward to Dr. Joy Sen delivering the first *IIA Sorab Bharoocha Memorial Lecture,* and the three eminent Keynote Speakers at ANVESHAN.

An appeal to all IIA members to contribute to JIIA with articles, projects, research papers and most importantly, in terms of sponsorship and funding.

Thank you for your continued support and readership.

Prof. Vinit Mirkar
Editor

PRESIDENT'S MESSAGE



Dear Fellow Members,

On 5 June, we celebrate *World Environment Day* across every Chapter and Centre. However, I believe that we should not only celebrate this day but also practice its principles in our daily lives to achieve the goal of a zero-carbon or carbon-free country.

When you consciously choose to be ordinary, you become extraordinary. Jaggi Vasudev (Sadhguru)

It is heartening to know that architectural practices, especially among youngsters from smaller towns across the country, are reaching out to a majority of the population with their services. Some of them are doing innovative work that truly spreads awareness of architecture, which can be beneficial to all.

There are a considerable number of architects in small towns, and we need to reach out to them to become part of the IIA. We must make efforts to explain the benefits of joining the Institute's Chapters and Centres. Chairpersons should provide them with a platform to share their knowledge and ideas for expansion.

A tree that wants to touch the sky must expand its roots into the earth. Anonymous

Expanding membership is crucial for the growth of our institute and its programmes. At the Institute-level, through Chapters and Centres, we are doing really well. Every Chapter and Centre is eager to host national and local programmes, which is a positive sign of the growing the knowledge of our fraternity and, through that, the membership of the Institute. However, there is still much more to achieve. I am confident that our Membership Drive Committee will soon reach its target of 50,000 members.

Let us all participate and contribute to the growth of the Institute and its reach.

My Best Wishes.

Ar. Vilas Avachat
President
The Indian Institute of Architects

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COVER THEME

SOAK IN SUBTERRANEAN

Soak is to drench, permeate, penetrate thoroughly by saturation. Also, it indicates action that is steep or causes it to lie in liquid, meaning 'take up by absorption'.

The cover image is literally as well as through its process of making conveys this.

Cyanotype is an artistic printing technique where the paper is applied with photosensitive chemicals. Here, inverse print on plastic is used as an overlay on the paper and the assembly is exposed to the sun. The paper is then immersed in plain water to wash off the chemicals and the image emerges in an alchemy of whites and blues.

The image is a cyanotype print of an image captured at the Adalaj stepwell in Gujarat.

Also known as *Rudabai ni vav*, it was built in 1411. The building of the *vav* was started by the Vaghela chieftain, Veersinh, husband of Rudabai and completed by Mahmud Begada. It served both a utilitarian and spiritual purpose for the people around it for centuries.

It has not lost its grandeur with passage of time. The well, approximately 21 m deep, and with five storeys going down in the subterranean structure, allows a modicum of light to penetrate through. The beams, columns and lintels adorned by intricate carvings made of sandstone soak in the sharp sunlight and reflect it in a dappled manner onto the interior chambers where maidens must have immersed in their girlish banters. Serving communities with potable water in dry and arid regions also providing people with comfortably cool and shaded space to have informal interactions over the daily chore of filling up the pots, this well must have been a very popular watering hole in every sense of the word.

Today the place is frequented by tourists, photographers, architects and art enthusiasts. Merely half an hour drive from CEPT, a visit to Adalaj is almost like an initiation ritual for students here and even in faraway cities studying architecture. All drenched in the wondrous spells of this beautiful space, losing themselves in dreams of their creative pursuits. Many of us try to carry a piece of this magic with us. Magic created by interesting play of light and shadow, textures of stone and water, the cool moist air of the interior chambers of the stepwell, muffled soft soundscape of the underground, womblike sense of safety, unsaid emotions and expressly comforting spaces of this step well. These memories continue to charm generations, despite the cacophony of the world outside. The subterranean continues to invoke truly primal emotions unaffected by the digital, virtual realities. *Adalaj ni Vav* lets us soak in its solace.

Ar. Shruti Utpal Barve (A27853) is a landscape architect and academic with keen interest in Indian culture and history. She has over 19 years of experience in teaching, practice and field-based research involving various indigenous landscapes and communities. She is currently Associate Professor at Rachana Sansad's Academy of Architecture (affiliated to IIA).
Email: shrutiutpal@gmail.com

Image by:
Miriam Thomas is a V Year Year B.Arch. student of Rachana Sansad's Academy of Architecture (affiliated to IIA). She has a keen interest in heritage, art, and culture.

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 FOUR 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/hyhsCoK6QPe6qDJu8

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

google form link: https://forms.gle/Ru4JBLSHwaYEBTcg7

(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

google form link: https://forms.gle/BSkuE5cApXdy7dX1A

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.

Declaration
World Environment Day

We, the members of the Indian Institute of Architects, recognising that there exists only one planet earth having finite resources for sustaining all living organism and land remains one of many valuable gifts, given by the nature to the mankind, for performing all its activities and land has been recognised as most vital element for rational human growth and development and creation of built environment and availability of land, in adequate quantity and quality, for human habitation remains a major issue, globally and locally and India remains globally one of the most land stressed nation; with only 2.42% of global land houses 17.7% of the global population and Valuing criticality of land, United Nations has accepted; Land Restoration, Desertification", as the theme for The World Environment Day for the year 2024.

In order to preserve, protect and optimise the land resource, we the Architects of India undertake, commit and resolve that:

- We shall use all our professional skill, knowledge and understanding to optimise the existing land resource available, by minimising the use of land, while evolving design solutions for various projects.
- We commit to plan and design buildings, having minimum footprints for using minimum land for creating of the built environment.
- We undertake to use the principle of limited land unlimited space while evolvng the design solution for all architectural projects to optimise the land resource.
- We shall continue to review, redefine and rationalise all architectural norms and principles to optimize the use of land resource.
- We shall use all our skill and make efforts to eliminate the misuse and abuse of the land resource using our architectural solutions.
- We shall redefine architectural education and professional practice to optimise and make value addition to the land resource and minimise its misuse and abuse.
- We shall continue to consult, co-operate and collaborate with, all professional agencies operating in the country in the domain of planning and designing human settlements, to evolve strategies and options for promoting optimum use of available land resource.
- We undertake and resolve to aid, advise, assist and support all state and parastatal agencies in evolving policies and implementing projects with focus on conserving and preserving the available land resource.
- We shall continue to work and use our knowledge and skill for ensuring that land is appropriately preserved, conserved and used for achieving the good of humanity, communities, environment, ecology and achieving the 17 Sustainable Development Goals, defined by United Nations to achieve sustainability and make planet earth better place to live and work.

Ar. Vilas Avachat
President
The Indian Institute of Architects
5th June 2024

RESEARCH PAPER

Evaluating the Affordances and Use of Transitional Spaces in Architecture Schools

Ar. Madhura Khaire, Ar. Shravani Khire, Dr. Vasudha A Gokhale

Abstract

The emerging need for conducive learning environments in architectural schools calls for well-designed spaces to facilitate a capacious pedagogical repertoire than conventional classrooms. Transitional spaces offer an interactive environment that is invaluable to the architectural educational process. This research is guided by Gibson's theory of affordance, which postulates affordance as an opportunity for action that the environment offers to the users focusing on transitional spaces in architectural schools. It is argued that links between affordances, architecture and the spatial environment have been overlooked. The methodology included a questionnaire survey to analyse the physical attributes of transitional spaces that impact use and the behavioural responses of the architecture students from Maharashtra. The analysis identified architectural features including permeability, adequately designed landscape and seating spaces affording several social and learning activities. Statistical analysis revealed an association between architectural affordances, space use and student profile. It is stressed that the concept of affordances represents an applicable approach to the design of educational buildings promising better-aligning spaces, pedagogy and overall architectural education. The analysis will help architects and planners create new opportunities for more engaging learning environments through architectural affordances that facilitate active and meaningful learning in architectural schools.

Keywords: Courtyard, Threshold, Landscaping, Socialising, Learning.

1. Introduction

Students' social behaviours, social interactions at educational facilities buildings and the consequent need for formal and informal gathering areas are among the most significant issues of architectural design. It has been stated that transition spaces (TS) help create an environment for students to interact with their peers and professors, thus enhancing their overall educational performance. Such spaces cater to various functions and activities, creating an interactive environment that is invaluable to the educational process. Transition is an in-between state, while TS is referred to as a connection or link between two enclosed spaces. Transitional space's in-between realm often represents an indirect passive control that influences student's day-to-day behaviour. Besides, they possess a social meaning, having qualities like prominence, and auspiciousness or they can be just an interconnection between the classrooms or public space (Kray et al, 2013).

Transition space is a third space or a buffer zone that experiences between the outer and inner worlds. The design of TS is of utmost importance for architects, given the functional characteristics and their contribution to health, comfort and aesthetics. They also serve as escape routes in an emergency. Such spaces are built without any specific function. Instead, they connect two spaces and are articulated based on the connectivity and privacy needs of the spaces connected (Pitts & Saleh, 2006). Some examples of transitional spaces include hallways, entryways and foyers. These spaces are commonly used to pass through on the way to a destination or purpose as a place to display the culture of a school, enhancing social interaction (Clark & Uzzell,

2006). The lack of good transitional spaces and consequent less motivation and disengagement underpin the narrative to reconceptualise the learning environment with a different perspective. However, the dynamic interrelations between students and the learning environments using the concept of affordance is less explored. This research examines affordances representing the architectural significant attributes that occur due to a favourable environment encouraging interaction and informal learning in architectural schools (Young & Cleveland, 2022).

2. Concept of Transitional Space

"Transition" refers to the change from one place, act, state or set of circumstances to another (Fowler, 1982). It is dynamic in use and subtle, where transitions lead through a sequence of varying spaces, providing a complete change in the user's use and mood that is sometimes imperceptible. Transition can be powerful, startling and dramatic if planned with the intent to provide varied experiences. The aim is to help people experience different responses, reflexes and emotions. Transient or transitional spaces are primarily used for the ancillary activities in a building in addition to their intended use (Pitts & Saleh, 2006). A well-designed transitional space plays a significant role in understanding the building, providing a rich spatial experience in spaces that leave an unforgettable impression on the user. People enjoy a profound spatial experience while navigating through spaces, pausing or inhabiting them. The size of such spaces is a crucial factor affecting the overall spatial experience of a building. Transition spaces are perceived differently by users navigating through them depending on their spatial characteristics, structure, and properties. Transition spaces are often termed in-between spaces that originated in architecture during Greek architecture. Such spaces played a significant role in architectural designs, as evident in Palladio's works in entrances, lobbies, corridors, courtyards, staircases, etc. Several researchers emphasised the importance of creating spaces overlapping two spaces connecting them to form an attractive composition. Wiechel (2002) termed transitional spaces as interstitial spaces connecting two destinations that may simultaneously serve as an interlude space or a destination. Renowned architects and researchers have described such spaces from different theoretical perspectives and lexicons. A theory of 'Flowing Space' proposed by Frank Lloyd Wright has contributed to the widely acceptable term 'Continuity of Space' in later centuries. The theory of 'Intermediary space' proposed by Architect Aldo Van Eyck emphasises the space that neither belongs to inferior nor to exterior space (Kim, 2009).

3. Transition Space as a Threshold

The transition space is often referred to as a threshold, which is the space through which a person approaches the building before actually entering inside. This space introduces the built structure or space preconditioning a person's mind entering for the various inside activities. Transitory connectors and separators contribute to the value of movement and subsequent use interpretation of an architectural space. It provides a separation between two realms similar to Lynch's concept of "edges," creating a boundary and a symbolic representation of passage between them (Laiprakosup, 2008). The entrance or threshold to institutional buildings helps people become acquainted with the building's space and purpose. They blend two physical entities of the exterior and interior of a building, linking two heterogeneous spheres (Kariyawasam, 2003). Transitional spaces also referred to as thresholds, are created in various ways, such as changing lighting patterns, sound or direction. Besides, a variety of surface or floor level manifests a feeling of transition. Transitional spaces vary in scale, use and type, playing a crucial role in providing light, ventilation and space for socialisation (Chun et al, 2004).

Courtyards have played the role of transitional space from historical times, serving as mediating a direct yet controlled connection from the outside environment to the inside or vice versa. They possess diverse privacy levels and are used for interaction, performing activities and a space to relax (Gatersleben & Griffin, 2017). Courtyards in an institutional building are used as a space for transition or interaction, besides they act as a functional space to perform various curricular activities and academics. They add to a space's spatial character by providing climatic comfort, bringing diffused light and leading to a relaxing, calm environment (Muhaisen & Gadi, 2006).

4. Role and Significance of Transitional Spaces in Institutional Buildings

An educational institute's purpose, presence and domain are manifested in its architecture, representing the place where the community pursues knowledge, learning and growth. Learning is focused on transferring knowledge and procedures to students rather than instructions, resulting in meaning-making from interactions with others in which the role of transitional spaces is significant. Social negotiation between learners and their environment leads to the generation of knowledge,

whereas learning is an active process that requires providing an environment that challenges learner and their thinking (Lee, 2012).

The non-formal learning space in institutional settings includes spaces beyond the formal learning spaces supporting non-scheduled learning activities. Such spaces include connecting spaces for independent study, breakout learning activities, group study, working alongside, networking and socialising (Vanichvatana, 2019). Informal learning in informal transitional spaces is often considered a residual space without a formally organised learning activity or event (Ramu et al, 2022). McCrone (2021) advocated the educational importance of transitional space and used it as a physical, spatial cognitive phenomenon. It is stated that the pedagogical significance of transitional spaces shall be highlighted for achieving the goal of active learning. Students interact between passive and active learning, directed and self-directed learning, and formal, timetabled and informal, leading to better student engagement (Luke, 2006).

Architectural spaces include buffer spaces or breathing spaces between exterior and interior environments. Corridors and lobbies are transition spaces often designed as emergency exit routes, considering the safety and health of the building occupants as an essential aspect (Pitts & Saleh, 2006). TS including courtyards and atriums provide a high daylight factor and are suitable for a particular climate (Hui & Jiang, 2014). Such spaces can temper the indoor temperature and decrease the electric loads associated with cooling while shifting indoor activities outdoors, motivating the occupants to spend more time outdoors and increasing their contact with nature (Taleghani et al, 2012). Buildings need to extend beyond their envelope to create more transitional spaces, contributing to the reduction of the urban heat island phenomenon by optimising thermal comfort and human health factors (Youssef, 2018).

The research established the supremacy of outdoor learning experiences in developing cognitive skills over classroom-based learning. Transitional spaces are among the popular typologies of spaces students prefer for such experiences (Kwon, 2022). Transition spaces in institutional buildings have a significant influence on the activities and day-to-day working patterns of students. They dictate students' social behaviour by encouraging social interaction. Informal learning tends to involve more learning than formal classrooms. It is noted that students using informal learning portray higher student engagement than non-users. The quality of spaces catering to informal learning spaces affects students' behaviour and success (Hunter & Cox, 2014). In educational buildings, transitional spaces in form and scale govern the user's movement pattern. The research established that a well-designed transitional space creates an environment conducive to learning, an essential aspect of the education process (Wiechel, 2002).

5. Transitional Space's Affordances

An in-depth understanding of an environment is necessary, as human behaviour and environment cannot be seen in isolation. A person is an active agent of the process who acts on an environment and is influenced by it. It has been stated that different built environment patterns afford different behaviours and aesthetic experiences, where the affordances limit or extend an individual's behavioural and aesthetic choices depending on how the environment is configured. People generally change and continue to change the natural and artificial environments to alter their affordances (McGrenere & Ho, 2000). Affordance adds conceptual clarity to the understanding of the interrelationship between the environments, human behaviour, values and needs fulfilment (Clarck & Uzzell, 2006). Gibson's theory of affordance brings the socio-cultural and physical environment together, facilitating the examination of the user's behavioural response and the functional properties of the environment (Chemero, 2018). Affordance explains the relations between a person's abilities and the environmental aspects of a situation that are non-deterministic preconditions for activity (Mehan, 2017). Affordance often depends on the person's capabilities, limitations and personality to perceive an environment, which affects their choice to use it (Gaver, 1991). They represent the qualitative features of a particular setting that allows the individual to interact, which can be positive and negative socially. The characteristics of spaces afford a variety of aspects to users that include layout, material, opportunities for social interaction, presence of landscaping features, etc. (Hutchins, 2010).

6. Conceptual Framework

This research adopts Gibson's affordances theory, an ecological approach to visual perception (Koutamanis, 2006). The concept of affordance dwells in perceptual psychology, as in architectural theory and research, affordances are widely used to explore the interrelationship between users and environments, particularly concerning form and function as a conceptual framework (Maier et al., 2009). It has been considered that the knowledge that the environment offers opportunities for the users is essential for the planning and designing of

institutional buildings. Such knowledge helps to recognise that the design process involves creating, modifying or eliminating these opportunities to use, i.e., affordances. As per Chemero (2018), affordances are perceivable and observable through an individual's interactions within their environment and are perceived by individuals, enabling them to respond to the context of situations. Therefore, this research identifies and analyses the observable affordances of interaction spaces in architectural schools as perceived by students based on the behaviour setting concept (Nassar & Hosam, 2014). This research uses an environmental behavioural approach that examines the interaction between human behaviour and the physical environment. It explores the reciprocal relationship between the place where an activity is performed and the person who carries out the activity. The concept adopted to analyse the environment-behavior interactions is based on the behavior setting, which includes four characteristics, as shown in Fig.1 (Churchman, 2003).

7. Methodology

The data was collected through an online questionnaire survey of students studying in various institutes. The total sample size obtained for the students was 145. For this research, the snowball sampling method was used to collect the necessary data from students across different institutes. The questionnaire survey aimed to understand the use of TS in various institutional buildings from 4 cities. The research tool has two parts, the first includes demographic information of the respondents while the second part includes questions based on four themes suggested by Churchman, 2003) including various activities performed, the purpose of the use or recurring behaviour, physical environmental features governing the use and time locus. The questionnaire was designed using a five-point Likert scale where user satisfaction was also examined.

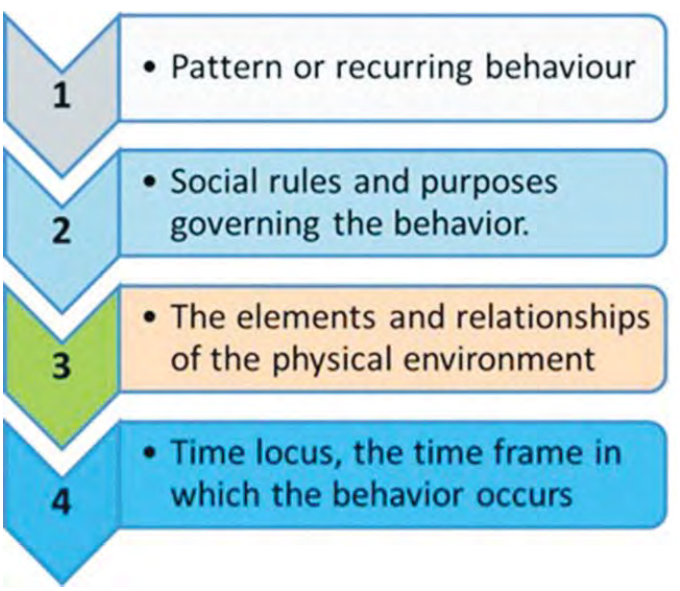


Fig. 1: Environment-Behavior Interactions
Source: Churchman, 2003

8. Findings and Analysis

Sample Composition: The sample included students from different levels of study from the second year to the fifth year and varied financial status (Figs. 2, 3).

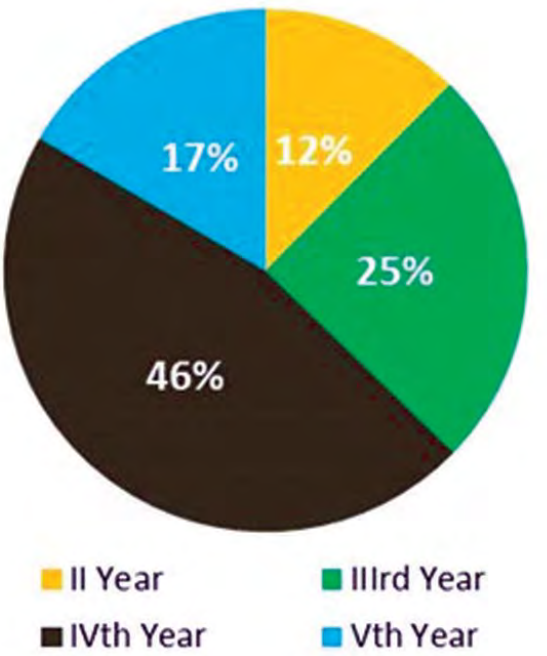


Fig.2: Year of study
Source: Authors

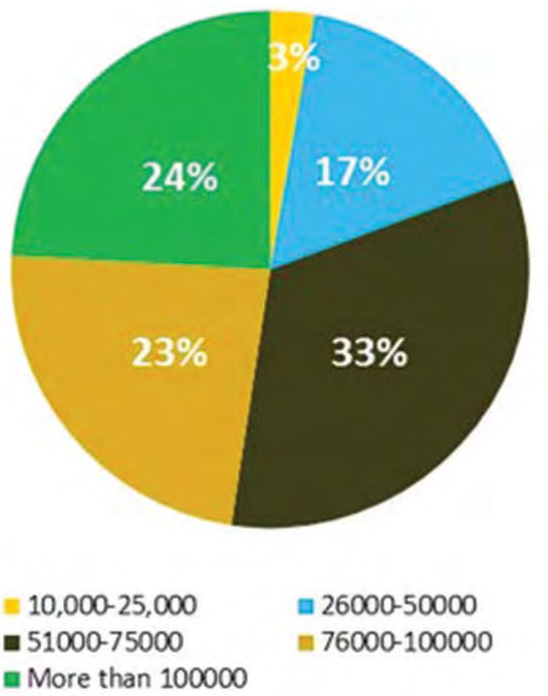


Fig.3: Financial status
Source: Authors

The pattern of use: It is represented by the typology and purpose of use.

8.1. Space Typology: Courtyards were the most used space as per 22% of responses, followed by steps (21%), which accounted for the most common seating opportunity in any educational institute. About 18% of students preferred to spend time in areas with good landscaping features. 16% of respondents use corridors due to adjacency to the classroom, while 15% use other informal spaces. Lobbies surfaced as the least used space for several reasons, including lack of privacy, seating, light, and ventilation, providing a favourable environment for interaction and spending time (Fig.4).

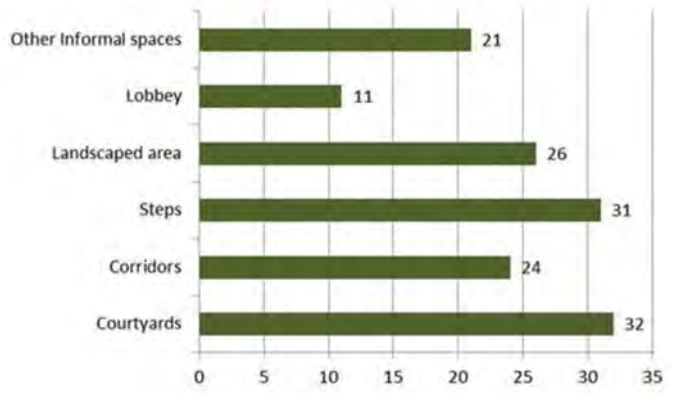


Fig.4: Space Typology
Source: Authors

8.2. Purpose of Use: Analysis indicated that 35% of respondents use transition spaces as they connect two static spaces. However, 27% of spaces offer affordances for pausing between two activities, waiting or just sitting idle. However, 30% of respondents use it for college events. Various socio-spatial attributes of spaces facilitate such occurrences or host a nomadic activity that does not require traditional spaces designed solely for a specific activity. Furthermore, 8% of respondents use it to complete their group assignments (Fig.5).

8.3. Physical Environment: Students' perceptions and behaviour are governed by the physical environment's spatial characteristics represented by seven attributes. It includes a refreshing environment with well-designed physical features, an appealing visual appearance, adequate size and space design, creating a relaxing environment, good seating facilities and considering ergonomics and quality of furnishing. The availability of good light and ventilation and colour textures make such spaces vibrant. Required permeability refers to the space's capacity for connection to other realms, rendering the space conducive to interaction and an

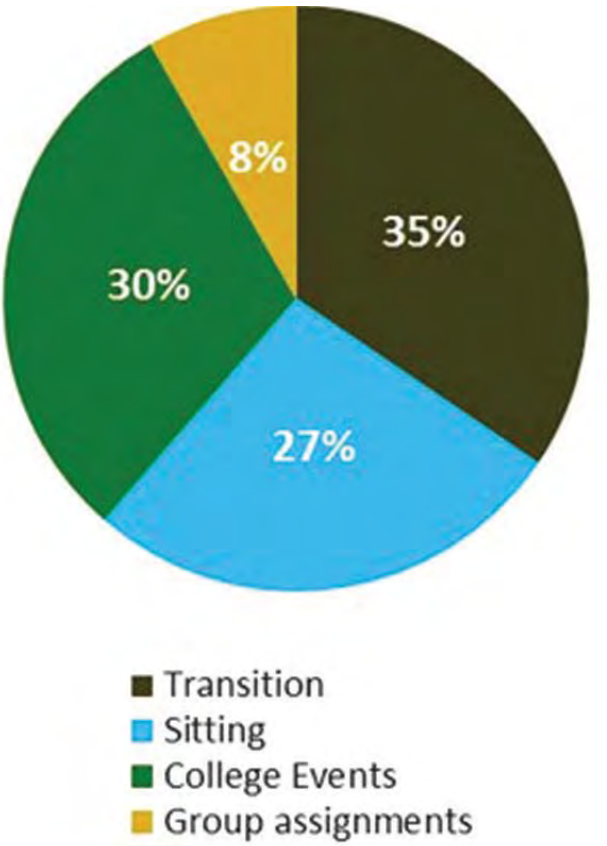


Fig.5: Purpose of Use
Source: Authors

adequate level of privacy and safety (Al-Ramahi et al., 2023). Good seating facilities with appropriate ergonomic aspects significantly govern the use of transitional spaces, as 49% of respondents reported. It is followed by the presence of nature in educational settings, as for about 48% of respondents, making it a critical factor that motivates them to spend time in such spaces. Permeability, which describes the interrelationship between space's environments and other spaces fostering the interactions, scored high by 37% of the respondents. The appropriate size and scale of a particular space addressing the user's requirements surfaced as another essential aspect, as indicated by 36% of respondents. However, for 30% and 26% of respondents, various physical design elements and light colour scheme respectively affect their choice (Fig. 6).

8.4. Time spent: Research stated that the frequency of visits and extended time spent in transitional spaces are coupled with enhanced learning environments and satisfaction in general. Analysis indicated that 25% of respondents spend 2 hours or more, 47% 1 to 2 hours, and 28% less than 1 hour per day in various interaction spaces located in the educational facility (Fig.7). More time spent in TS indicated the need for such spaces in architectural schools facilitating students interacting and collaborating

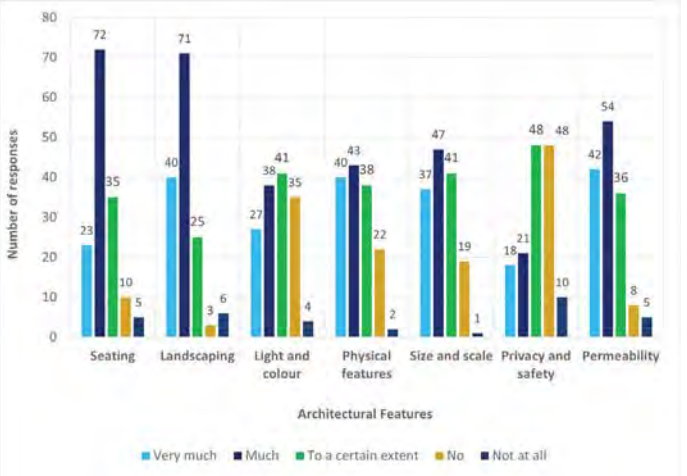


Fig. 6: Architectural Features
Source: Authors

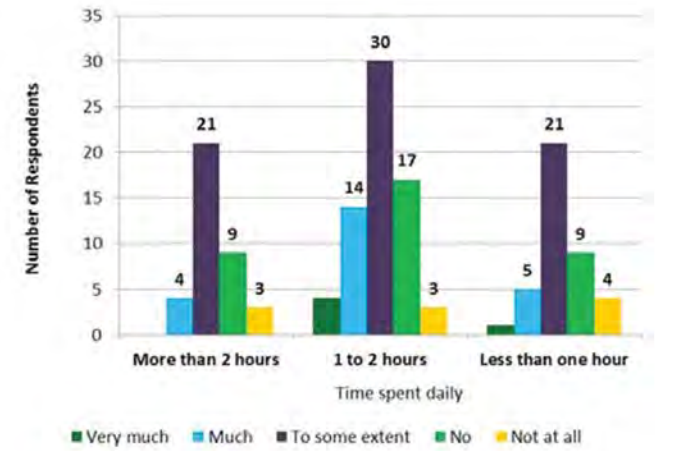


Fig. 7: Time spent.
Source: Authors

with their peers. Respondents' level of satisfaction was examined concerning the availability and quality of interaction spaces at their institute. Analysis revealed that only 8% were highly satisfied, 23% were satisfied, 39% were satisfied to a certain extent, 27% were not satisfied and 3% were unsatisfied (Fig. 8). Lack of well-designed transitional spaces affected the student's learning experience as about 30% respondents showed their dissatisfaction as the existing spaces failed in satisfying their psycho-physical needs affecting their learning.

9. Statistical Analysis

The data is further statistically analysed with the chi-square test which is a nonparametric test used for hypothesis testing aimed to draw conclusions about whether the variables have a meaningful association helping in design decisions. Pearson's correlation coefficient is used to express the degree of association or relationship between variables with the Statistical Package for Social Sciences (SPSS) software. Here p-value of less than or equal to 0.05

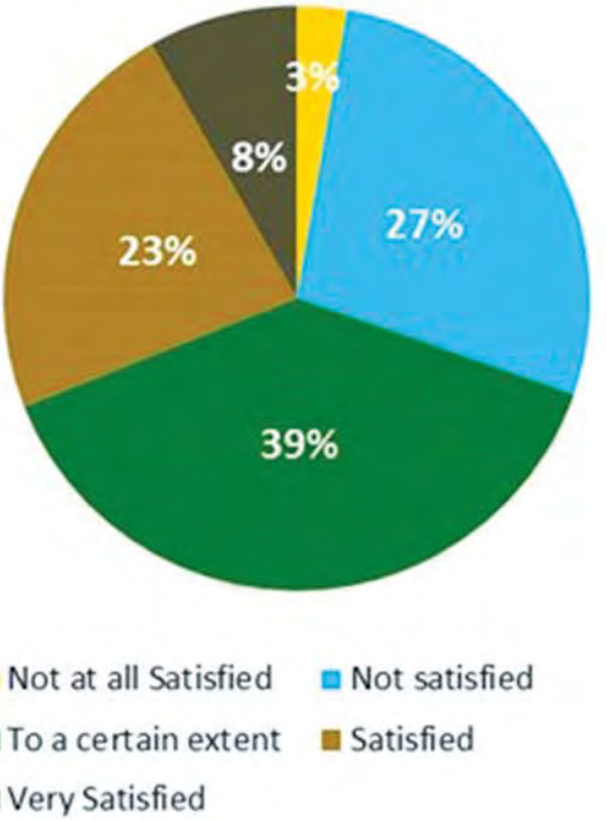


Fig. 8: User's satisfaction
Source: Authors

is regarded as evidence of a statistically significant result, and in these cases, the null hypothesis is rejected in favor of the alternative hypothesis.

Null Hypothesis 1: There is no association between the time spent and variables representing various spatial aspects.

The analysis indicated that the presence of good light, colour, permeability and privacy are independent with the time spent as P (0. 728, 094 and 0.056 respectively) > 0.05 = accept null of no association, as shown in Table 1. The size and scale have a weak correlation with the time spent P (0. 0 47) ≤ 0.05, however, the variable's presence of landscape, good seating and physical features are strongly associated with time spent P (0. 041, 0.018 and 0.018) ≤ 0.05, rejecting the null hypothesis.

Null Hypothesis 2: There is no association between the year of study and variables representing various spatial aspects

The analysis indicated that the year of study and various spatial aspects including light and colour, permeability, physical features, size and scale, presence of landscaping and good seating are independent and for these variables, the null hypothesis is accepted as P is greater than 0.05, as

Table 1. Association between time spent and space attributes. *Source: Authors*

Space Attributes		Value	Df	Asymp. Sig. (2-sided)
Light and colour	Pearson Chi-Square	5.272[a]	8	.728
Permeability	Pearson Chi-Square	13.558[a]	8	.094
Physical features	Pearson Chi-Square	18.488[a]	8	.018
Size and scale	Pearson Chi-Square	15.134[a]	8	.047
Privacy	Pearson Chi-Square	15.141[a]	8	.056
Presence of Landscaping	Pearson Chi-Square	16.079[a]	8	.041
Good seating	Pearson Chi-Square	18.533[a]	8	.018

Table 2. Association between spatial aspects and year of study. *Source: Authors*

Space Attributes		Value	Df	Asymp. Sig. (2-sided)
Light and colour	Pearson Chi-Square	11.843[a]	16	.755
Permeability	Pearson Chi-Square	19.049[a]	16	.266
Physical features	Pearson Chi-Square	12.600[a]	16	.702
Size and scale	Pearson Chi-Square	9.243[a]	16	.903
Privacy	Pearson Chi-Square	34.892[a]	16	.004
Presence of Landscaping	Pearson Chi-Square	10.688[a]	16	.828
Good seating	Pearson Chi-Square	9.206[a]	16	.905

Table 3. Association between type of space and year of study. Source: Authors

Space typology		Value	Df	Asymp. Sig. (2-sided)
Courtyard	Pearson Chi-Square	27.028[a]	16	.041
Playground	Pearson Chi-Square	32.850[a]	16	.008
Landscaped Space	Pearson Chi-Square	37.330[a]	16	.002
Lobby	Pearson Chi-Square	20.223[a]	16	.210
Corridor	Pearson Chi-Square	16.295[a]	16	.433
Stairs	Pearson Chi-Square	17.691[a]	16	.342

shown in Table 2. However, a strong association was found between variable privacy and year of study spent P (0. 004) ≤ 0.05. Thus, the null hypothesis is rejected, and the alternative hypothesis stands as privacy offered by a transitional space has an association with the users from different years of study.

Null Hypothesis 3: There is no association between the year of study and space typology.

The association between the use of spaces including courtyard, playground and landscaped space was found statistically significant as P (0. 041, 0.008 and 0.002 respectively) ≤ 0.05 rejecting the null hypothesis and the alternative hypothesis is accepted that the use of these spaces is affected by the user's year of study. However, the use of lobbies, corridors and stairs are independent showing no association with the year of study as P is greater than 0.05 indicated in Table 3.

Null Hypothesis 4: There is no association between gender and space typology.

The Pearson coefficient was ≤0.05 for landscaped space, lobbies, and gender (0.002, 0,023, respectively), indicating a statically strong correlation, as shown in Table 4. However, the correlation between gender and using courtyards, playgrounds and stairs was statistically insignificant as p ≥ 0.05. Hence, the null hypothesis was rejected for the variables landscaped spaces and lobbies, and the alternative hypothesis established that the use of these spaces is associated with the user's gender. However, the null hypothesis for the variables is the use of courtyards, playgrounds and stair stands.

10. Discussion and Conclusion

Interaction spaces often facilitate planned and spontaneous activities, including just transition, structured activities like hosting social events,

Table 4. Association between type of space and gender. *Source: Authors*

Space typology		Value	Df	Asymp. Sig. (2-sided)
Courtyard	Pearson Chi-Square	6.816[a]	4	.146
Playground	Pearson Chi-Square	7.992[a]	4	.092
Landscaped Space	Pearson Chi-Square	16.742[a]	4	.002
Lobby	Pearson Chi-Square	11.314[a]	4	.023
Corridor	Pearson Chi-Square	3.737[a]	4	.443
Stairs	Pearson Chi-Square	3.336[a]	4	.503

spending leisure time or performing academic-related activities in an outdoor or semi-enclosed setting. This research examined transitional spaces in architectural schools that offer perceptual cues and *affordances* for various academic and non-academic activities. Classroom studies are intense, where voluntary attention results in mental fatigue. It is found that students need restoration to enhance the cognitive capacity that various architectural design characteristics can foster. Architectural design elements creating visually appealing spaces surfaced as spaces with adequate light and ventilation affording comfort to occupants through climate control were preferred to spend time. Large-scale use of courtyards, as reported, indicated that their openness was a momentous affordance for casual interactions and collaborations among students. Lobbies, corridors and other informal spaces were used for various academic and non-academic purposes as the location, orientation and surrounding features of such spaces afford the transmission of light, hence illuminating the environment. Many activities in an educational setup, like an architectural school, demand a minimum of distraction and some degree of isolation and privacy. Students need a space to retreat to buffer some of the negative impacts of crowding and noise. A small group discussion often needs an enclosed setting supporting private talking. A casual environment is preferable for passive activities, such as sitting idle, experiencing the presence of nature or just watching people around. During special occasions, ample space is required for large gatherings. Spaces designed to afford desired activities, including social activities, group discussions and small gatherings of various scales and sizes, added to the overall learning experience. Various TS were used due to their permeability, offering strong affordance that refers to their connectivity to other spaces, allowing ease of movement and direct access or visual connectivity. The canonical affordances of corridors did not allow working or sitting activity for some respondents as the students are often attuned to crowding, particularly working in groups.

As an educational facility with various activities catering to diverse users, it is desirable to have multiple choices to fit users' diverse expectations and encourage spontaneous activities. Students often like to study or sit in an open space with a broad view; however, they often prefer a private, isolated space offering more privacy. It is revealed that landscaped spaces designed with intelligent use of softscapes, and hardscapes enhance their use, making landscapes pleasurable to prospects while providing refuge. Analysis indicated that the presence of landscape elements in an institutional environment provides affordance for users' engagement with spaces. It offers a relaxing environment to help alleviate their tense nerves. Affordance of transitional spaces allowed users to choose where and how they liked to sit. These spaces included ledges, steps and formal seating, which are ergonomically appropriate and enable people to sit comfortably in groups or alone. The analysis identified that built environments' high-level affordances arouse the user's multidimensional perception, resulting from the colours, odours, sounds and textures present there and govern the user's response to the space.

Architecture education has its unique curriculum, where dynamic learning frequently happens through interaction, which plays a prominent role in learning and students' overall experience at school. By analysing the person-environment interaction in transitional spaces in architectural schools, the reciprocal relationship between the student who carries out the activity and where the activity occurs is surfaced. It has become imperative to fully understand human behaviour and the environment, considering that the person is not a passive agent of this process but acts on the environment and is influenced by it. It is stressed that an affordance-based lexicon helps design learning spaces that cater to users' needs. This research postulates that an affordance-based perspective could correlate architects' and users' perceptions, leading to design innovation and reducing stereotype design solutions. For design purposes, the concept of affordance forms

a theoretical basis for improving the design process. Furthermore, it may be used to evaluate the design intentions or objectives. Besides, the knowledge gained could be used in future projects, avoiding the likelihood of design failures. The research established that the design of learning spaces should have a variety of transitional spaces offering consistent affordances that improve functionality and usability, offering a holistic architectural education.

References

- Al-Ramahi, A., Iranmanesh, A., & Denerel, S. B. (2023). Well-Being as an Effective Aspect in the Perception of Vital In-between Spaces within Art and Architecture Faculties. *Buildings*, 13(6), 1467. https://doi.org/10.3390/buildings13061467
- Chemero, A. (2018). An outline of a theory of affordances. In *How Shall Affordances Be Refined?* (pp. 181-195). Routledge.
- Chun, C., Kwok, A., & Tamura, A. (2004). Thermal comfort in transitional spaces—basic concepts: literature review and trial measurement. *Building and Environment*, 39(10), 1187-1192. https://doi.org/10.1016/j.buildenv.2004.02.003
- Churchman, A. (2003). Environmental Psychology and Urban Planning: Where Can the Twain Meet? In R.B. Bechtel & A. Churchman (Eds.), *Handbook of Environmental Psychology* (pp. 191–200). Hoboken, USA: John Wiley & Sons.
- Clark, C., & Uzzell, D. L. (2006). The socio-environmental affordances of adolescents' environments. *Children and their environments: Learning, using and designing spaces*, 14, 176-195.
- Fowler, H. A. (1982). *The Concise Oxford Dictionary*, pg.1138
- Gaver, W. W. (1991). Technology affordances. In Proceedings of the SIGCHI conference on Human factors in computing systems Reaching through technology - CHI '91 (pp. 79–84). New York: ACM Press. doi:10.1145/108844.108856
- Gatersleben, B., & Griffin, I. (2017). Environmental Stress. In: Fleury-Bahi, G., Pol, E., Navarro, O. (eds) *Handbook of Environmental Psychology and Quality of Life Research*. https://doi.org/10.1007/978-3-319-31416-7_2
- Hui, S. C., & Jiang, J. (2014). Assessment of thermal comfort in transitional spaces. In *Proceedings of the joint symposium 2014: change in building services for future.* http://hdl.handle.net/10722/217424
- Hutchins, E. (2010). Cognitive ecology. *Topics in cognitive science*, 2(4), 705-715. DOI: 10.1111/j.1756-8765.2010.01089.x
- Hunter, J., & Cox, A. (2014). Learning over tea! Studying in informal learning spaces. *New Library World*, 115(1/2), 34-50. https://doi.org/10.1108/NLW-08-2013-0063
- Kariyawasam, M. T. (2003). *The Transitional role of open space in architecture* (Doctoral dissertation). Sri Lanka: A Dissertation presented to Faculty of Architecture, University of Moratuwa.
- Koutamanis, A. (2006). Buildings and affordances. In *Design Computing and Cognition '06* (pp. 345-364). Dordrecht: Springer Netherlands.
- Kim, R. (2009). The tectonically defining space of Mies van der Rohe. ARQ: *Architectural Research Quarterly*, 13(3-4), pp. 251–260. https://doi.org/10.1017/S1359135510000102
- Kray, C., Fritze, H., Fechner, T., Schwering, A., Li, R., & Anacta, V. J. (2013). Transitional spaces: Between indoor and outdoor spaces. *11th International Conference, Proceedings* (pp. 14-32). Springer International Publishing. https://doi.org/10.1007/978-3-319-01790-7_2
- Kwon, C. (2022). Architectural typologies of school outdoor spaces by case study of the school design guidelines. *International Journal of Sustainable Building Technology and Urban Development*, 13(2), 231-240. https://doi.org/10.22712/susb.20220019
- Laiprakobsup, N. (2008). Inbetween Place: The Presence of Transitional Intervals. *NAJUA: Architecture, Design and Built Environment*, 23, 17-17.
- Lee, G. (2012). Development Study On Supporting Strategies For Leaners Task Selection In Self-Directed E-Learning Environment (Doctoral dissertation). https://hdl.handle.net/10371/120743
- Luke, C. L. (2006). Fostering learner autonomy in a technology-enhanced, inquiry-based foreign language classroom. *Foreign Language Annals*, 39(1), 71-86. https://doi.org/10.1111/j.1944-9720.2006.tb02250.x
- McGrenere, J., Ho, W. (2000). Affordances: Clarifying and evolving a concept. In *Proceedings of the Graphics Interface 2000 Conference, Montréal, QC, Canada*, 15–17 May 2000.
- McCrone, L. (2021). *Transitional space in active learning: Perspectives from an undergraduate STEM education context* (Doctoral dissertation, Imperial College London).
- Maier, J. R., Fadel, G. M., & Battisto, D. G. (2009). An affordance-based approach to architectural theory, design, and practice. *Design Studies*, 30(4), 393-414. https://doi.org/10.1016/j.destud.2009.01.002
- Mehan, A. (2017). An integrated model of achieving social sustainability in urban context through theory of affordance. *Procedia Engineering*, 198, 17-25.
- Muhaisen, A. S., & Gadi, M. B. (2006). Effect of courtyard proportions on solar heat gain and energy requirement in the temperate climate of Rome. *Building and*

Environment, 41(3), 245-253. https://doi.org/10.1016/j.buildenv.2005.01.031

- Nassar, U. A., & Hosam, S. (2014). Transition Space in Higher-Education Buildings as an Efficient "Behavior Setting" Model. *Transition*, 3(1).
- Pitts, A., & Saleh, J. B. (2006). Transition spaces and thermal comfort–Opportunities for optimising energy use. In *Proceedings PLEA International Conference on Passive and Low Energy Architecture* (pp. 1423-1428).
- Ramu, V., Taib, N., & Massoomeh, H. M. (2022). Informal academic learning space preferences of tertiary education learners. *Journal of Facilities Management*, 20(5), 679-695. https://doi.org/10.1108/JFM-05-2021-0047
- Taleghani, M., Tenpierik, M., & Van Den Dobbelsteen, A. (2012). The effect of different transitional spaces on thermal comfort and energy consumption of residential buildings. In *7th Windsor Conference*, Network for Comfort and Energy Use in Buildings.
- Vanichvatana, S. (2019). Investigation of student's preferences for off-campus informal learning spaces: The case of business school students in Bangkok. *Kıbrıslı Eğitim Bilimleri Dergisi*, 14(4), 590-600.
- Wiechel, D. (2002). Utilising Interstitial Space to Encourage Interaction in The Learning Environment, Ms.S. thesis, Ball State University, pp.2-3.
- Young, F., & Cleveland, B. (2022). Affordances, architecture and the action possibilities of learning environments: A critical review of the literature and future directions. *Buildings*, 12(1), 76. https://doi.org/10.3390/buildings12010076
- Youssef, O. (2018). *Development of a Human-centered Climatic Design Methodology for Transitional Spaces in Hot-arid Regions*. The University of Arizona.

Ar. Madhura Khaire is a graduate of Dr. Bhanuben Nanavati College of Architecture (BNCA), Pune. She has a profound commitment to excellence in academics. She is currently working as a Junior Architect at a Nashik-based architectural firm. She is passionate about the exploration of innovative design concepts and the intricate spaces within architecture.
Email: madhura.k.khaire@gmail.com

Ar. Shravani Khire recently completed her B.Arch. from MKSSS's Dr. Bhanuben Nanavati College of Architecture, Pune. She always stands out from the crowd due to her passion for architecture, design and research. She is currently preparing for further postgraduate studies.
Email: khiresrk@gmail.com

Dr. Vasudha A Gokhale has a B.Arch. from MANIT, Bhopal, and an M.Arch. and PhD from IIT, Roorkee. She has been a visiting scholar at the University of Melbourne and New Zealand. She is a Professor and Head of PhD Research Centre at B.N.C.A. Pune. Fourteen candidates have been awarded Ph.D. degrees under her supervision. She has more than 175 publications to her credit.
Email: gokhale.va@gmail.com

ANVESHAN

IIA International Research Conference 2024

IIA ANVESHAN International Research Conference 2024 will be held at MCAP Thiruvananthapuram from 29 – 31 August 2024.

Architectural education and practice in Bharat and other countries, have a long-standing tradition, with a diverse range of architecture, construction techniques and sustainable design principles. As we navigate the challenges of globalization, urbanization and climate change, we draw inspiration from the Bharatiya and other indigenous Knowledge Systems and their transfer among all countries.By delving into the depths of such architectural education and practice, IIA aims to uncover valuable insights that can inform and shape the future of architecture worldwide through ANVESHAN.

IIA Sorab Bharoocha Memorial Lecture

Ar. Sorab Bharoocha was the first Indian President (1927 to 1928) of the IIA (then known as Bombay Architectural Association). The event of ANVESHAN IIA International Research Conference will commence with the First Sorab Bharoocha Memorial Lecture by an eminent architectural personality.

Dr. Joy Sen will be the Speaker for the IIA Sorab Bharoocha Memorial Lecture

Dr. Joy Sen
Professor
Dept. of Architecture and Regional Planning
Indian Institute of Technology, Kharagpur

Dr. Joy Sen is currently Professor, Department of Architecture and Regional Planning, Indian Institute of Technology, Kharagpur with 27 years of teaching experience and 9 years of industrial experience. His master's degrees are from College of Design, Iowa State University, where he received the ISU Best THESIS AWARD (1989). Prior to that he was recipient of Institute Silver Medal, Mansara Scholarship and the Best Thesis mark from IIT Kharagpur (1984). He has held many prestigious positions, among them: first Chairman, Centre of Excellence for Indian Knowledge Systems, IIT Kharagpur (2020 - 23), the first national IKS centre in the nation; Head of the Department of Architecture and Regional Planning (2017-19); Chairman, Ranbir and Chitra Gupta School of Infrastructure and Design, IIT Kharagpur (2014 – 2017); Principal investigator of the mega-19-projects initiative the Science and Heritage initiative IIT Kharagpur (S-and-HI) funded by the Ministry of Education (MHRD), Government of India (2013 -19) inclusive of Project Varanasi in additional collaboration with Columbia University, USA and Georgia Institute of Technology, USA.

Dr. Sen is the recipient of prestigious G. S. Sanyal All-round Faculty Excellence Award (2021) from IIT USA Alumni Foundation, USA – having outstanding records of sustained social interaction with students through empathy and compassion in teaching and research. He also received the QANSAS Distinguished Speaker Award (2019) from the Quantum Group, run jointly by Dayalbagh Educational Institute Agra, The University of Michigan, and Stanford University USA (Harmony of Indian Philosophy and latest in Quantum Sciences).

He has been a doctoral guide and authored numerous SCI journal papers, textbooks and children's thrillers including 'Sustainable Urban Planning' published by the The Energy Research Institute (TERI, 2011), which has been earmarked as a national bestseller.

Streams of IIA ANVESHAN

With its diverse range of architectural styles, innovative construction techniques, and sustainable design principles, all indigenous architecture stands as a testament to the wisdom and ingenuity of our ancestors. As we navigate through the challenges of globalization, urbanization, and climate change, it becomes imperative to revisit and draw inspiration from the Bharatiya and other indigenous knowledge systems that have guided architectural education and practice for generations. These knowledge systems not only nurture creativity and technical expertise but also foster a deep understanding of context, ecology, and human-centric design. By delving into the depths of all such architectural education and practice, we aim to uncover valuable insights that can inform and shape the future of architecture worldwide.

There is a quest to understand the transfer of Architectural Knowledge Systems among Asian and other countries. There are three Streams of IIA ANVESHAN International Conference which look at exploring transfer of knowledge systems pan Bharat as well as pan Asia and even other places in the past, present and also further in the future of these as well as advancements of Architectural Knowledge Systems.

Stream 1 : The Celebrated Past

This Stream looks at:

- Culture, Traditions and Heritage
- Indigenous Architectural Practices
- Traditional building materials and construction techniques
- Cultural Heritage Conservation: Preservation and adaptive reuse of historical structures
- Sacred Architecture

Dr. Manish Chalana will be the Keynote Speaker for Stream 1 : Celebrated Past

Dr. Manish Chalana
Professor, Urban Design & Planning
Adjunct Professor, Architecture
Adjunct Professor, Landscape Architecture
College of Built Environments, University of Washington

Manish Chalana, PhD, is an Associate Professor in the Department of Urban Design and Planning at the University of Washington (UW), USA, and the Director of the Graduate School Certificate in Historic Preservation. He also co-directs the Center for Preservation and Adaptive Reuse (CPAR) located within the College of Built Environments, UW. Additionally, he serves as an Adjunct Associate Professor in the Architecture and Landscape Architecture departments and on the faculty of the South Asia Studies Center in the Jackson School of International Studies at UW. Dr. Chalana's research focuses on historic preservation planning, planning history, and international planning and development, particularly in his native India. His work has been published in peer-reviewed journals such as Future Anterior, the Journal of Architectural Education, the Journal of the American Planning Association, the Journal of Planning History, Planning Perspectives, and Public Historian. He has co-edited volumes including "Messy Urbanism: Understanding the 'Other' Cities of Asia" (2016, Hong Kong University Press) and "Heritage Conservation in Postcolonial India: Approaches and Challenges" (2020, Routledge). He has presented his work at several international venues in Asia, North America, Africa and Europe. Currently, he is a Fulbright-Nehru Academic & Professional Excellence Award (Research) Scholar working on a new book project in India.

Stream 2 : The Significant Present

This Stream looks at:

- Sustainable Urban Planning
- Climate-responsive Design
- Community Engagement in Design
- Technology Research, advancements: Practice and Education
- Digital Technologies and Tradition: Role of BKS in dealing with Current Global Challenges and Education

Ar. Saif Ul Haque will be the Keynote Speaker for Stream 2 : The Significant Present

Keynote Speaker
Stream 2 : The Significant Present
Ar. Saif Ul Haque
Sthapati
Bangladesh

Saif Ul Haque (b.1958) is the principal of Saif Ul Haque Sthapati and an adviser at the Bengal Institute for Architecture, Landscapes and Settlements at Dhaka, Bangladesh. His works include residential, institutional and industrial facilities at different locations in Bangladesh. Some of his works have been published. exhibited and received awards in and outside Bangladesh. He has an active interest in research that covers environment, architecture and city and has written and given talks on these topics. He has been also involved in the organizing of several exhibitions on architecture. His practice covers residential, institutional and industrial facilities at different locations in Bangladesh. which has won awards in Bangladesh and abroad, among them, the prestigious Aga Khan Award for Architecture 2019.

Stream 3 : The Projected Future
This Stream looks at:

- Finance model for architects
- Multidisciplinary aspects of designing the built environment
- Balancing modernization with ecological considerations
- Digital tools for documentation and preservation of traditional architecture
- Future of Bhartiya Knowledge Systems

Ar. Smita Chandra Thomas will be the Keynote Speaker for Stream 3 : The Projected Future

Keynote Speaker
Ar. Smita Chandra Thomas
CEO, Founder, Principal
Energy Shrink
Washington DC

Ar. Smita Chandra Thomas is a recognized expert, published author, and speaker specializing in decarbonizing the built environment. With a strong dedication to advancing energy efficiency in buildings through building science, Ms. Thomas is at the forefront of green technology and energy management strategy. She has over two decades of experience in performing and managing techno-economic analyses to support demand-side management for innovative green buildings, programs, and policy development. After working in US national and international technical and management consulting, Ms. Thomas now runs her consulting practice, Energy Shrink, LLC based in Washington, DC serving clients such as the World Bank, UNEP, the US Federal and State governments, and private entities. She is also a Visiting Scholar at the George Washington University in Washington, DC, where she teaches a course on Decarbonizing Buildings.

IIA plays a pertinent role in terms of research in architecture for its future in Bharat through this international research conference ANVESHAN. It aims to provide a platform to promote this research initiative and give a quality opportunity to existing researchers in architecture to further enhance their research approach.

Narratives in Stone

Aihole, Badami, Pattadakal

By Prof. Suresh M. Singh

AIHOLE

Once the capital of the early Chalukyan dynasty, Aihole is a picturesque village on the banks of the Malaprabha river. Also known as Ayyavole and Aryapura in the inscriptions, Aihole is historically famous as the cradle of Hindu temple architecture. The initial efforts of the Chalukyans are represented by a considerable group of stone-built shrines and temples at Aihole. The majority of these structures are Brahmanical, although a few are Jain, and all appear to have been built in the period between 450 CE and 650 CE. At Aihole, the Hindu temple not only took an introductory form structurally, but marked the beginning of temple constructions in this geographical region. The temples at Aihole consist of some seventy buildings; about thirty are contained within a walled and bastioned enclosure, while the others, owing to lack of space, are dispersed within its vicinity. It is in fact, a town of temples.

At Aihole, across a time span of two centuries, the art of temple building must have been conducted with fervor and energy and in the middle of the seventh century, the centre of religious activity seemed to be transferred to the town of Pattadakal, where a later phase of the style ensued. The temples at Aihole have flat or slightly sloping roofs, but in some instances are surmounted by a small upper storey or tower (shikhara), which appears to have been subsequently added.

Ladh Khan Temple:

Mainly on account of its primitive appearance the temple known as Ladh Khan is considered to be the oldest building of the Aihole temple cluster, seemingly built in the middle of the fifth century. In form, it is a comparatively low, flat-roofed building, its plan being a square of fifty feet side, and overall raises a small supplementary storey of later date (Refer Figure 1). Three of its sides are completely enclosed by walls, two of which are relieved by perforated stone grilles, but from its fourth side, forming its eastern front, there is a projected open-pillared porch. The interior consists of a hall that resembles a pillared pavilion, as it contains two square groups of columns, one within the other, thus providing a double aisle all round. A large stone effigy of a bull (*Nandi*) almost fills the central bay, while at the far end is the cella, an unusual chamber offsetting the axis of the main hall, against the back wall. With the exception of the Shiva symbol of the *Nandi*, which has been introduced later on, it was built as a Vishnu temple.

Although it was intended for a temple, it was an adaptation of another structure devised for an entirely different purpose. This was an edifice planned for secular and civic use, the *santhagara*, the village mote, moot, or meeting hall.

Durga Temple:

This temple is a Brahmanical version of the Buddhist chaitya hall. It was probably erected during the sixth century, and is an apsidal-ended structure measuring 18m. by 12m. externally. Additionally, there is a large portico on its eastern front 7.5m. in depth, resulting in an overall length of 25.5m (Refer Figure 2).

Raised on a particularly high and heavily moulded plinth or stereobate, the topmost tier of its flat roof is at 9m. from the ground; over the apse a short pyramidal tower, or shikhara, has been subsequently added. Among other notable features in the design of

Figure 1: Ladh Khan temple showing the flat-roof with a small supplementary storey, Aihole
Source: Author

Durga temple is its peripheral exterior, or pteroma, a passage formed by the colonnade of a verandah which is carried around the building, and connects with similar pillars comprising the portico. This portico is approached by two flights of steps, one on each side of the front, with the entrance doorway inside the pillared vestibule.

The interior consists of a hall 13.5m. long and divided by two rows of four pillars into a nave and two aisles, with an apsidal shaped cella. The aisles are continued round this cella as a processional passage. Light is obtained both for the central hall and for this passage by means of stone grilles; square at the sides being and the circular in the apse, each filled with an elegant carved and perforated pattern. The roof of the nave is raised higher than that of the side aisles, such that, not only in the treatment of its parts, but in the nature of the building as a whole, it is a literal restatement of the Buddhist chaitya hall. Dedicated to god Vishnu, the temple derives its name from *Durgadagudi* meaning 'temple near the fort'.

BADAMI

Badami, a corrupt form of the ancient "*Vatapi*", was a stronghold of the founders of the Chalukyan kingdom early in the sixth century. Picturesquely nestling at the foot of steep cliffs and by the side of a small lake, it contains several buildings of an early date. The most interesting element is a series of four pillared halls excavated in the scarp of a hill overlooking the south-east side of the town. Three of these are Brahmanical, and one is Jain; in number 3 of the former, there is an inscription to the effect that it was prepared in 578 CE in the time of Mangalisa, the son of *Pulakesa* I, who selected the site for his capital. The group at Badami proves, by the high standard of the workmanship, that considerable progress had been

Figure 2: Durga Temple from the apsidal end, Aihole
Source: Author

made in this form of architectural expression in such a short interval. These four temples are connected by a causeway inclined up the face of the cliff, and each appears originally to have had an open court in front; in addition to the forewall, the approach being by means of a flight of steps and through a doorway composed of excellent ashlar masonry. In their general appearance and interior arrangements these excavated temples are all of the same type, as each includes three features: a pillared verandah, a columned hall, and a small cella deep into the rock (Refer Figures 3 and 4).

Cave- I (late 6th century)
This is probably the earliest of the rock-cut series. The cave temple consists of a small square sanctuary containing a linga excavated into the rear wall of a large columned mandapa. The mandapa is divided by raised floor bands and beams into aisles; it is approached through a triple entrance from a long porch. The column shafts are incised with jewel and garland motifs as well as miniature medallions

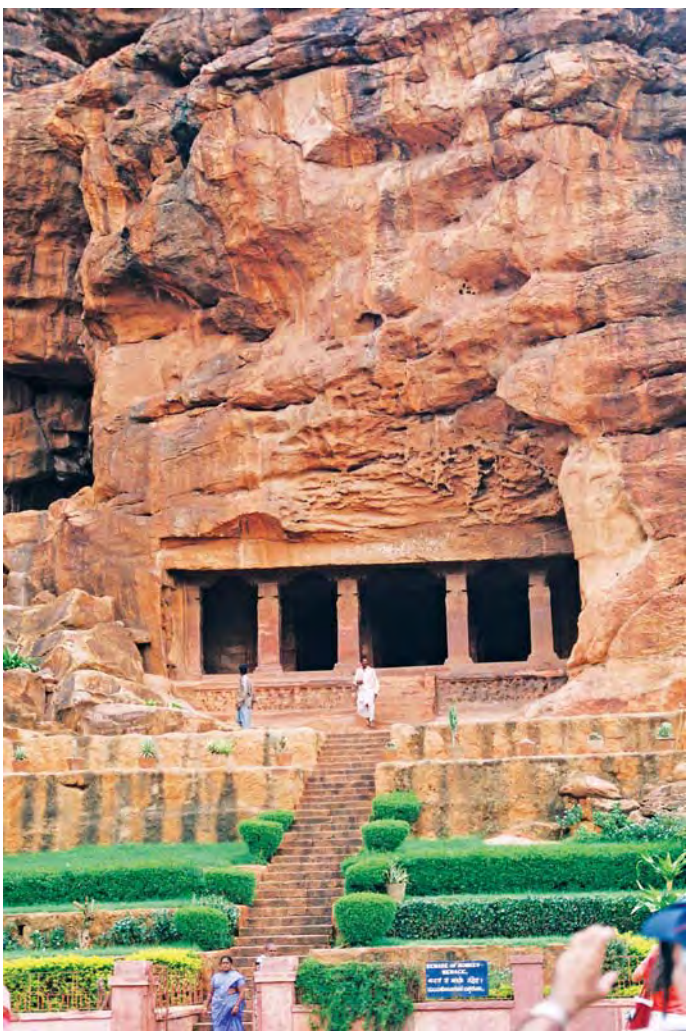


Figure 3: Cave 1, Badami
Source: Author

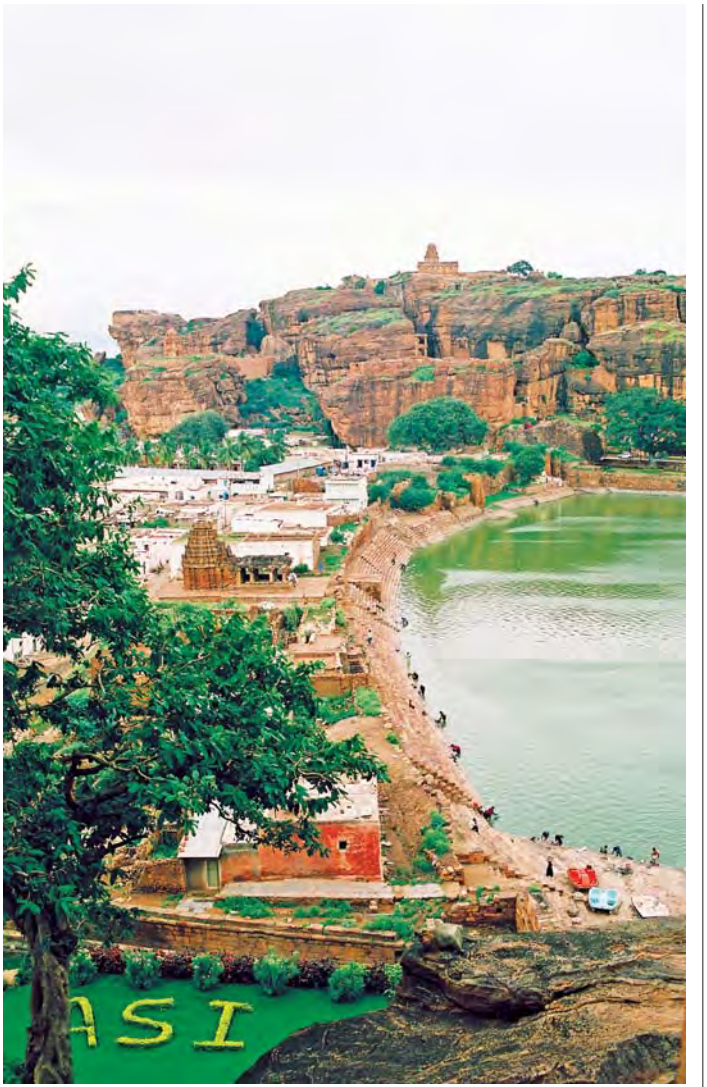


Figure 4: View from the Cave overlooking the Agastya Lake, Badami
Source: Author

containing figures and foliation; the capitals are often fluted. Large sculpture panels at either end of the porch depict *Harihar* accompanied by Lakshmi, Garuda, Parvati and *Nandi* (left) and *Shiva* with *Nandi* (right). Among the ceiling panels in the porch are a coiled *naga* deity as well as depiction of *Shiva* and *Parvati* and flying couples. Brackets are adorned with rearing beasts. Outside the porch on the right is a small shrine housing images of *Durga, Karttikeya* and *Ganesha.* A vigorous representation of eighteen-armed dancing *Shiva* is carved on to the adjacent rock face; guardian stands opposite. Flanking the access steps is a frieze of *ganas.*

Cave- II (late 6th century)
This Vaishnava sanctuary is similar in layout and ornamentation to Cave- I Panels at either end of the porch depict *Varaha* (left) and *Trivikrama* (right) both with friezes of *ganas* beneath. The brackets are fashioned as figures emerging out of open-mouthed *makaras.* The elaborate ceiling panels include a

wheel of radiating fish surrounded by foliation and also a composition incorporating swastika motifs and flying couples. Graciously posed guardians flank the porch entrance.

Cave- III (578 CE)
According to its dedicatory inscription, this monument was excavated during the reign of the Early Chalukya ruler *Pulakeshin*-I. The large scale of the temple, which otherwise follows the basic scheme of Caves I and II, and the elaborate sculptural ornamentation make this the finest of the series; indeed, this rock-cut monument is one of the most remarkable in the Deccan region. Throughout, the carving of the deep-red sandstone is exceptional. The columns have a variety of multifaceted and fluted designs.

Medallions on the shafts contain amorous couples and delicately incised lotus ornaments. The brackets are elaborately treated, especially those of the outer row, which are fashioned as embracing couples or maidens beneath trees; rearing beasts support the overhang of the cave. Carved on to the inner face of this cave is Garuda flanked by flying figures. On either side there are faint traces of paintings. Major figural compositions in high relief are carved at either end of the porch: to the left are *Vishnu* on the coiled serpent (end panel), *Varaha* and standing *Vishnu* (side panels); to the right, *Narasimha* (end panel), *Harihara* and *Trivikrama* (side panels). The ceiling is carved with medallions in which divinities are surrounded by smaller figures. The central medallion depicts *Vishnu* flanked by *Lakshmi* and *Garuda*. The ceiling within the mandapa is embellished with flying figures of the *Dikpalas* with Brahma in the middle.

Cave- IV (6th century and later)
Although this Jain temple is the latest in the excavated series, it is smaller in scale and less elaborate. Both seated and standing *Tirthankara* figures adorn the walls; their full modelling distinguishes them from later carved insertions of small standing *Jinas*.

Bhutanatha group (late 7th and 11th centuries)
The small shrines of this group are typical of the Late Chalukya period; they have unadorned exteriors and pyramidal towers with narrow horizontal mouldings. The principal shrine overlooking the water consists of an Early Chalukya towered sanctuary and adjoining mandapa, partly contained within later additions (Refer Figure 5).

PATTADAKAL (680 CE - 746 CE)
This royal commemorative Hindu site served as a setting for the coronation ceremonies of the Early Chalukya rulers. Seven temples grouped closely together and surrounded by numerous minor shrines

Figure 5: Bhutanatha group of temples along the Agastya Lake, Badami
Source: Author

and plinths, face eastwards towards Malaprabha River. A temple dedicated to *Papanatha* is situated on the south side of the village; about 500m. to the west is a later Jain monument. There are ten temples of consequence at Pattadakal, four of which are in the Indo-Aryan or northern style, and six in the Dravidian or southern, as follows -

INDO-ARYAN	DRAVIDIAN
Papanath Temple (680 CE)	Sangameshvara (725 CE)
Jambulinga	Virupaksha (740 CE)
Kadasiddheshvara	Mallikarjuna (740 CE)
Kashivishvanatha	Galaganatha (740 CE)
	Sangameshvara
	Jain

The Pattadakal temples provide a striking illustration of the coexistence of different building styles and artistic traditions derived from different regions of India. The large scale of the architecture, the complex elevational and spatial treatments and the rich ornamentation represent the climax of the Early Chalukya phase (Refer to Figure 6).

Kadasiddheshvara and Jambulinga Temples (8th century)
These two small shrines have curved towers adorned with horseshoe-shaped and ribbed elements, in the typical central and western Indian style. The sculptures, now worn, on the outer walls of the sanctuaries are framed by pilasters. On the front (east) faces of the towers are panels carved with *Nataraja* images. The sanctuaries adjoin small mandapas.

Galaganatha Temple (8th century)
This temple is closely related to contemporary monuments at *Alampur*. The most striking feature is the well-preserved curved tower with horizontal tiers covered with horseshoe-arched motifs; *amalakas* are positioned at the edges and at the summit. Of the three porches that once sheltered the pierced stone windows, only that on the south still stands; it shelters a carved panel depicting *Shiva* killing *Andhaka*. Damaged river goddesses and an icon of dancing Shiva adorn the sanctuary doorway.

Sangameshvara Temple (early 8th century)
Founded by the Early Chalukya ruler *Vijayaditya*, this temple was never completed. The finely proportioned building demonstrates the essential features of the southern Indian style: a deeply moulded basement, walls divided into projections and recesses by pairs of pilasters, a parapet of miniature root forms and a multi-storey tower with a square roof. Most of the sculpture panels are incomplete; the intermediate perforated stone windows have geometric patterns.

Kashivishvanatha Temple (late 8th century)
Protruding into the *Mallikarjuna* temple courtyard, this building is a later example of the central and western Indian styles. The wall projections have pediments of arch-like motifs. Similar motifs adorn the tower, especially the central band, which consists entirely of a mesh of these motifs. A dancing Shiva is positioned on the front (east) face.

Figure 6: Pattadakal group of Temples
Source: Author

Figure 7: Virupaksha Temple, Pattadakal
Source: Author

Virupaksha and Mallikarjuna Temples (8th century) These neighbouring, almost identical, temples were erected by the two queens of *Vikramaditya*-ll to commemorate the victory of Early Chalukyas over the Pallavas at Kanchipuram. In plan, the temples consist of sanctuaries housing Shiva lingas surrounded on three sides by passageways that adjoin columned mandapas, and each divided into five aisles and entered through three porches. East of the temples are open pavilions sheltering large images of *Nandi*. Enclosure walls with minor shrines and gateways contain the temples and pavilions in rectangular paved courtyards (incomplete in the *Mallikarjuna* complex. The diagonal arrangement by which the two enclosures interlock is unique. The *Virupaksha* courtyard has a gateway on the east.

Deriving from the *Sangameshvara* scheme, these temples demonstrate a remarkable stylistic evolution in the increase of scale and elevational complexity. Plinths, pilastered walls, sculpture niches, open porches, parapets and multi-storey pyramidal towers are combined in slightly different ways in the two temples. For example, in the *Virupaksha* temple the wall projections are flanked by double pairs of pilasters, while in the *Mallikarjuna* temple these are increased to triple sets; the *Virupaksha* has a square roof, while the *Mallikarjuna* has a hemispherical roof. Both towers have horseshoe-shaped frontal projections framing images of dancing Shiva (Refer Figures 7 and 8).

The vitality of Early Chalukya art is amply displayed in the sculptures. The outer walls have numerous figurative panels, many depicting Shiva and Vishnu in their different forms. On the *Virupaksha* temple, some of the finest panels are *Shiva* appearing out

Figure 8: Virupaksha Temple, Pattadakal
Source: Author

of the linga, *Vishnu* as *Trivikrama* (either side of east porch), dancing Shiva (east end of south wall), Bhairava (middle of south wall of sanctuary) and *Vishnu* with *Durga* beneath (middle of north wall of sanctuary). Figural panels are moderately preserved on the *Mallikarjuna* temple but there is a robust *Natraja* on the west wall of the sanctuary. Perforated stone windows are delicately carved with foliate motifs. Both panels and windows are surmounted by arch-like pediments filled with figures or *makaras* with foliated tails. On the *Virupaksha* temple, there are pot-bellied attendants (east doorway), *Ravana* subdued by *Shiva* (south porch column) and *Vishnu* on *Garuda* (north porch column).

The interior columns have bands of narrative friezes, which include illustrations of epic scenes, scrollwork and lotus ornament. Peripheral columns are adorned with amorous couples. Over the central aisle the raised ceiling panels have *naga* deities, dancing *Shiva* icons and scenes of *Lakshmi* bathed by elephants. Other panels in the porch ceilings of the *Virupaksha* temple depicts *Shiva* with sages (north), *Surya* in chariot (east) and *Brahma* (south).

The doorways are elaborate compositions with river goddesses and attendants beneath at either side and *makaras* with foliated tails raised on pilasters above. A remarkable three-dimensional sculpture of Durga is placed in the minor north shrine of the Virupaksha temple mandapa. The sanctuaries house polished black stone lingas. The large *Nandi* images within the open pavilions are carved to almost perfection. The circular columns have projecting brackets and delicately applied foliate decoration.

Papanatha Temple (8th century)
The two interconnecting columned *mandapas* of this temple lead to the sanctuary surrounded by a narrow passageway. There is a single entrance porch; the Nandi image sitting immediately inside the doorway is now misplaced. Three blind porches at the western end of the temple shelter pierced stone windows and carved panels, are now damaged.

Elements derived from different architectural traditions are combined in the elevation. The tower over the sanctuary resembles those of *Kadasiddheshvara* and *Jambulinga* temples, which are central and western Indian in origin. The parapet of roof forms and the *makaras* with foliated tails on the pilasters that flank niches and doorways are typical of southern Indian practice. The basement preserves traces of fighting elephants and lions (east porch).

Friezes in the niches of the upper walls illustrate scenes from the epics Mahabharata and Ramayana; processions of monkeys appear on the south wall. Porch columns have fully modelled couples, maidens and guardians; similar figures adorn the peripheral columns of the interior *mandapas*. In the middle of the outer *mandapa* there are niches housing images of *Durga* (north) and *Ganesha* (south). The columns have brackets decorated with monster heads and foliation; the brackets are fashioned as open-mouthed *makaras* disgorging lions. The raised ceiling panels over the central aisles in both *mandapas* have carved compositions; the finest are Nataraja and the coiled *naga* deity of the inner *mandap*a. The doorways to the *mandapas* and sanctuary are the most ornate of the Pattadakal series.

In conclusion, Aihole, Badami and Pattadakal are significant tangible portals to the rich tapestry of historical, architectural and cultural knowledge. They offer an opportunity to witness the sculptural marvels through the beautiful stone carvings, architectural diversity through evolution of temples and abundant insights on political, social, and religious aspects. Exploring these magnificent places allows us to connect with our heritage and appreciate the enduring inheritance of human creativity.

References:

Michell G., 1988, The Hindu Temple: An Introduction to Its Meaning and Forms, Chicago: University of Chicago Press

Michell G., 2002, Pattadakal, Oxford University Press

Michell G., 2014, Badami. Aihole. Pattadakal, Jaico Publishing House

Prof. Suresh M. Singh (A09091) heads the Rachana Sansad's Academy of Architecture, Mumbai. He is an alumnus of the institution, and has been associated as a teacher with his alma mater since 1987. He is a Member of several professional bodies and authored several travelogues on the various places he has toured. As a long-time teacher, he believes that learning to learn is most important, especially in a professional and creative field like architecture that happens in praxis.
Email: principal@aoamumbai.in

ARTICLE

When Conservation Transcends Conversion, a 'Smart City' is Born

Time to conserve the depleting *Basai* wetlands of Haryana

By Ar. Poonam Saini and Dr. Aarti Grover

Introduction

The concept of healthy, livable and smart cities is centred around the common spaces for social life in a city enhancing the 'quality of life' for its residents and communities. A vision plan for new-age cities that includes the participatory planning model has been adopted by many governing agencies across the world to articulate the concept of livability in their region. However, in India, much deliberation is needed for the participation of local communities in important policy-level decisions affecting the management of natural areas which are constantly under threat due to increasing global temperature. At the onset of this Summer, we have been warned by the United Nations that the development of the *El Nino* weather phenomenon in the central and eastern tropical Pacific Ocean may cause a hike in global temperature leading to setting new heat records this year and change the weather and climate patterns worldwide. As a matter of course, the predictions made by the World Meteorological Organization for severe droughts in 2023-24 for countries like Australia, Indonesia, India and parts of southern Asia can have severe impacts on various segments of society (WMO 2023).

Alteration of Earth's natural systems to cater to the needs of the rising population has led to many environmental problems, especially in the majority of urban areas of the world (Singh et al. 2006) and it has become a serious concern in developing economies, where the population density is way too high as compared to developed nations. The impact of environmental degradation may vary in magnitude with implications of food security, mental stress and health issues leading to untimely deaths. For the same reason, now is the time to take action on reversing the changing climatic patterns through soil and water conservation strategies and protecting the natural resources of our cities.

***Basai* Wetlands: A Place to Conserve Avian Diversity**

To fulfil the demands of modern housing and infrastructure development, while preparing the master plan for towns and cities in India, planning agencies and policy-makers often try to compromise on the open spaces of the city by putting them under discernible land use for obvious monetary benefits to be derived from that land parcel. The same is happening with *Basai* wetland area in the Gurugram district of Haryana state which has considerably shrunk from its original size over the past few years due to the accelerated expansion of the city of the future. *Basai* shelters 240 species of birds which makes it an important 'biodiversity hotspot' in India (Rai et al. 2017). Solanki and Joshi (2017) have explained that even after getting the status of "Important Bird Area" by the Bombay Natural History Society, still it has not got the status of protected wetland by the Haryana Government. Due to the lack of identity, the area is continuously under threat by developmental activities such as the construction of housing, new roads and expressways cutting through the terrain, substantially impacting the flyway route for migratory birds (Fig. 1).

Fig.1: Urban expansion near Basai wetland area, Gurugram
Source: https://commons.wikimedia.org/wiki/File:Basai_Wetland_Gurgaon_DSC9266.JPG

Being one of the most productive habitats spreading over 206 hectares of land (Fig. 2), *Basai* wetlands are home to a number of ecological communities of invertebrates, vertebrates, reptiles, amphibians and birds including species which are rare and uncommon in the region (Fig. 3 and 4). Catching water from all the four sides, these wetlands lie in the natural catchment of one of the paleochannels of *Sahibi river* that originates from *Aravali range* in *Rajasthan* and flows through the region. Due to their capacity to hold extra water during heavy rainfall, these wetlands serve as a buffer for flood protection and an additional source of fresh water during heatwaves. Additionally, this blue-green infrastructure helps promote vegetation growth, reduce urban heat temperatures, control erosion, increase sponge function and build resilience for extreme weather conditions of flood and drought. More importantly, this area houses species of endangered vultures and provides refuge to migratory birds such as the long-billed Godwit already classified as vulnerable and is on the verge of becoming endangered. Another major wetland specialist, Greater Flamingos, are found to feed, roost and nest in these wetlands; hence any change or loss in their habitat is considered a significant threat to their population (Kumar and Rana 2021). Losing certain species from the food web can have irreversible impacts on ecosystem functions and the long-term sustainability of ecologically sensitive areas.

Local communities in *Basai* village and neighbouring areas benefit greatly from these wetlands as they continue to produce many ecosystem goods and services, such as improving soil fertility in the surrounding agricultural land, providing food for both wild and domestic fauna, producing oxygen, storing carbon and improving water quality. Besides that, these wetlands serve the needs of these rural people who depend upon this invaluable natural resource for extracting raw materials, food, fodder and medicines. Also, they contribute greatly towards poverty reduction by providing opportunities for income for women residing here, enabling them to be self-dependent. To negate the harmful effects on their livelihoods, local people can play a significant role in conserving the depleting wetlands at *Basai*. Conscious efforts from aware citizens in nature conservation programs by forming local rules and regulations for the area as well as making committees or registered

Fig.2: Basai Wetland Area, Gurugram
Source: Google Earth Image

trusts to represent the village society in the decision-making process can bring tremendous change in the governance model our cities have right now.

Protecting City Greens for Smart-Sustainable-Healthy Cities

Central Government's Smart Cities Mission (SCM) initiative by the Ministry of Housing and Urban Affairs was launched with a central objective of promoting cities that provide core infrastructure, decent quality of life and a clean and sustainable environment to its citizens. A vision to assess overall performance, the Quality of Life, Economic Ability and Sustainability formed the three pillars of 'Ease of Living Index Framework 2019' constituting 79 indicators (MoHUA 2019). The third pillar 'Sustainability' aims at realizing the need for greener cities which in turn depends greatly on water quality, total tree cover, air quality index and availability of green spaces. As mentioned earlier, due to changing climatic conditions, dry conditions are likely to increase in India even during Monsoon. Maintaining optimum levels of underground water table is important to ensure enough water supply for the residents of the city. *Basai* wetland, being the major source of groundwater recharge in maintaining Gurugram's hydrological balance qualifies to be one of the richest landscape resources with obvious indicators of environment sustainability criterion for Smart City Assessment Process.

Fig.3: Painted stork, a near threatened species at Basai wetland, Gurugram
Source: https://commons.wikimedia.org/wiki/File:MyPicsSpeaks-DSC1087.jpg

Fig.4: Bar-headed geese, migratory birds flocking at Basai wetland, Gurugram
Source: https://commons.wikimedia.org/wiki/File:Migratory_Birds_in_Basai_Wetland.jpg

The Way Forward

The National Green Tribunal has directed every state government to ensure the sustainable use of its resources. In this particular case, the Haryana state government's role is to proactively take steps to combat the long-term effects on the ecological processes caused by real-estate infrastructure development projects in this area responsible for the rapid shrinkage of *Basai* wetland zone. To start with, new knowledge generated from ecosystem services assessment studies and technological advancements in the field for monitoring the health of these sensitive ecosystems can be used to strengthen the legal and policy framework for management and governance. Secondly, by recognizing and tapping the traditional Indian local knowledge and indigenous practices, the concentrated efforts towards biodiversity protection by the local residents can prove to be lucrative in ensuring the resilience and sustainability of the region.

REFERENCES

Books

Krishnan, Pramod, Rajesh Ramakrishnan, Sushil Saigal, Shailesh Nagar, S Faizi, H S Panwar, Subrata Singh, and Nimesh Ved. Conservation Across Landscapes: India's Approach to Biodiversity Governance. New Delhi, India: United Nations Development Programme, 2012.

Singh, J S, S R Gupta, and S P Singh. Ecology Environment and Resource Conservation. 1st ed. New Delhi, India: Anamaya Publishers. 2006.

Internet

Chaturvedi, B. "Wetland in Gurugram is a perfect example of what is wrong with India's urban Planning." April 14, 2019. Accessed May 24, 2023. Available online: https://scroll.in/article/913129/gurgaons-residents-are-opposing-efforts-to-conserve-the-basai-wetland-and-thereby-hangs-a-sad-tale.

WMO Update: Prepare for El Nino. May 03, 2023. Accessed May 23, 2023. Available online: http://public.wmo.

int/en/media/press-release/wmo-update-prepare-el-ni%C3%B1o.

Journals

Kumar, Amit, and Sarita Rana. "Population and conservation threats to the Greater Flamingos Phoenicopterus roseus (Aves: Phoenicopteriformes: Phoenicopteridae) at Basai Wetland and Najafgarh Jheel Bird Sanctuary, Haryana, India." Journal of Threatened Taxa 13, no. 7 (2021): 18894-18898. https://doi.org/10.11609/jott.6258.13.7.18894-18898.

Rai, Deepak, Girish Chopra, Rakesh Gulia, and Parveen Vats. "Avian Diversity of Basai Wetlands, Haryana (India): An IBA Site." J. Exp. Zool. India 20, no. 1 (2017): 109-117.

Sen, Swatilekha and Sanat Kumar Guchhait. "Urban Green Space in India: Perception of Cultural Ecosystem Services and Psychology of Situatedness and Connectedness." Ecological Indicators 123 (2021):107338. https://doi.org/10.1016/j.ecolind.2021.107338.

Solanki, Vipin, and Aparna Joshi. "Disappearing Wetland: A Study of Basai Wetlands, Haryana, India." International Journal of Economic Research 14, no. 20 (2017): 681-691.

Reports

MoHUA. Ease of Living Index 2019 Assessment Framework https://smartnet.niua.org/eol19/ease-of-living.php.

Ar. Poonam Saini (A15187), a Landscape Architect with an experience of more than two decades in the industry, is currently enrolled as a PhD Scholar at the Department of Landscape Architecture, School of Planning and Architecture, New Delhi. Her areas of interest are Urban Landscapes, Architectural Heritage, Climate Action, Sustainable Landscapes, Environmental Education and Ecological Restoration.
Email: poonamsaini.ska@gmail.com

Dr. Aarti Grover (A15186)**,** possessing an experience of 21 years in academics, profession and research, is the Head of the Department in the Post-Graduate Course of Landscape Architecture at the School of Planning and Architecture, New Delhi. She was awarded as a trendsetter in the field of Architecture by the Times of India in March 2022. She has been on the Editorial Boards of important publications in India, Greece, Turkey and the Netherlands.
Email: a.grover@spa.ac.in

Deciphering Dimensions of Architecture Profession in the Context of Transforming Habitat Connections

By Ar. Shanthala V

Introduction

The aspect of change is inherent in all systems, but this is phenomenally evident in the way the physical environment is changing globally in the recent years. Fuelled by leaps in technological advancement, globalisation, and transformation of natural systems, the spatial characteristics of our cities, towns and villages have undergone significant change in the last few decades. Accelerated urbanisation processes especially in the Global South (McGee, 2009) has not only physically transformed our cities but also the city regions. The zone of influence of the urbanisation processes has impacted a much larger area, significantly transforming the social, economic, and environmental structures. These transformed situations have posed new design challenges of shaping the physical environment in cities, towns, and villages alike. Hence, the design profession dealing with sculpting the physical environment needs to realign its position to find relevance in this changing situation.

Interpreting Architecture

The notion of what comprises Architecture has evolved overtime. The horizon of base and scope of architectural knowledge has expanded and what was once perceived as an art and science of buildings and structures (Merriam-Webster.com, 2024) has evolved to account for the emerging larger physical environment. The conception of aesthetics and the engineering of structures are necessary for architectural ideas to translate into a physical reality. But at the same time, architecture also connects to various other aspects beyond a visually appealing physical form.

Renowned architect Norman Foster states "Architecture is an expression of our values- the way we build is the reflection of the way we live". The subtle nuances of existence and experiences reflect in this definition of architecture. Our values are also reflected in how every intervention becomes part of the larger whole. Architect B V Doshi interprets architecture as satisfying human needs in cultural terms. "The architect must give symbolic shape to institutions as it is these that provide social life with coherence and continuity. Even a humble tap on a corner becomes an institution" states architect Doshi (Curtis, 2015). This reinforces the need of a larger commitment on the part of the architecture profession where every element created, alters the existing balance and aims to achieve a new equilibrium. The intangible attributes modulate the tangible, and the tangible influences the intangible patterns and also create new patterns.

Design challenges in the current scenario

The necessity to accommodate evolving human needs for shelter using the available resources and technology has always been the primary architectural challenge. The value of an architectural outcome is perceived through its response to the contextual concerns.

Hence this study attempts to evaluate the social, economic, and environmental concerns and generate a framework to reflect the future challenges for the architecture profession. From a social perspective, achieving equity and inclusivity become important considerations in evolving the physical environment. Hence equal opportunity for all stakeholders is an important design objective. The disparity in economic

levels result in varying consumption patterns and choices which offer new design challenges. The concern for environment and the forces of climate change have compelled sensitive design outcomes to address these issues. From an environmental perspective, the flow of matter and energy is a crucial parameter (Montoya & Johari, 2020) to assess responsible physical environment. The architectural design solutions need to address these concerns which are critical for contemporary societies at the local and global level. Figure 1 summarises the way in which social, economic and environmental concerns translate into design challenges in a project. All these concerns shape the nature of architecture profession based on the design responses.

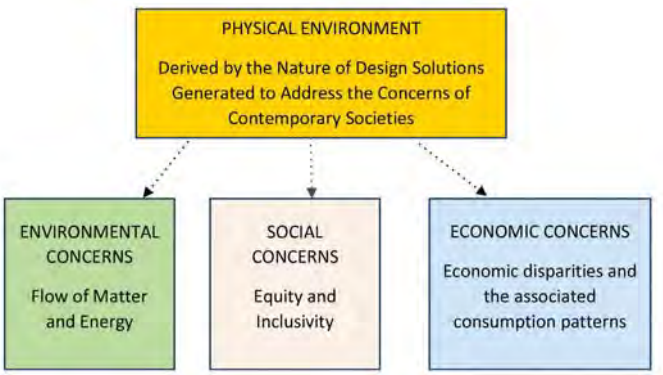


Figure 1: The contemporary factors which affect the design of the physical environment.
Source: Author

Translation of challenges to design responses

The intent of an architectural endeavour is to arrange meaningful spaces to invoke a sense of place in the experiences. It is about finding meanings to materials and their intersection with physical space for human use. In this enquiry, the design philosophy is informed by social, economic, and environmental considerations which determine the design intent. The choice of materials become the medium to translate the architectural idea into reality. As referred in Figure 2, architectural philosophy and the material choices intersect with the social, economic and environmental determinants which determine the architectural outcome. The environmental concern translates as to how material flows and energy flows are modulated in a design response. The evaluation here is not confined to the immediate site but within the larger system of interconnected events beyond the physical site.

Each of the design determinants have varying degrees of possibilities to which an architectural intent can respond to. For example, considering social concern as one of the determinants, the degree of inclusivity may be an architectural philosophy in the context of environmental sensitivity and economic viability. A strategy to use local materials and crafts may reinforce the inclusive nature of the project but may offer challenges of sourcing the right skill and resources. This generally increases the project cost, challenging the economic feasibility and hence determining what one consumes.

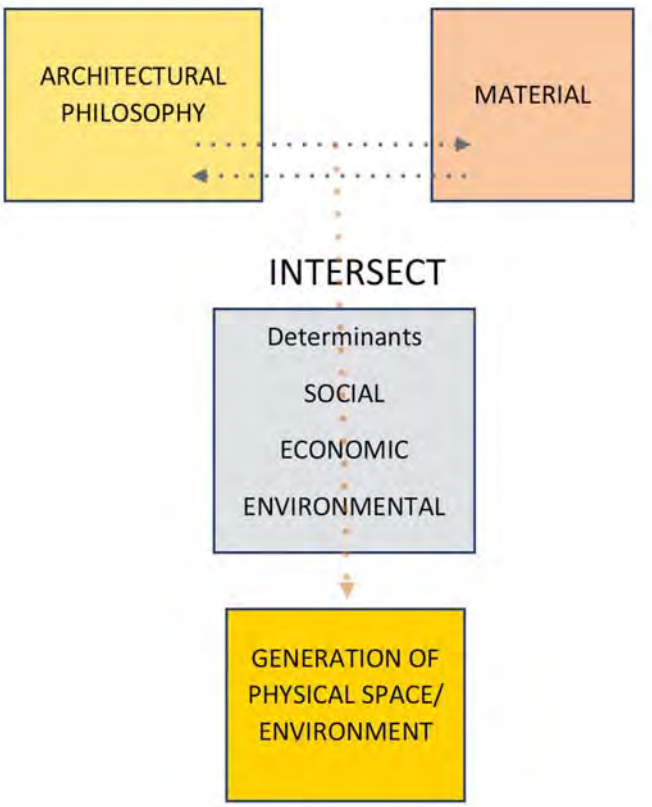


Figure 2: The translation of physical environment as an intersection of determinants.
Source: Author

From an ecological perspective, connecting materials consumed to their ecosystems and flows may be conceptualised, as theorised by Toledo (2013). Toledo identifies five processes by which materials consumed flow through the ecosystem - namely appropriation, transformation, circulation, consumption, excretion as represented in Figure 3. The architect through his/her design philosophy, takes a position with respect to each of these stages of material flow to make design decisions and incorporating suitable materials. These design decisions based on material interaction processes have a large implication on the social and economic systems. The design decisions and positions taken impact the institutions, social structures, and various other dimensions of the society. It also has implication on the laws, economic relations, perceptions and hence a multi-dimensional impact on the social, economic and ecological situations of the place.

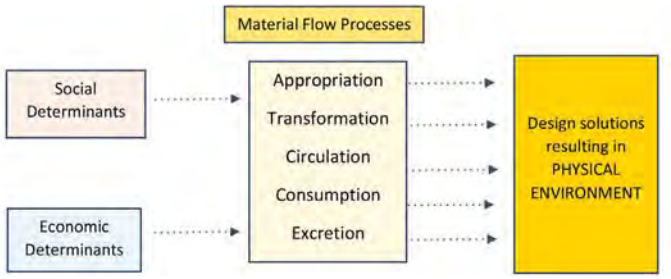


Figure 3: The processes involved in material interaction and its translation.
Source: Author

The impact of the profession

It is observed that a very limited percentage of the built environment is designed by architects, but nevertheless responsible architectural outcomes have always significantly influenced a larger section of society. Sensitive design responses have set precedents for the larger building culture of the place. Architecture profession along with generating the design outcome needs to instil these processes through the nature of spaces, material choices and preferences.

Sensitivity to material flows and preferences have also resulted in new economic opportunities. Preference to choose locally available materials reinforce the local economy while the material choices made from what is available in far off places sets large geographical footprints for the projects. Materials appropriated though recycling, further sets in new economies and reinforces sensitivity to the available resources. Thus, architects through their work, set precedents and a larger culture of choices and preferences for societies to follow and economies to benefit.

The physical environment reflects the spirit of time - physical presence of a multi-layered past (Vershinina & Kurbanov, 2017). Architecture as identification of place (Unwin, 1997) that inherently translates through the multiple representations of the physical and the manifestation of life in the space. The space does not confine to a thing of beauty, but an experience that resonates with the processes involved in the making of the spaces, positions taken, and preferences made. This is true of architectural interventions in the private realm and more profoundly in the public realm.

Planners and architects hold enormous power in the production of space where a "designed space" translates into "perceived space" which then emerges as "lived space". Perception of space reinforces the inclusive nature of space and augment resources for equitable distribution. The built design philosophies for larger societies instil distinct perceptions of design and hence, social processes. The lived space celebrates these valid design positions which set precedents for future building culture.

It is the idea of not only carving the physical space but also inculcating a building culture that is socially relevant that justifies economic relevance to communities through responsible environmental meanings.

Conclusion

The architecture profession should strengthen the human society to elevate itself from considering architecture to merely satisfy its basic needs at the bottom of Maslow's pyramid (Maslow, 1943). Architecture should aspire to satisfy the basic human need for shelter, offer safety and security supported with a caring community endowed with dignity of life and giving an opportunity for fullest expression of human potential in the inhabited space. Hence, an architect in the process of satisfying the need for shelter should attempt to satisfy all other levels of human needs and aspirations. The commitment of an architectural practice ought to address beyond the confines of the built form/building into a larger realm of the physical environment. Holistic comprehension of extending realms and relationships can strengthen the relevance of the profession. This will realign our perspectives, our aspirations and our commitment and responsibility as a profession to the society.

References

Curtis, W. J. (2015). *Balakrishna Doshi: An Architecture for India.* Ahmedabad: Mapin Publishing. Retrieved from https://issuu.com/mapin/docs/balkrishna_doshi/s/16427566

Maslow, A. H. (1943). Theory of Human Motivation. *Psychological Review*, 370-396.

McGee, T. (2009). *The Spatiality of Urbanisation: The Policy Challenges of Mega-Urban and Desakota Regions of Southeast Asia.*

Montoya, C. Y., & Johari, A. (2020). Urban Ecological Footprints. *Sustainable Cities and Communities,*.

Toledo, V. (2013). El metabolismo social: una nueva teoría. *Relac Estud History*.

Unwin, S. (1997). *Analysing Architecture.* New York: Routledge.

Vershinina, I. A., & Kurbanov, A. R. (2017). 8th LUMEN International Scientific Conference Rethinking Social Action. (pp. 992-1006). Suceava, Romania: LUMEN Conference Center & LUMEN Proceedings.

Shanthala V (A25755) is a practicing architect and researcher with specialisation in Habitat Design. Her extensive experience in academics for over 12 years and industry for over 10 years contributes to her critical thoughts about the profession. Her research interests involve habitat issues concerning city extensions, societies and communities, natural systems.
Email: shanthala.venugopal@gmail.com

STUDENT WORK

User Experience through Spatial Connectivity and Accessibility in Research Institutes

By Anamika Tiwari and Ar. Sayon Pramanik.

1. Introduction

The symbiotic relationship between architecture and human experience is an essential aspect in shaping the built environment. Architects hold the responsibility of not merely constructing spaces but curating experiences that resonate with the lives of individuals, influencing their well-being, behaviour, and overall satisfaction with the spaces. The design and layout of physical spaces and their connectivity play a crucial role in creating an interactive and engaging atmosphere. The spatial connectivity and accessibility determine the functionality and user flow, and affects the dynamic experience of the users within the spaces.

The design of a space goes beyond just the physical aspects and affects the intangible elements, particularly the experiences and emotions of people within that space (ASID, 2017). Architectural design, similar to user experience design, encompasses the thoughtful creation of spaces that not only serve functional purposes but also evoke emotional responses and engage users on an intense level. The design and utilization of physical spaces have a deep impact on individuals, influencing their physical health along with their emotional well-being (Ergan et al., 2018).

It's crucial to understand that user experience is highly subjective and varies significantly from one individual to another in different spaces or environments(Lentz, 2023). Some people can feel excitement and mystery in a maze that might make others feel fear. Emotional responses to design elements, colours, and overall aesthetics differ with the user. What may be visually appealing to one person might be uninteresting or overwhelming to another. For instance, the pastel colour palette can appear soothing to one, but can give boring and dull vibe to others, contrarily vibrant colours appear soothing to someone, but flashy to others. Understanding and accommodating this diversity in user experiences requires a user-centric design approach (Lentz, 2023).

It is significant to realize that individuals exist within enclosed structures for a substantial duration of their lives, that emphasizes the importance of understanding how these spaces impact personal well-being (Kwallek et al., 1997). The physical spaces and built form play a crucial role in shaping human behaviour, particularly in Institutional buildings. The environment with a more dynamic, engaging, and interactive learning approach has a great impact on student's active and experiential learning, rather than a more passive or theoretical approach (Alnusairat et al., 2021). Spatial configuration of the educational settings has a great impact on the experiences and performance of the students (Kishimoto & Taguchi, 2014). The layout of the workspace can either promote or hinder collaboration. In research institutes, open plans can encourage communication and teamwork, while private offices may promote focused individual work. Striking the right balance is crucial for overall productivity. A well-designed flow can promote intuitive navigation, reducing stress and enhancing the overall user experience. Thoughtful placement of communal areas, private spaces, and recreational zones can create a balanced environment that caters to various needs and activities.

Historically, architects primarily emphasized the functional and morphological aspects of a space, focusing on creating structures that were efficient, aesthetically pleasing, and met the functional

needs of their inhabitants. However, in recent decades, a discussion has been initiated about its phenomenological aspect of a space (Lee, 2022) there remains a notable gap in research concerning the user experience and emotion in the architectural domain (Cho & Kim, 2018).

This study tries to give an understanding towards User Experience in architecture through a systematic literature study. Further this article explores the significance of designing a research institute emphasizing user experience of accessibility and spatial connectivity.

2. Literature Review

What makes spaces different can be attributed to a combination of both the physical attributes of the space and the subjective experiences that unfold within them. It is the interplay between the tangible aspects of a space and the intangible, yet powerful, human perceptions that occur within it. The concept of a user experience within a space encompasses the way people engage with and perceive their surroundings. It involves the interactions, emotions, and memories evoked by a space (Rahimi et al., 2018).

O'Sullivan & Spangler (1998) has mentioned that users undergo a three-stage journey while engaging with spaces - before, during, and after their participation. The initial stage, known as pre-experience, becomes a mental canvas where users paint an initial picture of what the upcoming participation might be like. Factors such as cultural background, personal preferences, and past experiences contribute to shaping expectations during this stage. The second stage, known as participation, is the core of the experience when the user is actually involved in the event. The level of interactivity and the quality of engagement significantly impact the overall user experience. This stage is where the intended value of the experience is realized and translated into meaningful moments for the user. Post-experience, being the final stage, is concerned with the impact of the experience which continues to influence the user beyond the immediate participation. Memories, lessons learned, and changes in perspective become part of the user's extended narrative of the experience. These three stages are the crucial part of the spatial experience. (see figure 1).

Figure 1: Stages of User Experience
Source: Adventurelab Studio, 2020

The concept of user experience of spaces is shaped by three interconnected systems that collectively contribute to the stages of experience mentioned by O'Sullivan & Spangler (1998). The first system is the physical system of experience, which encompasses the tangible and concrete elements of a space. This system is rooted in the actual physical setting, including architectural design, spatial layout, and environmental features. The shape of the space, the degree of enclosure, and other architectural components play a crucial role in shaping diverse experiences for the users. For instance, a well-designed open-concept space might evoke a sense of freedom and connectivity, while a more enclosed and intimate setting may generate feelings of coziness and privacy (Ching, 2007; Cho & Kim, 2018; Ergan et al., 2018, 2019; Mya Nanda Aung, 2020; Salima et al., 2023; Shahriari, 2019).

The second system is the perceptual system, which is responsible for how individuals perceive and interpret the information within a space through various senses. Theorists and architects like Juhani Pallasmaa, Peter Zumthor, Kengo Kuma, and Yi-Fu Tuan emphasize the importance of engaging the entire range of bodily senses rather than portraying the sensory experience for visual senses only (Lee, 2022). For instance, texture of a material can significantly alter the tactile experience within a space; running one's hand across a smooth, cool marble surface versus tracing the intricate patterns of a coarse, wooden texture, both evoke a distinct tactile sensation (Ching, 2007; Cho & Kim, 2018; Ergan et al., 2018, 2019).

The third is the psychological system of user experience. This system focuses on the psychological and emotional impact of physical settings after the information has been perceived by the individual. The emotional and cognitive responses generated by the architectural environment contribute significantly to the overall user experience. However, it is challenging to establish a systematic method for precisely measuring the influence of specific architectural design features on user's satisfaction levels (Ergan et al., 2018) as the perceptual and psychological systems are inherently subjective and vary for each individual (Ching, 2007; Cho & Kim, 2018; Ergan et al., 2018, 2019).(see Figure 2).

While the perceptual and psychological aspects are more challenging to quantify, optimizing the physical system can provide a foundation for achieving the intended psychological effects. A well-designed and

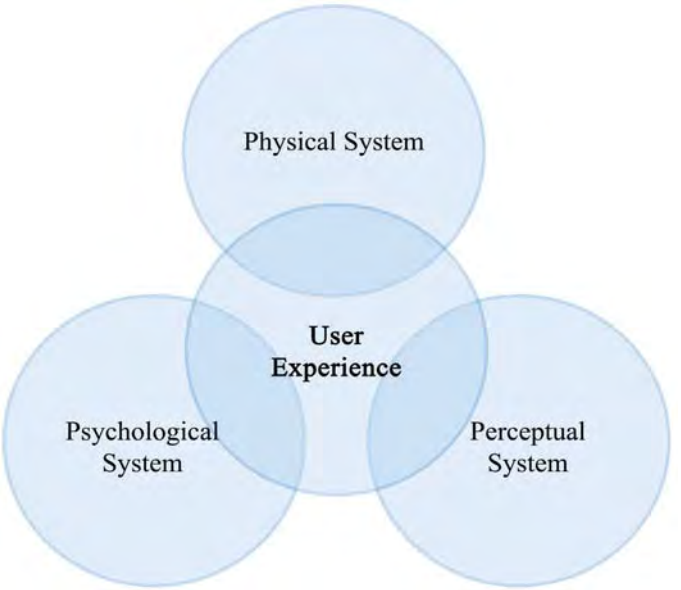


Figure 2: Systems of User Experience
(Source: Author)

thoughtfully arranged physical environment can influence mood, behaviour, and overall satisfaction (ASID, 2017).

3. Parameters of User Experience

Various physical aspects affect the experience within a space. For quantifying the User experience, there are several parameters identified through literature that are mentioned in Table 1. The physical spaces have a considerable influence over human experiences, impacting factors like work motivation, stress levels, and overall enjoyment. Even subtle variations in the configurations of architectural design features can have a significant effect on the resulting human experiences (Zou & Ergan, 2020).

In the specific context of a Research Institute, accessibility and spatial connectivity emerge as particularly prominent parameters that significantly influence the overall user experience. This observation

Table 1: Parameters of User Experience
(Source: Ching, 2007; Cho & Kim, 2018; Ergan et al., 2018, 2019; Mya Nanda Aung, 2020; Salima et al., 2023; Shahriari, 2019)

Parameter	Description
1. Light	The presence and absence of natural and artificial light and their intensity affects the stress level and changes the experience of perceiving form, colour, texture etc.
2. Visibility and Visual Connection	The visibility from a particular point determines the visual connection between spaces and elements.
3. Unobstructed view and Visual movement	Unobstructed view refers to the reduced no. of visual barrier in a space and determines the ease or difficulty of visual movement from one point to another.
4. Visual Privacy	The visual privacy of a space can be determined by the exposure of the space. The high exposure of a space refers to the higher visibility and minimizes the visual privacy.
5. Visual attention	Visual attention determines which point of the space the observer will notice at the first glance and which will they ignore. It identifies the more accurate locations in a space to place prominent elements.
6. Enclosure	Enclosure of a space refers to how much open or enclosed it is. It determines how free or bounded a person feels in a space.
7. Relative distance	Relative distance is the distance between two points. Analysing this can provide the adequate distance to place different functional spaces and control the physical approach to the spaces.
8. Spatial Connectivity and accessibility	This refers to the connectivity of the space based on their functional requirements and the sequence a user will follow in order to access those spaces.
9. Depth of Space	The spatial depth refers to the number of all other space a user passes through to reach the intended destination.
10. Psychological Parameters	Different design features that provoke different emotions and a slight change in them can change the whole experience. This is a qualitative aspect and cannot be quantified using simulation or analysis tools, rather it requires the human input and participation to understand the psychological effect of different design features. The methods include ethnographic study, scales, survey and questionnaire etc.

is supported by research conducted by the American Society of Interior Designers (ASID), which sheds light on the crucial role of the physical workspace in shaping the social environment and engagement levels of individuals within the office setting. ASID's investigation reveals that users, including researchers and staff in a Research Institute, spend almost a half portion of their conscious daily hours within their workspace (ASID, 2017). This emphasizes the importance of creating an environment that not only facilitates work tasks but also contributes to the well-being and productivity of individuals.

When spaces are easily accessible and well-connected, researchers are more likely to engage with their surroundings and with each other. This engagement encourages a sense of attachment to the workplace, creating a positive and collaborative atmosphere that can enhance the overall research experience (ibid).

4. Accessibility and Spatial Connectivity in Research Institutes

4.1 Significance of Accessibility and Spatial Connectivity

Research institutes play a significant role in advancing human knowledge, driving innovation, and addressing complex challenges across various fields. In these institutions, the teams of scientists, scholars, and experts collaborate to explore new theories, conduct innovative studies, and develop solutions that shape the future. Interaction of users is necessary in research institutes for the exchange of ideas. Designing the spatial configuration and connectivity of a research institute that accommodates a vast combination of users from scientists and research scholars to common public and visitors, involves a thoughtful design process. The spatial configuration and connectivity in these institutes should enhance the overall user experience, encourage collaboration, along with segregation and connectivity of the spaces as per user flow.

Certainly, understanding the space in relation to human behaviour is not only concerned about the individual properties of a space but also the relation and interaction between various spaces within a given layout. It extends beyond dimensions, structures, and aesthetics to explores the way these spaces are connected, the choices and sequence offered while moving through the spaces, and how their configurations influence human movement (Hillier & Tzortzi, 2006) as moving through a space is not just reaching the destination, it goes beyond the simple navigation, and involves the dynamic interaction with the spaces, shaping the overall experience. (Basyazici & Alpturer, 2013) A strategic approach to organizing physical spaces to enhance both functionality and the overall user experience within a research institute contributes towards achieving the balance of privacy and user interaction. It requires a careful consideration of human behaviour, user flow within the spaces, accessibility, and functionality. Enhanced user engagement in the workspace is a result of the seamless ease of interaction (ASID, 2017).

4.2 Methods to analyse Accessibility and Spatial Connectivity

Visualizing the spatial relationships among different spaces can be effectively achieved through justified graphs. In this graph, the vertical levels convey the depth of each space, offering a clear depiction of how integrated or segregated a space is. An integrated space is characterized by a shallow graph, whereas a segregated space exhibits a deeper graph (Hillier & Tzortzi, 2006).

Another method is integration that serves as an index of space centrality or accessibility, with higher values signifying a centrality within the system. Strong connectivity and high accessibility are depicted by the higher mean integration value. The integration value, as defined by Hillier and Hanson (1984), proves valuable in the analysis of accessibility within a spatial configuration. Connectivity, another index in space syntax, refers to the number of links connecting a space to others. Spaces with greater connectivity have numerous connections to other spaces, while those with limited connectivity are considered independent. Higher mean connectivity (MC) across all spaces suggests a network with greater connections, loops, and diverse choices of route for movement (Kishimoto & Taguchi, 2014).

These methods can be used to analyse the accessibility and spatial connectivity of any given building. The subjective aspect of user experience requires the input from the users in the form of surveys, questionnaires, interviews etc to understand the individual experience of a space.

5. Conclusion

This article has tried to explore the understanding of user experience through literature study, and tries to establish a base on user experience in the field of architecture. A key revelation of this exploration is the identification of three distinct systems shaping user experience: the physical, perceptual, and psychological; among which the perceptual and psychological systems are entirely subjective and

vary for individuals, whereas physical systems can be quantified based on different parameters.

An important aspect of this study has been to investigate the significance of accessibility and spatial connectivity, particularly within research institutes. The configuration and connectivity of spaces within research institutes not only influences the efficiency of work processes but also significantly contributes to the well-being and satisfaction of the occupants. Adequate accessibility and spatial connectivity encourage collaboration, enhance communication, and facilitate knowledge sharing among researchers. Research institutions should invest in thoughtful spatial planning and accessibility of the spaces, acknowledging that the physical environment and built spaces play a significant role in shaping the experiences of researchers.

References

- Adventurelab Studio (2020). A better guest experience with a before-during-after strategy. *The Experience Economist*. Accessed in 2024 from: https://www.adventurelabstudio.com/2021/01/05/a-better-guest-experience-with-a-before-during-after-strategy/
- Alnusairat, S.; Ayyad, Y.; Al-Shatnawi, Z. (2021). Towards meaningful university space: perceptions of the quality of open spaces for students. *Buildings*, *11*(11). Accessed in 2024 from: https://doi.org/10.3390/buildings11110556
- ASID. (2017). Design Impacts Lives. *American Society of Interior Designers*.
- Basyazici, B., & Alpturer, M. I. (2013). A phenomenological study of spatial experiences without sight and critique of visual dominance in architecture. *Experiential Simulation: The Sensory Perception of the Built Environment*, 167–174. Accessed in 2024 from: https://www.researchgate.net/publication/321533731
- Ching, F.D.K. (2007). *Architecture - Form, Space, and Order* (3rd ed.). John Wiley & Sons, Inc.
- Cho, M. E.; Kim, M. J. (2018). Measurement of User Emotion and Experience in Interaction with Space. *Journal of Asian Architecture and Building Engineering* , *16*(1).
- Ergan, S.; Radwan, A.; Zou, Z.; Tseng, H.; Han, X. (2019). Quantifying Human Experience in Architectural Spaces with Integrated Virtual Reality and Body Sensor Networks. *Journal of Computing in Civil Engineering*, *33*(2). Accessed in 2024 from: https://doi.org/10.1061/(asce)cp.1943-5487.0000812
- Ergan, S.;;Shi, Z.; Yu, X. (2018). Towards Quantifying Human Experience in the Built Environment: A Crowdsourcing Based Experiment to Identify Influential Architectural Design Features. *Journal of Building Engineering*, *20*, 51–59.
- Hillier, B.; Hanson, J. (1984). *The social logic of space*. Cambridge University Press.
- Hillier, B.; Tzortzi, K. (2006). Space Syntax: The Language of Museum Space. In S. Macdonald (Ed.), *A Companion to Museum Studies* (pp. 282–301). Blackwell Publishing Ltd.
- Kishimoto, T.; Taguchi, M. (2014). Spatial configuration of Japanese elementary schools: Analyses by the space syntax and evaluation by school teachers. *Journal of Asian Architecture and Building Engineering*, *13*(2), 373–380. Accessed in 2024 from: https://doi.org/10.3130/jaabe.13.373
- Kwallek, N.; Woodson, H.; Lewis, C. M.; Sales, C. (1997). Impact of three interior color schemes on worker mood and performance relative to individual environmental sensitivity. *Color Research and Application*, *22*(2), 121–132. Accessed in 2024 from: https://doi.org/10.1002/(SICI)1520-6378(199704)22:2<121::AID-COL7>3.0.CO;2-V
- Lee, K. (2022). The Interior Experience of Architecture: An Emotional Connection between Space and the Body. *Buildings*, *12*(3). Accessed in 2024 from: https://doi.org/10.3390/buildings12030326
- Lentz, E. (2023, May 8). *Decoding User Experience: Objective and Subjective Perspectives*. Artversion. Accessed in 2024 from: https://artversion.com/blog/decoding-user-experience-objective-and-subjective-perspectives/
- Mya Nanda Aung, A. (2020). Relationship between enclosure ratio and emotional experience on Shwedagon Complex. *International Journal For Innovative Research In Multidisciplinary Field*, *6*(1).
- O'Sullivan, E. L.; Spangler, K. J. (1998). *Experience marketing : strategies for the new millennium*. Venture.
- Rahimi, F. B.; Levy, R. M.; Boyd, J. E.; Dadkhahfard, S. (2018). Human behaviour and cognition of spatial experience; a model for enhancing the quality of spatial experiences in the built environment. *International Journal of Industrial Ergonomics*, *68*, 245–255. Accessed in 2024 from: https://doi.org/10.1016/j.ergon.2018.08.002
- Salima, M.; Bada Yassine; Hocine, B. (2023). Impact of the Degree of Enclosure on the

Use of In-between Spaces in Residential Neighbourhoods The case of Béjaia, Algeria. *International Review for Spatial Planning and Sustainable Development*, *11*(1), 122–140. Accessed in 2024 from: https://doi.org/10.14246/irspsd.11.1_122

- Shahriari, F. (2019). *Space Syntax: The difference between 'Depth' and 'Distance' in architecture*. Accessed in 2024 from: https://www.linkedin.com/pulse/space-syntax-difference-between-depth-distance-farzane-shahriari/
- Zou, Z.; Ergan, S. (2020). Impact of Design on Human Experience: Evaluating Space Preferences in Interior Design Alternates Presented in a Crowdsourcing Platform. In *Construction Research Congress 2020* (pp. 905–914).

Anamika Tiwari is a fifth year B.Arch. student at National Institute of Technology, Raipur. Her interests lie in architectural visualization and function-based designs. She is always eager to explore the connection between human and spaces, and believes in a user-centric approach of architecture.
Email: anamikatiwari259@gmail.com

Ar. Sayon Pramanik (A23303) is an architect and urban designer. He is currently Assistant Professor at National Institute of Technology, Raipur. Having a specialization in space syntax and soundscape analysis, his interests lie in urban morphology, streetscape, and urban landscape.
Email: spramanik.arch@nitrr.ac.in

Evolution to Innovation:

Embracing Biomimetic Materials and Nature-Inspired Strategies for Sustainable Construction

By Ar. Lokesh J, Ar. Prajwal and Dr. Sharmila Jagadisan

1. Introduction

Inherent in our human nature is a deep connection with the natural world, compelling us to mimic its shapes and functionalities to fulfill our needs. While biomimicry structures abound in our surroundings, a critical examination of their quality is imperative for ongoing enhancement. This exploration delves into the evolution of design, shedding light on historical progressions and influences that shape contemporary creations. Recognising the dynamic interplay between functionality, purpose and aesthetics, this study underscores the significance of informed decision-making, innovation and an understanding of adaptations over time. In the realm of construction, where environmental concerns loom large, this project's focus on sustainable materials aligns with global goals, contributing to responsible consumption and production. Beyond environmental impact, the study's implications extend to economic viability, occupant well-being and cross-disciplinary technological innovation, offering a holistic approach to address the challenges faced by the construction industry and beyond.

2. Objectives

- Evolution: Every form, shape, concept, idea, etc., can be traced back to inspiration from nature. To gain historical insights, recognising influential factors, identifying challenges, promoting innovation, assessing adaptability, facilitating knowledge transfer and anticipating future trends to inform proactive approaches in the construction industry.
- Investigate waste generation: To analyse the extent and causes of waste generation in the construction industry, with a focus on understanding the areas which use non-reusable, non-recyclable or non-degradable materials, to propose better sustainable materials for the future.
- Explore biomimetic materials: To examine the potential of microorganisms like bacteria, fungi, algae and others in the development of sustainable construction materials.
- Promote sustainability: To emphasise the nature of sustainable construction, incorporating environmental responsibility, economic viability and occupant well-being in design and construction practices.
- Expand biomimicry in construction: To explore the underutilised potential of biomimetic materials in the construction industry, extending beyond architectural aesthetics to functional and structural components.
- Leverage technology: To use advanced technology like 3D printing and AI to better understand and replicate natural systems for sustainable construction materials.
- Foster interdisciplinary collaboration: To bridge the existing gap between construction and biology by encouraging collaboration among experts from various fields, including design, construction and biology and to find innovative ways to connect these disparate fields, with the goal of creating superior, more sustainable construction materials and practices.

3. Limitations

Implementing nature-inspired solutions in architecture and construction is a challenging endeavor due to several factors. Firstly, nature's designs are often incredibly complex, involving intricate systems and materials that are not easily replicated with current technology and building practices. This complexity requires extensive research and interdisciplinary collaboration between architects, biologists and engineers, which can be difficult to coordinate and sustain. Additionally, the initial costs of developing and testing biomimetic materials and structures can be significantly higher than those of conventional methods, posing financial barriers. Moreover, integrating these innovative solutions into existing regulatory frameworks and building codes can be problematic, as they are typically designed around traditional.

- Complexity of biomimicry: Biomimicry involves complex natural systems, which can be challenging to understand and replicate accurately. The complexity of natural systems may limit the speed and success of implementing biomimetic solutions in construction.
- Cost and investment: Developing and implementing sustainable construction materials and practices, especially those based on biomimicry, can require significant research and development costs. The initial investment may be a barrier for some construction projects or companies.
- Resistance to change: The construction industry has established practices and materials. Resistance to change within the industry can be a significant limitation to the adoption of innovative and sustainable alternatives.
- Time-intensive research: Understanding and replicating natural systems for construction materials can be a time-consuming process. It may take years of research and development before practical applications can be realised.
- Limited availability of expertise: Interdisciplinary collaboration is vital for the success of such a project. However, there may be a limited pool of experts with knowledge spanning design, construction and biology, making it challenging to find the right talent for these projects.
- Market acceptance: The market's willingness to accept and pay for sustainable construction materials is crucial. If consumers or clients are not willing to invest in sustainable building materials or technologies, it can hinder the project's success.
- Scale of implementation: Successfully implementing sustainable construction practices and materials at a large scale across the industry can be a logistical challenge. Achieving broad adoption and impact may take time and effort.
- Ethical considerations: There may be ethical concerns associated with the use of certain biomimetic materials or practices, especially if they involve genetically modified organisms or other potentially controversial approaches.

4. Literature Review

As per the Table 1, it is evident that biomimicry can significantly reduce energy consumption in buildings, particularly in skin design, as demonstrated by Nagy & Osama (2016). The rapid development of construction biotechnology, highlighted by Volodymyr (2017) suggests promising advancements in sustainable building materials through microbial processes. Rossin's (2010) comparison of natural and architectural design processes underscores the efficiency and sustainability of biomimetic approaches. Nature-inspired design principles, as discussed by Virmani (2016), can enhance the sustainability of architectural practices. Leena and Pradeep (2019) emphasise the potential of biomimicry to foster a more sustainable built environment. The educational perspective provided by TavsanFiliz, Tavşan and Sonmez, (2015) highlights biomimicry's motivational potential for students. Peter, Aigbavboa and Akinradewo (2021) highlight the environmental benefits of bio-concrete and other biotechnological products. Kaiser, Wang and Hazell (2022) review points to the resilience and sustainability of bio-inspired materials. The promise of construction biotechnology for sustainable buildings is further supported by Fakruddin and Shishir (2023). Ikshita, et al (2022) explore the integration of biomimetics with modern technologies like 3D printing. Stuart-Fox, et al (2023) identify significant challenges and opportunities in designing bio-informed sustainable materials. Neri Oxman's "Aguahoja" (Neri, 2020) project showcases the potential of biodegradable materials for sustainable design. Lastly, the study by Saad, Othman and Alamoudy (2022) on construction waste generation highlights the need for strategies to reduce material waste in the construction industry. These insights collectively suggest that while biomimicry presents substantial benefits for sustainable architecture and construction, it also requires overcoming significant technical, educational and regulatory challenges.

Table 1: Review of literature
Source: Compiled by Author

LITERATURE	SUMMARY	INFERENCE
1. Biomimicry, an Approach for Energy Efficient Building Skin Design (Gehan. & Nouran, 2016)	Investigating the ability of reducing energy consumption by applying the biomimicry approach on building skin design.	Understanding the examples of notable biomimicry projects. Relating how biomimicry is implicated and how it helps solve the problem.
2. Construction Biotechnology (Stabnikov, 2017)	Construction Biotechnology, an emerging scientific and engineering discipline currently focuses on to include selecting microorganisms and developing processes for microbial-mediated construction, leading to low-cost, sustainable and environmentally friendly microbial Bio cements and bio-grouts.	Future developments of Construction Biotechnology- how biotechnology can help in making better materials for construction, which helps in achieving sustainability.
3. Biomimicry: nature's design process versus the designer's process (Rossin K. J., 2010)	Integrating biomimetic approaches into design processes, exploring nature's database for sustainable solutions. Nature's unique problem-solving approach. It compares nature's design process to Architect's design process.	Understanding how nature works and how it benefits humankind. Every designer can think of a problem in the way nature thinks, how would nature solve the problem, the same way a designer needs to solve problems and achieve sustainability.
4. Biomimicry as a tool for sustainable architecture design (El Ahmar, 2011)	How nature-inspired design principles can enhance sustainability in architecture. The paper discusses the application of biomimicry to derive innovative and environmentally friendly solutions for architectural challenges.	Studying buildings inspired by biomimicry, how they have replicated form, function and materials from nature. Comparing biomimicry adaptations versus traditional construction methods.
5. Biomimicry: An Approach to Sustainable Architecture and Design (Fukey & Pradeep, 2019)	Bringing about the awareness of 'Biomimicry', a concept of adopting nature's principles and its application in the fields of architecture, engineering and science to help create a more sustainable built environment for future generations.	Benefits of biomimicry in architecture and Scholars' Opinions on Biomimicry
6. Biomimicry in Architectural Design Education (Tavsan, Tavşan, & Sonmez, 2015)	Different points of view about design and showed students how the Design and Nature interaction influenced each other. As a result of the study, the indications support the case that analogies aroused interest and wonder and increased motivation	How design can be achieved through biomimicry, trying to understand and face the problems of adapting biomimicry since it is a new field of research in the construction industry. Concept to reality.
7. Intervention of Biomimicry for Sustainable, Construction (Adekunle, Aigbavboa, & Akinradewo, Intervention of Biomimicry for Sustainable Construction: The use of Bio-Concrete, 2021)	The use of materials such as bio-concrete increases environmental impacts exponentially. One of the major benefits of bio-concrete is that it is self-healing and it increases the effectiveness of any project design	Different biotechnological products and biotechnologies applied to civil engineering are being developed in that direction. Decrease in production costs, use of waste in secondary processes, increased quality and useful life of the materials obtained are considered in the process.
8. From biology to biomimicry: Using nature to build better structures A review (Ahmed, Wang, & Hazell, 2022)	Current research on bio-inspired novel cementitious composites, bacteria-enhanced materials, building envelopes and facade systems, advanced manufacturing processes and their applications are discussed	The application of bio-inspired materials and structures can bring numerous benefits such as better resilience, sustainability, energy conversation and environmental friendliness.
9. Construction Biotechnology: The Promise of Sustainable Buildings (Md. & Shishir, 2023)	Construction Biotechnology is a new scientific and engineering discipline that has been developing exponentially during the last decade. In this biotechnology-based construction, microbially treated construction materials are used. The bio-agents used in construction biotechnologies are pure or enriched with cultures of native microorganisms or microorganisms isolated and activated from the soil	The reduction of the environmental impact of the conventional production of construction materials, together with a decrease in production costs, use of waste in secondary processes, increased quality and useful life of the materials obtained are considered in the process.
10. Biomimetics and 3D printing - Opportunities for design applications (Ikshita, Jandyal, Wazir, Raina, & Ul Haq, 2022)	How biomimetics can be better augmented with the design of various engineering systems.	History and evolution of biomimicry, how to achieve biomimicry using technology like 3D printing and engineering.
11. Challenges and opportunities for innovation in bio informed sustainable materials (Devi Stuart-Fox, 2023)	Nature provides a rich source of information for the design of novel materials; yet there remain significant challenges in the design and manufacture of materials that replicate the form, function and sustainability of biological solutions. Key challenges and promising approaches to the development of materials informed by biology were identified	While curated, annotated and georeferenced databases can improve access to accurate biological information and link it to specific environments, the consideration regarding how this information is integrated into the design process is also essential. Conventional bioinspired materials design focuses on a particular biological example or material property as the basis for narrow optimisation of a specific property or function.
12. Aguahoja pavilion (Oxman, 2021)	"Aguahoja" is a visionary project at the MIT Media Lab's Mediated Matter group. It explores sustainable design through the use of biodegradable materials like chitosan and cellulose, inspired by natural forms such as leaves and exoskeletons. This initiative aims to innovate architecture and manufacturing by promoting environmentally friendly practices and demonstrating the potential of biomaterials in creating resilient structures that harmonise with the environment.	Pioneers sustainable design by integrating biodegradable materials such as chitosan and cellulose, inspired by natural structures like leaves and exoskeletons. This initiative aims to transform manufacturing with eco-friendly materials that mirror nature's resilience and versatility. Beyond architecture and industry, "Aguahoja" sparks interdisciplinary collaboration in biomimetic design, highlighting biomaterials' potential for sustainable innovation and encouraging ongoing research in materials science and environmental stewardship.
13. Causes Influencing Construction Waste Generation During the Design Process: An Analytical Study (Saad, Othman, & Alamoudy, 2022)	Construction waste (CW) is the loss of materials that are produced during or after the construction process and has no remaining value.	Studying the amount and type of waste generated throughout the lifecycle of a building and finding ways to reduce the waste generation.

5. History

The history of biomimicry traces back to the dawn of human civilisation when the instinct to control, utilise and gain independence from nature was first observed (Figure 1). Ancient civilisations laid the foundation for this concept as people keenly observed and replicated natural phenomena in their designs and technologies. Early architectural elements, such as tree-inspired arches, serve as tangible examples of an incipient form of biomimicry. The journey of human dominance over nature began around ten thousand years ago with the Agricultural Revolution, liberating societies from the constraints of hunting and gathering and introducing the practice of food stockpiling for prolonged sustenance.

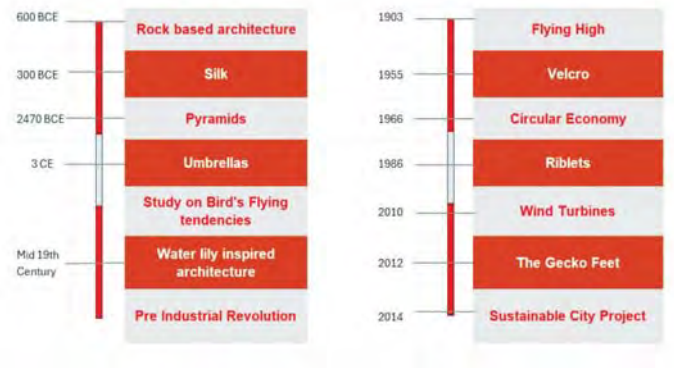


Figure 1: Historical overview of biomimicry
Source: Ikshita, et al, 2022; modified by Author

The term "biomimetics" was first introduced by Otto Schmitt in the 1950s for the derivation of ideas inspired by nature to solve real-life problems (Chaturvedi et al., 2022). The term "biomimetics" got officially added in Webster's dictionary in the year 1974 and is defined as the "study of the formation, structure, or function of biologically produced substances and materials (as enzymes or silk) and biological mechanisms and processes (as protein synthesis or photosynthesis) especially for the purpose of synthesising similar products by artificial mechanisms which mimic natural ones (Vincent, Bogatyreva, Bogatyrev, Bowyer, & Pahl, 2006).

Historical overview of biomimicry, beginning with pre-industrial revolution architecture utilising cut rocks and the biomimetic innovations like silk, pyramids and umbrellas. Post-industrial revolution developments include the Crystal Palace's structure, the Wright brothers' aircraft design mimicking bird flight and inventions like Velcro and the circular economy concept. Other examples are biomimetic applications in wind turbines and gecko-inspired adhesives and the Lavasa Corporation's biomimetic-based town project in 2014.

6. Application of biomimicry

Bio-concrete will save a considerable amount of money and will also give rise to environmental savings. This is achieved because given the volume of cement that will be needed to manufacture concrete discharges between 5% - 7% carbon dioxide. It is necessary to note that the bacteria used are the ones that produce spores, as ordinary bacteria won't survive in the harsh conditions. Bio-concrete are very tough building materials and can last for 100 years (Chereddy , Nerella , Madduru, & Venkatesh, 2019). Some applications of biomimicry in architectural projects are highlighted in Table 2.

Different biotechnological products and biotechnologies applied to civil engineering are being developed in that direction (Figure 2). The reduction of the environmental impact of the conventional production of construction materials, together with a decrease in production costs, use of waste in secondary processes, increased quality and useful life of the materials obtained are considered in the process. These issues, among others, constitute the main advantages of this technology (Fakruddin & Asaduzzaman, 2023). Some novel applications of construction biotechnology have been highlighted in Table 3.

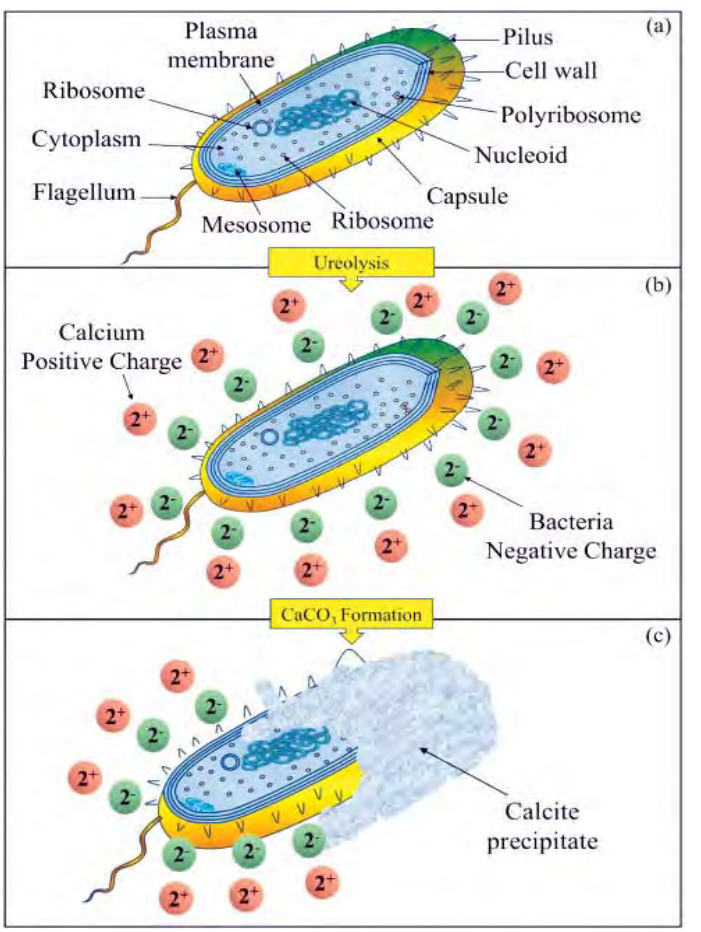


Figure 2: Bacterial infused self-healing concrete
Source: Rajadesingu et al, 2024

Table 2: Applications of Biomimicry in architectural projects
Source: Radwan & Osama, 2016

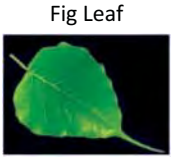
NAME OF THE BUILDING	INSPIRATION	APPLICATION IN DESIGN	PROBLEM SOLVED
Eiffel tower 	Thighbone 	-The outward flare resembles that of a femur bone. -The lattice is built from metal studs and braces.	-Withstands bending and shearing effects due to wind -Ventilation problem solved
National Aquatics Center, Bejing 	Water bubbles 	-The surface is covered with membrane of lit blue bubbles of pneumatic cushion created from ETFE allowing for the bubble effect.	-The bubbles collect solar energy that heats swimming pools. -Allows for temperature regulation.
Bejing International Stadium 	Birds Nest 	-Contains ETFE panels that insulate by stuffing small pieces of materials in the twigs. -Panels protect and provide sunlight filtration.	-Facade openings allow for natural ventilation -panels reduce the dead load supported by the roof. -cost reduction, durable and recyclable.
Eastgate Center, Harare 	Termite Mound 	The center opens and draws more air to help fans and is pushed up through ducts that are in the center of the building.	Temperature is regulated throughout the year with no need for HVAC systems.(Radwan & Osama, 2016)
HOK, Avasa, India 	Fig Leaf 	-Foundation stores water. -Drip tip system water to clean its surface.	-Responds to the seasonal flooding. -Moves excess water.

Table 3: Applications of construction biotechnology
Source: Fakruddin & Asaduzzaman, 2023

PRODUCT	MICROBIAL SOURCE	FUNCTION	REFERENCE
Sodium gluconate	*Gluconobacter oxydans* *Aspergillus niger* *Aureo basidium pullulans*	Set retarder; plasticizer; corrosion inhibitor used in concrete	(Ma, et al., 2015)
Xanthan gum	*Xanthomonas campestris*	Thickener and set retarder for self-consolidated concrete	(Plank, 2005)
Welan gum	*Alcaligenes sp.*	Thickener, set retarder for self-consolidated concrete	(Pacheco-Torgal & Jalali, 2012)
Scleroglucan	*Sclerotium, Corticium, Sclerotinia, Stromatinia*	Thermostable thickener	(Pacheco-Torgal & Jalali, 2012)
Succinoglycan	*Alcaligenes sp.*	High shear-thinner with temperature-induced viscosity	(Ma, et al., 2015)
Curdlan gum	*Agrobacterium sp.;* *Alcaligenes sp.*	Thickener; self-consolidated concrete	(Plank, 2005)
Bacterial cell walls	*Aerobic bacteria*	Micro-structured filler for concrete	(Pei, Liu, Wang, & Yang, 2013)
Carrageenan	*red seaweeds*	Foam for protecting freshly poured concrete from premature drying during highway construction	(Volodymyr & Stabnikov, 2017)
Pullulan	*Aureobasidium pullulans*	Thickener; self-consolidated concrete	Pacheco-Torgal and Labrincha, 2013
Biobrick	*Synecococcus sp.*	Re-inforced eco-friendly brick	Khitab et al., 2016
Bioinsulator	*Ganoderma lucidum* *Pleurotus ostreatus*	Low-cost insulator; foam sealing	Barberan et al., 2020

7. Case Study I - Aguahoja

Location: San Francisco Museum of Modern Arts. 2020. San Francisco, California (Aguahoja I).

Cooper Hewitt Smithsonian Design Museum. 2019. NYC, New York (Aguahoja II)

The Aguahoja Artifacts (Figure 3) seamlessly intertwine the principles of biomimicry and sustainable design, with a focal point on the deliberate utilisation of chitin. This natural polymer, abundantly found in crustacean (crab, prawn, shrimp etc.) exoskeletons and fungal cell walls, play the prominent role in artifact construction. By adopting chitin, the creators draw inspiration from nature's ingenious solutions, capitalising on its strength, lightweight properties and inherent biodegradability. This biomimetic material choice not only ensures sustainability but also reflects the dynamic adaptability observed in the natural world.

Figure 3: Aguahoja – exploration of nature's design space
Source: Oxman, 2018

Distinguishing themselves from conventional materials like steel and concrete, the Aguahoja Artifacts engage in a continuous dialogue with their environment. These biomimetic composites exhibit a remarkable responsiveness to external factors such as humidity and heat, mirroring the adaptive qualities of natural materials. This responsive nature not only contributes to sustainability by reducing the need for energy-intensive climate control but also introduces an element of seasonal transformation. The artifacts, akin to the fluid changes observed in nature, aesthetically and functionally adapt to their surroundings. The product, despite their emergent diversity, shares a standardised quality intricately linked to humidity. This feature, combined with their ability to disintegrate in water, closely mirrors the natural life cycle of organic materials. This emphasis on humidity-mediated qualities and the artifacts' eventual return to the ecosystem exemplify a commitment to zero wastage and a closed-loop system. In essence, the Aguahoja Artifacts stand as a testament to the harmonious blend of biomimicry and sustainable design, offering not only aesthetic brilliance but also a blueprint for a design philosophy aligned with the regenerative processes inherent in the natural world.

Crafted from biodegradable and sustainable materials, the innovative adaptive windows and facades draw inspiration from the Aguahoja Artifacts. Designed for optimal natural lighting and temperature regulation within any building, these elements showcase a transformative quality that allows for reproduction in any size or shape. By incorporating multiple layers, transparency can be easily adjusted, providing precise control over the inflow of natural light for a harmonious and energy-efficient interior. Rooted in biomimicry and committed to sustainability, these architectural features represent a breakthrough in design, offering a dynamic and eco-friendly solution to enhance the ambiance of any building. Figure 4 shows the 3D printing applications of plant derived cellulose.

Figure 4: 3D printed celluloses, A plant derivatives
Source: Oxman, 2018

To confront the dual challenges of climate change and global pandemics, there is a shift away from methane-rich production methods and their environmentally harmful construction technologies. Instead, the focus is on the development and deployment of robotic manufacturing platforms capable of harnessing renewable and biodegradable polymers. These platforms are instrumental in crafting multi-scale structures with intricate geometries (Figure 5), offering a sustainable alternative to conventional plastic-based manufacturing. The transition involves replacing plastic goods with bio-polymeric counterparts, facilitating biodegradation for temporary products and ensuring longevity for structures built to withstand the impacts of time and climate change. This innovative approach aligns with a commitment to ecological responsibility and resilience in the face of evolving global challenges.

8. Case Study II - Beijing Olympic Stadium

Location: Beijing, China

Architects: Herzog & de Meuron Architekten AG
Year of Construction: 2002-08
Building Type: National Sports Venue
Total Area: 250,000 sqm.
Total Weight: 45,000 Tonnes
Materials Used: Concrete, steel and ethyl tetrafluoroethylene, (ETFE) panel roofing

Figure 5: Structural skin prototypes
Source: Oxman, 2018

Related Challenges and Strategies:

- To provide thermal comfort in the stadium - the exterior shell and inflated cushions as a filler: Just as birds stuff (Figure 6) the spaces between the woven twigs of their nests with a soft filler, the spaces in the structure of the stadium are filled with inflated ETFE cushions (Virmani, 2016). On the roof, the cushions will be mounted on the outside of the structure to make the roof completely weatherproof. Whilst the rain is collected for rainwater recuperation the sunlight filters through the translucent roof providing the lawn with essential UV-Radiation (Fair, 2008). On the facade, the inflated cushions will be mounted on the inside of the structure where necessary, e.g. to provide wind protection. Since all of the facilities - restaurants, suites, shops and restrooms — are all self-contained units, it is possible to do largely without a solid, enclosed façade (King, n.d.). This allows natural ventilation of the stadium which is the most important aspect of the stadium's sustainable design (Bajaj, 2021).
- Provide the best possible spectator view from all directions - sight lines and spectator viewing: The almost circular footprint optimises the viewing and atmosphere by bringing all the spectators as close to the action as possible. The stands are designed without any interruption to evoke the image of a bowl (Bajaj, 2021). This evenly constructed shape serves to focus attention on the spectators and the events on the field. The human crowd forms the architecture. The facility provides good comfort, excellent views and a superb atmosphere. It will generate crowd excitement and drive athletes to outstanding performances (Fair, 2008).
- Complex structural challenges: The entire structure is constructed of steel and concrete with a combined weight of around 50,000 tonnes. Hence, Computer simulation, synchronised control and structure monitoring techniques were all used to ensure accurate operation, even unloading and timely observation. All these provided for a structure that mutually supported each other and converged into a grid-like formation - almost like a bird's nest with its interwoven twigs (Virmani, 2016).

Figure 6: Beijing Olympic stadium inspired by nest
Source: Author, 2024

9. Discussion

Humans have an inherent connection with nature, motivating us to emulate its shapes and functionalities to meet our requirements. Everything in our human-built environment incorporates nature-inspired elements, making them biomimicry structures or components. However, it's crucial to scrutinise the quality of these reproductions and explore opportunities for enhancement. Continuous assessment is necessary to refine and perfect biomimicry elements, ensuring they closely mirror the efficiency, sustainability and functionality observed in the natural world. Understanding design evolution provides valuable insights into the historical progression and influences shaping current creations. This knowledge not only illuminates design origins but also reveals underlying principles, innovations and challenges contributing to their present form. By comprehending design evolution, a deeper appreciation emerges for the intricate relationship between functionality, purpose and aesthetics. Examining each change in the evolution process enables us to leverage current technology and resources like biotechnology, 3D printing and AI for continuous improvement. Inter-disciplinary collaborative synergy seeks to harness the collective expertise of professionals from different disciplines, propelling the development of superior solutions that not only meet the rigorous standards of construction but also integrate the principles of biology to enhance sustainability in the built environment.

The construction industry is a major contributor to environmental issues, including resource depletion, waste generation and energy consumption. Biomimicry focuses on sustainable and potentially

recyclable materials and aligns with the urgency of conserving resources. It also helps in alignment with various Sustainable Development Goals (SDGs) set by the United Nations, such as Goal 11 (Sustainable Cities and Communities) and Goal 12 (Responsible Consumption and Production). It contributes to the global efforts to achieve these goals. Sustainable construction practices can lead to long-term cost savings, which is of interest to the construction industry and businesses. Reducing waste and adopting eco-friendly materials inspired by biomimicry can enhance economic viability. Biomimicry can help to focus on occupant well-being addresses growing concerns for healthy living and working environments, especially considering the COVID-19 pandemic, where indoor air quality and occupant health have gained prominence. Getting inspired from nature and with the use of advanced technology to replicate natural processes has broad relevance in fields beyond construction, including materials science, biotechnology and engineering. It can drive technological innovations with diverse applications. The need to bridge the gap between different fields is an ongoing challenge in many industries.

10. Conclusion

In conclusion, this article has explored the profound intersection of nature's wisdom and human ingenuity in the quest for sustainable construction practices. The construction industry's historic contribution to environmental issues has fueled an urgent need for innovative and eco-friendly alternatives. By delving into the realm of biomimetic materials and nature-inspired strategies, this study advocates for a paradigm shift toward sustainable evolution in construction. The historical overview unveiled a rich tapestry of biomimicry, tracing its roots from ancient civilisations to the contemporary era. Architects and designers have consistently drawn inspiration from nature's efficient designs, adapting and refining biomimetic principles over time. From early biomimetic elements in architecture to the transformative advancements witnessed in the modern era, the journey of biomimicry reflects an ongoing dialogue between human creation and the intricate systems of the natural world. The case studies, exemplified by the Aguahoja Artifact and the Beijing Olympic Stadium, provide tangible evidence of the feasibility and success of biomimetic applications in construction. The Aguahoja Artifact, crafted from chitin, showcases a harmonious blend of sustainability, adaptability and a closed-loop system, offering a blueprint for a regenerative design philosophy. The Beijing Olympic Stadium, inspired by bird nests, stands as a testament to biomimicry's role in achieving thermal comfort, optimal spectator views and addressing complex structural challenges. This research has addressed key objectives, from historical insights and waste analysis to exploring the potential of microorganisms and promoting sustainability. The interdisciplinary approach, leveraging technology and fostering collaboration, is poised to bridge the gap between construction and biology, unlocking superior, sustainable materials and practices. While acknowledging the limitations, including the complexity of biomimicry and potential resistance to change, this study emphasises the transformative potential of biomimetic materials. The hurdles posed by cost, time-intensive research, limited expertise and market acceptance should be viewed as challenges to be surmounted rather than insurmountable barriers. In essence, the journey from evolution to innovation in construction involves not merely imitating nature but collaborating with it, imbibing its resilience, efficiency and regenerative capacities. The findings of this study contribute to the growing body of knowledge in biomimicry, serving as a catalyst for transformative change in the construction industry towards a more sustainable and harmonious future.

Bibliography

1. Jandyal, A., Chaturvedi, I., Wazir, I., Raina, A., & Haq, M. U. (2022). 3D Printing - A review of processes, materials and applications in Industry 4.0, *Sustainable Operations and Computers* , 3, pp 32-42. https://doi.org/10.1016/j.susoc.2021.09.004.
2. Adekunle, P., Aigbavboa, C., & Akinradewo, O. (2021). Construction Informaton Management: Benefts to the Construction Industry. *Sustaianability,* 14 (11366). DOI: 10.3390/su141811366.
3. Ahamed, M. K., & Wang, H. Hazell, J. Paul (2022). From Biology to Biomimicry: Using nature to build better structures -A Review. *Construction and Building Materials.*320 (126195). https://doi.org/10.1016/j.conbuildmat.2021.126195
4. Chereddy , S. S., Nerella , R., Madduru, S. C., & Venkatesh, C. (2019). Performance studies on rate of self healing in bio concrete. *Materials Today Proceedings 27*, DOI: 10.1016/j.matpr.2019.09.151.
5. Fair, M. (2008, July 30). *National Stadium, Beijing by Herzog & de Meuron*. Retrieved from Dezeen: https://www.dezeen.com/2008/07/30/national-stadium-beijing-by-herzog-de-meuron/
6. Fakruddin, M., & Shishir, M. A. (2023). Construction Biotechnology: The Promise of Sustainable Buildings. *Recycling and Sustainable Development*, 41-49, DOI: 10.5937/ror2301041F.
7. Ikshita, C., Jandyal, A., Wazir, I., Raina, A., & Ul Haq, M. I. (2022). Biomimetics and 3D printing - Opportunities for design applications. *Sensors International*, https://doi.

org/10.1016/j.sintl.2022.100191.

8. Kaiser, M. A., Wang, H., & Hazell, P. J. (2021). From biology to biomimicry: Using nature to build better structures – A review. *Construction and Building Materials*, 320(7):DOI: 10.1016/j.conbuildmat.2021.126195.
9. Leena, F., & Pradeep, S. (2019). Biomimicry: An approach to sustainable architecture and design. *International Journal of Life Sciences Research* , Vol. 7, Issue 1,pp.318-323.
10. Nagy, G., & Osama, N. (2016). Biomimicry, an Approach, for Energy Effecient Building Skin Design. *Procedia Environmental Sciences* , 34.pp.178-189 DOI: 10.1016/j.proenv.2016.04.017.
11. Neri, O. (2020). *AQUAHOJA Project, Water Based Digital Fabrication*. Retrieved from OXMAN: https://oxman.com/projects/aguahoja
12. Peter, A., Aigbavboa, C., & Akinradewo, O. (2021). Intervention of Biomimicry for Sustainable Construction: The use of Bio-Concrete. *Journal of Agronomy, Technology and Engineering Managemen*, 4(5), 641-648.
13. Radwana, D. A., & Osama, A. N. (2016). Biomimicry, an approach, for Energy Efficient Building Skin Design, *Procedia Environmental Sciences.* https://doi.org/10.1016/j.proenv.2016.04.017
14. Rajadesingu, S., Palani, N., Mendonce, K.C., Vijayakumar, P., Monisha, P., & Ayyadurai, S. (2024). State-of-the-art review on advancements of eco-friendly bacterial-infused self-healing concrete for sustainable constructions. *Journal of Building Engineering,* 91(109669). https://doi.org/10.1016/j.jobe.2024.109669
15. Rossin, K. J. (2010). Biomimicry: nature's design process versus the deigners process. Design and Nature, 138, DOI: 10.2495/DN100501.
16. Saad, A., Othman, A. A., & Alamoudy, F. O. (2022). Causes Influencing Construction Waste Generation During the Design Process: An Analytical Study. IOP Conference Series Earth and Environmental Science, DOI: 10.1088/1755-1315/1056/1/012012.
17. Stuart-Fox, D., Ng, L., Barner, L., Andrew T. D Bennett, S. J., Elgar, M. A., Evans, A. R., . . . Fernando Jativa, A.-L. J. (2023). Challenges and opportunities for innovation in bioinformed sustainable materials. Communication Material 4, https://doi.org/10.1038/s43246-023-00405-z.
18. TavsanFiliz , C., Tavşan , F., & Sonmez, E. (2015). Biomimicry in Architectural Design Education. Procedia - Social and Behavioral Sciences, 489-496, DOI: 10.1016/j.sbspro.2015.04.832.
19. Vincent, J. F., Bogatyreva, O. A., Bogatyrev, N. R., Bowyer , A., & Pahl, A.-K. (2006). Biomimetics: its practice and theory. Journal of the Royal Society Interface, https://doi.org/10.1098/rsif.2006.0127.
20. Virmani, S. (2016). Biomimicry as a tool for sustainable architecture design. Retrieved from Issuu.com: https://issuu.com/sahilvirmani07/docs/biomimicry
21. Volodymyr, I. S. (2017). Construction Biotechnology. Green Energy and Technology, DOI: 10.1007/978-981-10-1445-1.

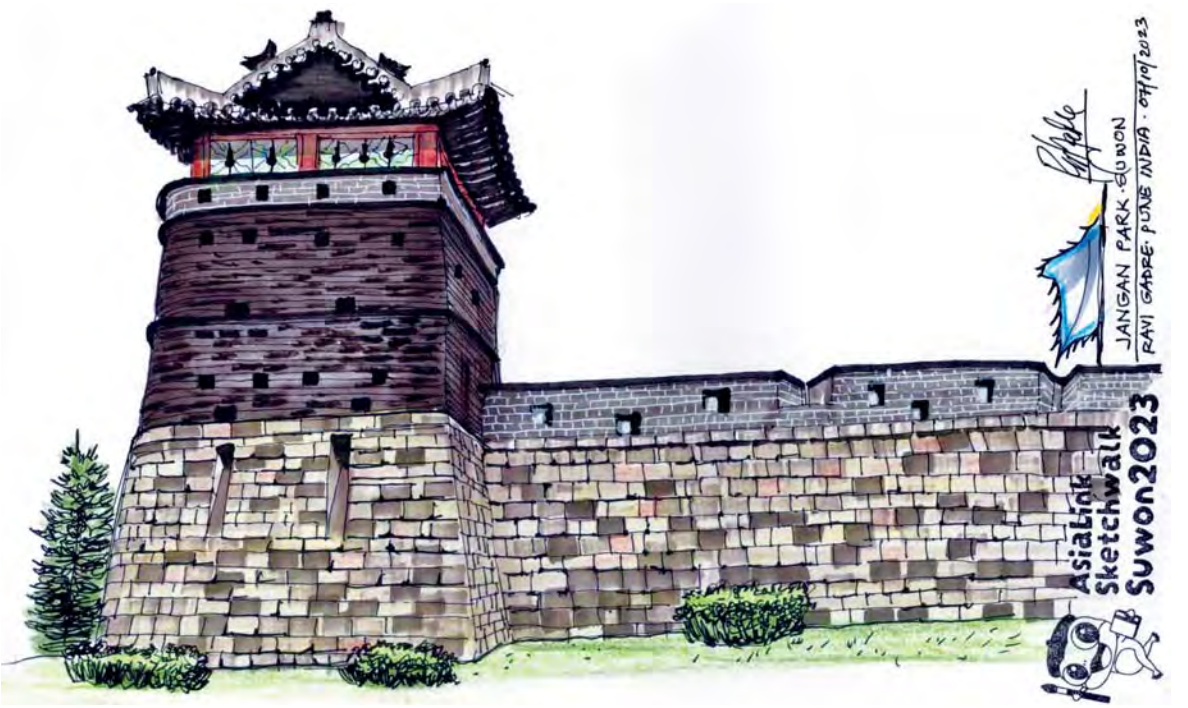
Ar. Lokesh J is 1st year student of M. Arch program (Digital Technology in Buildings) at Vellore Institute of Technology (VIT), Vellore. He earned his Bachelor's degree in the year 2023 from Brindavan College of Architecture. He has a strong focus on innovative design and is dedicated to advancing architectural boundaries.
Email: lokesh.j2023a@vitstudent.ac.in

Ar. Prajwal is 1st year student of M. Arch program (Digital Technology in Buildings) at Vellore Institute of Technology (VIT), Vellore. He earned his Bachelor's degree in the year 2022 from Brindavan College of Architecture. He has been actively engaged in various architectural projects, learning software, constantly exploring and experimenting with new technologies such as AI, 3D printing and travel learning.
Email: prajwal.2023@vitstudent.ac.in

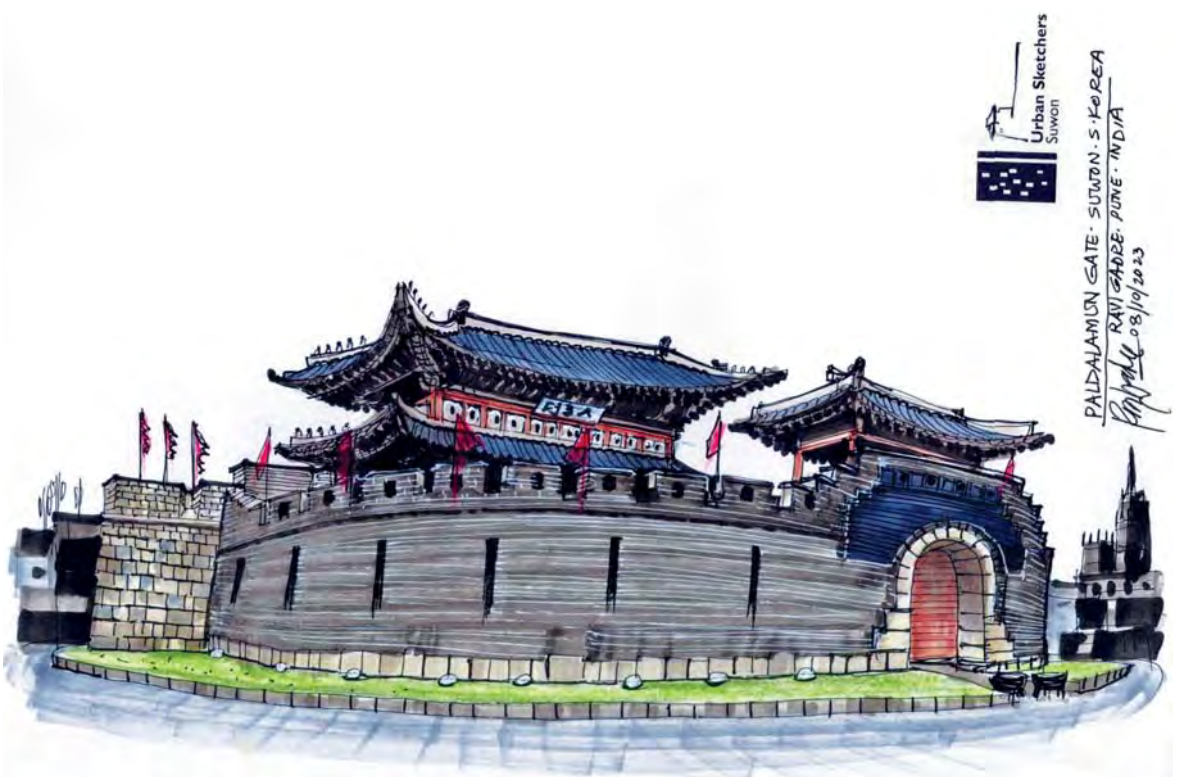
Dr. Sharmila Jagadisan (A24813) graduated from the University of Madras (1999) following which she completed her Master in City Planning (IIT Kharagpur, 2001), PhD (University of Auckland, 2009) and MBA (2018). She is currently a professor at the School of Architecture, Vellore Institute of Technology (VIT), Vellore. Having 19 years of work experience as an architect and planner, she has focused on achieving positive outcomes for communities through inter-disciplinary thinking.
Email: sharmila.jagadisan@vit.ac.in

Sketches

By Ar. Ravi Gadre



Jangan Park, Suwon (7 October 2023)



Paldalamun Gate, Suwon (8 October 2023)

Hwahongmun, Suwon (6 October 2023)

Sketching various places I have seen has been a source of inspiration for architectural thought processes.

All Images Courtesy: Author

Ar. Ravi Gadre (F07871) has completed his G.D. Arch from Abhinav Kala Mahavidyalaya of Architecture, Pune. He started a partnership practice in 1979 as M/s. Gadre Limaye & Associates and his own firm as M/s. Ravi Gadre & Associates in 1998.
He has been a visiting professor at BKPS CoA, Pune and BVCoA, Pune. He is fond of photography, music, travelling and reading. He has been awarded several times for his architectural work, as well as for his sketching.
Email: ravigadre28@gmail.com

Cyanotype

By Ar. Shruti Utpal Barve

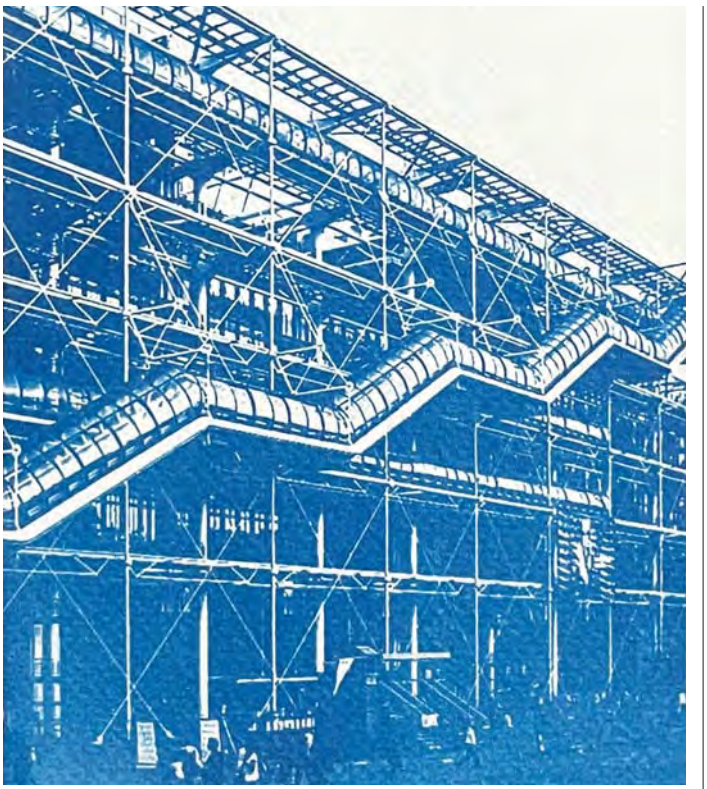
Cyanotype or 'blue print' is an age-old process used to produce copies using photosensitive chemicals. Though today digital media allows easy copying, the word 'blue print' persists in our use with expanded meaning. This technique of producing imprints now has artistic overtones more than its practical use of producing multiple copies.

Cyanotype print- making was conducted as an elective workshop at Rachana Sansad's Academy of Architecture, Mumbai. It was a week-long elective offered to B.Arch. students across the five years. The objective of the elective was to expose students to a different medium of expression. They also learnt the curation of various theme-based compositions using a variety of materials for printmaking.

1. Floral Composition

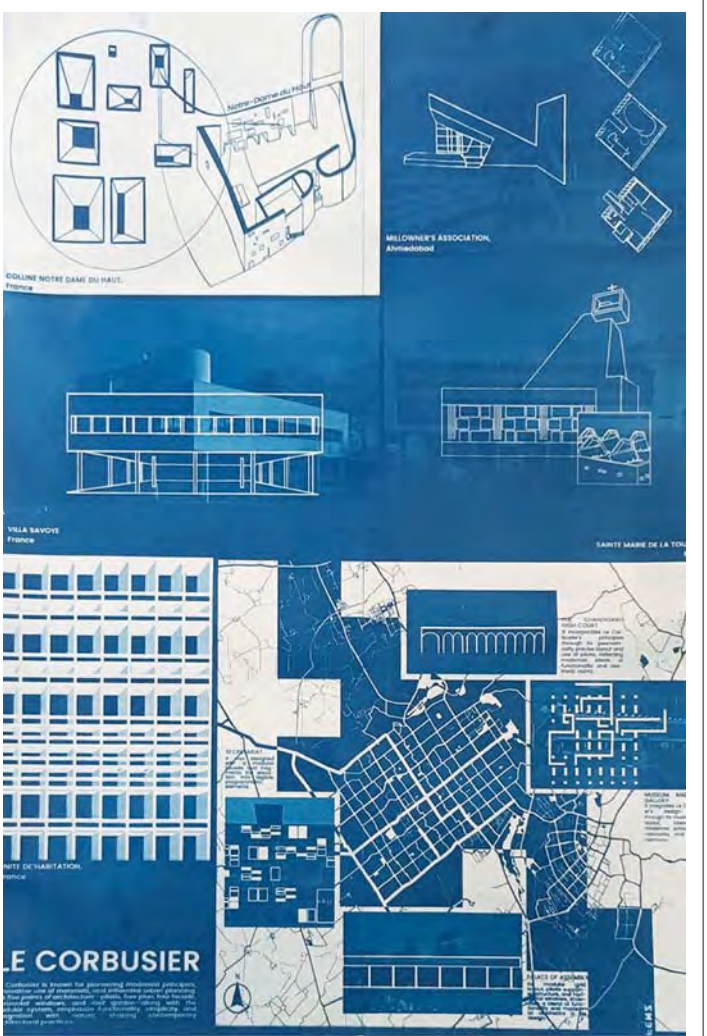
2. Floral Composition

3. Jali window



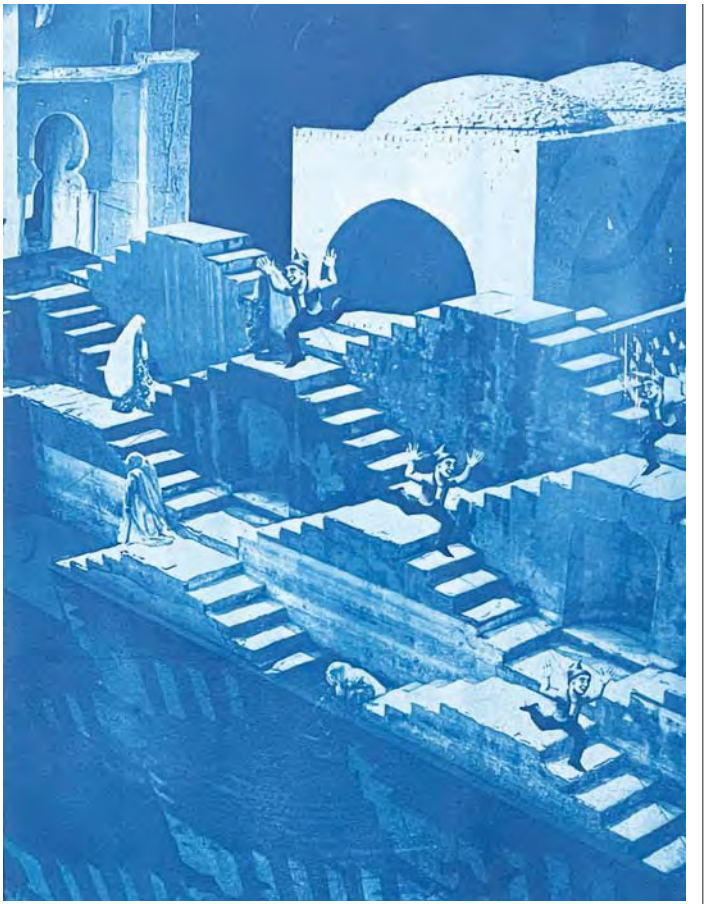
4. The Centre Pompidou

5. The Sagrada Familia Church



6. Collage based on Le Corbusier's works

7. M.C. Escher illustration



8. Composition based on Escher's illustration

History

The cyanotype process was invented by Sir John Herschel in 1842. Mildly photosensitive solutions made with ferric salts are applied to a receptive surface (such as paper or cloth) and allowed to dry in a dark place. An image can be produced by exposing sensitised paper to a source of ultraviolet light (such as sunlight) as a contact print. After exposure, the paper is developed by washing in water. The parts that were exposed to light turn blue as the non-water-soluble Prussian blue pigment remains in the paper. This is what gives the print its typical blue colour. English botanical artist, collector and photographer Anna Atkins was the first person to illustrate a book which was the first book ever to be printed and illustrated by photography.

Preparation of Sensitizer

The photosensitive pigment is created by mixing solutions of potassium ferro-cyanide and ammonium ferric oxalate in proper proportion using distilled water. This pigment is kept away from light usually in opaque plastic or amber coloured glass bottles.

Choice of Papers

Acid free paper of thicker quality is used for this purpose as acid in paper changes the pigmentation. Also, the paper needs to be thick to be able to take up absorption and washing processes involved.

9. Portraits by Steve McCurry

Coating Techniques

Pigment can be applied using brush, sponge, cloth etc. Plain application results in a plain blue background produced on exposure. However dry strokes of pigment and selected application on paper can result in varied artistic expression.

Drying

Papers or canvas applied with pigment are allowed to dry in dark places. Any contact with light is avoided. Upon drying the surface is ready to receive print.

Negatives and Other Compositions

Negatives of the image to be produced are created on transparent or translucent surfaces. This must have good contrast and density to produce sharper images. Also, various compositions are created using botanical specimens like flowers, leaves, branches, grass etc. Some pattern making is devised using metal objects, ropes, etc.

Exposure

All the above assembly is kept in place on the paper using transparent glass pressing it against print receiving paper. This is then exposed to sunlight for a minimum five-minute interval. Longer exposure resulting in darker pigmentation.

Washing

Once the paper is adequately exposed it is washed using clean water. This allows unused solution on the paper to dissolve leaving the permanent pigment on the paper. Thus, the Prussian blue pigment reveals the composition on the paper upon washing it. This colour can be deepened using hydrogen peroxide, also the blue can take coffee hue if immediately treated by coffee solution in water.

Themes of the Workshop

The five-day-long workshop consisted of different themes. After understanding the entire process by working hands-on, students worked with botanical specimens. Later, they also explored pattern making using metal objects and paper cutouts etc. Photographic compositions were printed in inverse on transparent OHP sheets and cyanotype prints were created. Finally, the students created a larger composition using works of Master Architect Le Corbusier, Master Photographer Steve McCurry, and M.C. Escher, in order to understand various typologies of visual expression.

Corbusier's plans, the master layout of Chandigarh and building photographs were used to create a collage. McCurry's war-ridden images were used and overlaid with objects and newspaper cuttings to invoke horrors and the futility of war. M.C. Escher's illusion was recreated using a collage of buildings having similar

10. Collage based on Steve McCurry's work

massing. Thus, it was an attempt to expose students to iconic work done by these masters.

The Cyanotype Workshop conducted as an Elective at the Academy of Architecture was a fun-filled week of energetic explorations. Students experimented with a range of opaque to transparent materials from botanical specimens, metal, wood, to sketches and printed works on transparent plastic sheets. Soaking their compositions in a trough of water, wondering at the alluring image that gradually emerged on the paper at the end of the process.

B.Arch. Student Participants in the Workshop (AY 2024-2025):

III Year: Aarya Phokmare, Ashlesha Mapari, Bhavya Patil, Gunjan Rathi, Jasmin Sebastian, Ruturaj Virkar, Sanika Tambe, Srushti Betkar, Swaraj Ingle

IV Year: Aaliya Shaikh, Akanksha Dhar, Anushree Mahajan, Devanshi Shrivastava, Janhavi Navare, Khushi Hathiram, Komal Kewat, Sayali Sarfare, Shreeya Desai, Sneh Dikshit

V Year: Ayushi Mahajan, Devyani Pawar, Kevin John, Miriam Thomas, Simran Khaitan, Suhani Khandelwal, Urja Arte

Picture Credits: Elective Workshop Artworks done by B.Arch. Students of Academy of Architecture.

Ar. Shruti Utpal Barve (A27853) is a landscape architect and academic with keen interest in Indian culture and history. She has over 19 years of experience in teaching, practice and field-based research involving various indigenous landscapes and communities. She is currently Associate Professor at Rachana Sansad's Academy of Architecture (affiliated to IIA).
Email: shrutiutpal@gmail.com

An annual initiative by AVANI Institute of Design, Kerala, to specifically encourage undergraduate students from architecture and design backgrounds from around the world to explore critical and exploratory writing. This year's essay competition invited students to explore the concept of a city that challenges the conventional narratives about its nature and purpose and ruminates upon an alternative narrative that falls between the extremes often associated with cities.

Jurors: Ar. Rupali Gupte (SEA, Mumbai), Dr. Pithamber Rao Polsani (Srishti Institute of Art, Design and Technology, Bangalore), and Ar. Sagar Trivedi (Avani Institute of Design, Calicut)

Writing workshop for finalists: Ar. Apurva Bose Dutta

Avani Essay prize 2023 coordination team - Ar. Anupama VJ, Ar. Sagar Trivedi, Dr. Soumini Raja

WINNING ENTRY

Looking Closely, as the City Unfolds

By Tanuja Vartak

"Cities operate according to logics that exceed regulative systems, defy normative notions of value and productivity, transgress boundaries of what is formal, informal and criminal and contaminate the rational bureaucratic forms. It is for this reason that most urban economies are under the threat of being formalised."

- Daniella Gandolfo, 'The city at its Limits: Taboo, Transgression, and Urban Renewal', 2013

I must question the relationship between the term 'urban' and 'city' and whether these two complement each other in all instances. If one googles the definition of urban, it states '*of connected to and relating to a city*', which translates to a city being and becoming all things urban. But, an urban area can be looked at as a series of forces and rhythms that co-exist and are at play with each other. A city is formed through these energies at play and not by the by-laws and conventional logic of planning and development that are enforced.

Cities have been historically shaped by capitalist modes of production which frame spaces as a set of problems to be solved through a hierarchical order and infrastructure. These principles enable the developer and in turn the public to look at the city through immediate reactions of erasure and renewal by assuming the position of a saviour.

In order to make an argument through this essay, I focused my narrative on a particular neighbourhood - the precinct of Darukhana in the eastern waterfront of Mumbai, where the landscape is an ecosystem of industrial, residential, labour and gendered forces playing out all at once. I chose to write about this part of the city since I conducted my undergraduate thesis research in a precinct of Darukhana- a region that acts as the backbone of the city's economy in a sense. Frequent visits to this area greatly sensitised me towards a part of the city that is often neglected and lesser known.

The Eastern waterfront of Mumbai is under the Mumbai Port Trust and it stretches from the salt pans of Wadala in the north to the Sassoon dock at Colaba in the south. It occupies 1/8th of the land area of Mumbai. From its establishment, the port has been the gateway to India, and was a primary factor in the emergence of Mumbai as the commercial capital of the country.

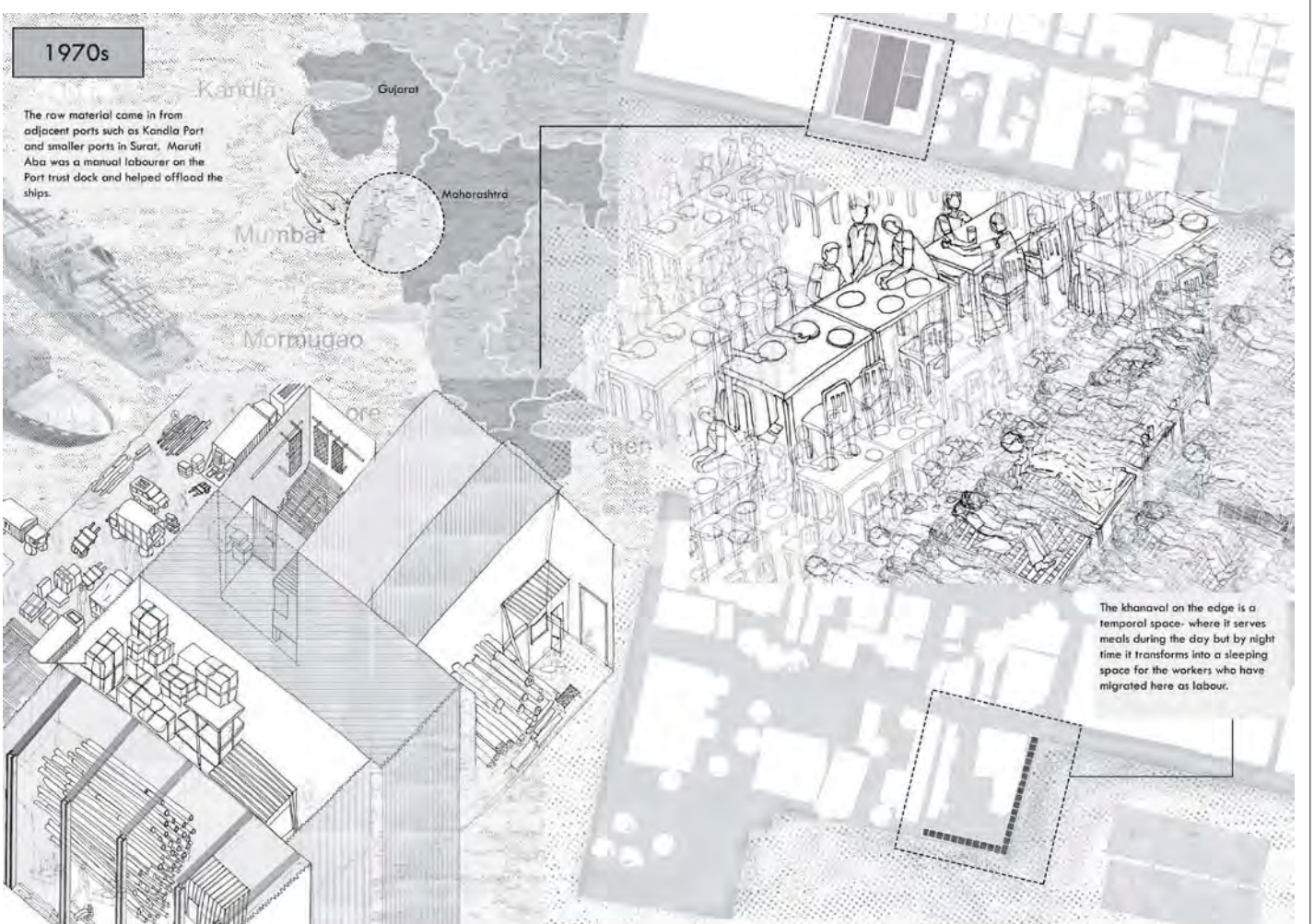
The need for technologically advanced ports with deeper water depths led to the establishment of the Nhava Sheva port (Jawaharlal Nehru Port) across Mumbai Harbour in Navi Mumbai in the late eighties in order to handle the growing container traffic. The shifting of the port from the island city to a region across the harbour left behind a space that remains like a *remnant* of the port. The current landscape is dotted with large, derelict and unused infrastructure which gives an overall sense of desolation. But this feeling is a fleeting one, and on delving deeper into the site I attempted to understand the urban life produced in an area that is generally deemed as unsafe and shady, the different types of claims on

Kolsa Bunder, Darukhana, Mumbai. 2023
Source: Author

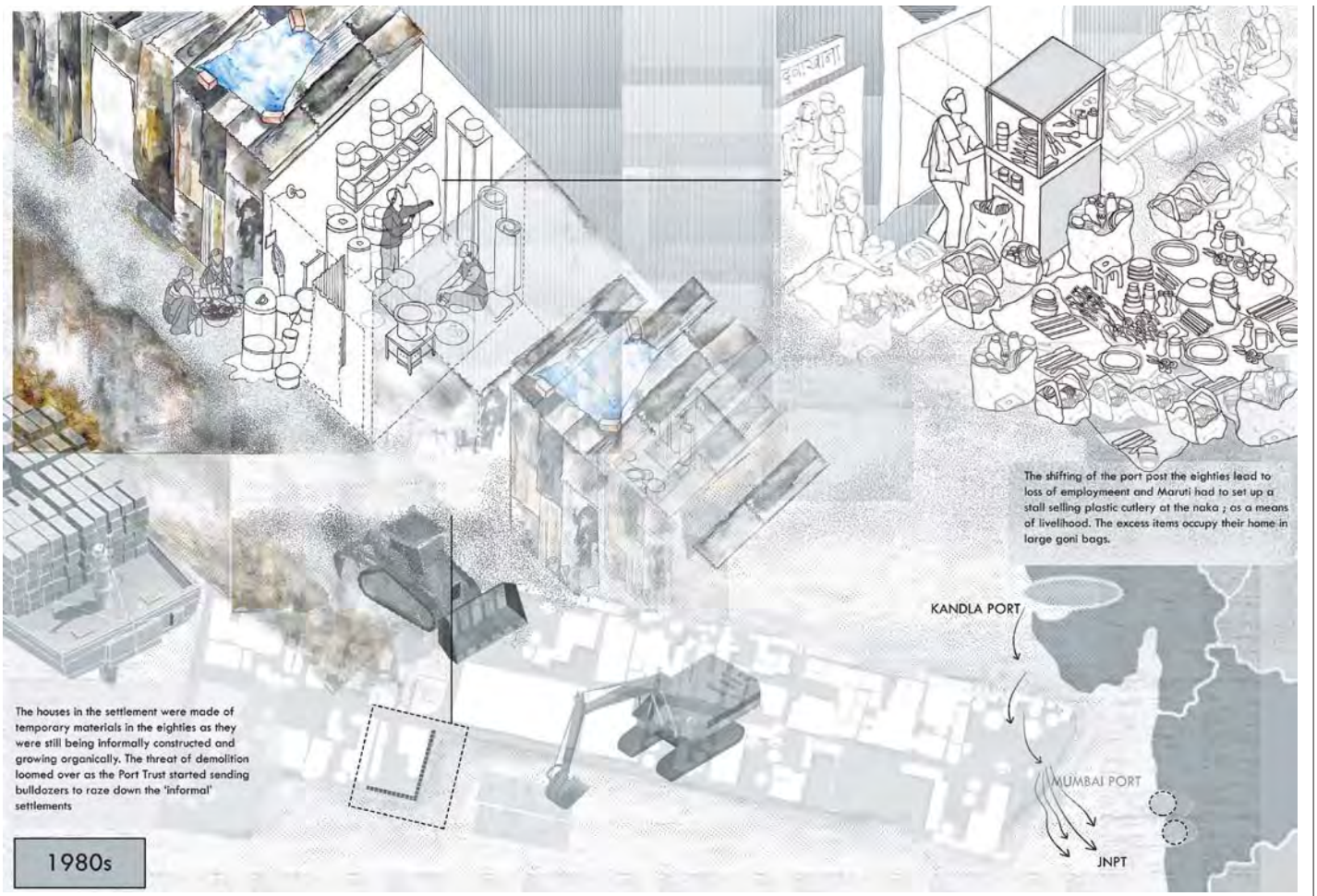
space, the settlements that emerged as a result of a once-active port and the changing nature of the industrial landscape.

I began to understand that there are forces that act here that play out subtly and can only be observed if one inhabits the site as if one is part of it. There is a regularity or routineness to the women that gather on the open ground and a rhythm with which the chores are performed inside each home. The regularity (or familiarity in this case) stays true to the inhabitants of the edge who performed and behaved in the expected manner of their custom. Meanwhile, the odd passerby who chose to interact (me) with this context entered into strange territory. At the scale of this particular neighbourhood, the city is both- an economic powerhouse to seek fortune from and a disaster-spouting- entity. But from this emerged a new perspective of looking at it as a space of refuge. Refuge for the dwellers primarily who were considered migrants of the land despite having settled decades ago and being the backbone of the port economy (whatever is left of it). Surprisingly, these dwellers were content with the space they currently inhabit. They were completely above the utopian concrete dream and have not been sold by the dream of owning a 'block' or 'bhk' of their own.

A utopian city does not necessarily have to mean one where everything works perfectly and parts fit like a jigsaw puzzle, but one which can hold people and their networks cohesively, and accommodate spaces for 'insurgent citizenships' (Holston, 2013).



Influx of migrants in the early 1970s, Kolsa Bunder
Source: Author



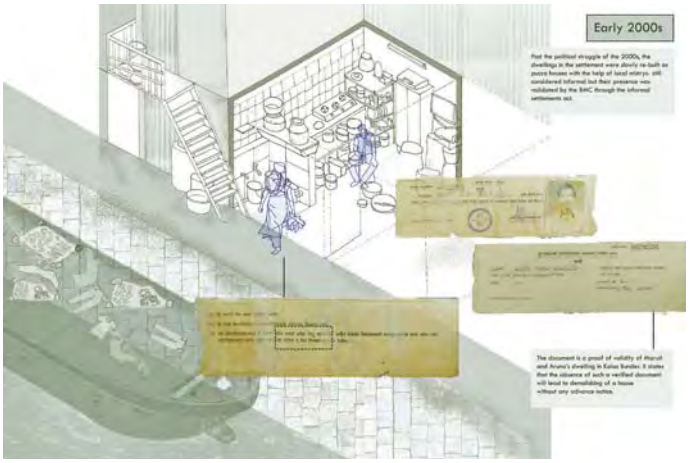
Informal settlements cropped up along water edges in late 80s
Source: Author

The urban life in the neighbourhood of Darukhana held networks - networks of people and things and relationships that get formed as a result of everyday interactions and dependencies. These dependencies arose from a certain precarity that the dwellers existed in, a precarity of home, of work and of erasure. The case of Darukhana is a special one, because it has survived and continues to thrive despite the numerous redevelopment proposals put forth over the past two decades. It has challenged the notions fed into middle class minds of how modern cities are expected to and supposed to look “shiny, tourist-worthy spots with water fronts and decks and recreation centres that only accept avenues of formal citizenship”. The residents here fought for the survival of their settlements through protests and garnering political support and continue to enunciate their lives on this contested piece of land (contested because the eastern waterfront is owned by several entities- central government, private companies, Port Trust etc.).

History is political. It has always been written through the lens of a political agenda and thus it is simply not reliable enough to know in depth about a given place. The present emerges from the stories of people who live and breathe the air of the neighbourhood. Attempting to look at a place ethnographically, one delves deeper into understanding a place and its people and their culture. I thus narrate the de-industrialisation of the Mumbai port and the impact of its shift through a story - a specific personal history of Maruti and Aruna Bhajnawale who are long-term residents of Kolsa Bunder and through whom, I simultaneously understood about the history of the transformation of the port.

In the early 1970s, Maruti Bhajnawale migrated to Mumbai from Sangli (town in Maharashtra) and worked as a dockworker for a loading company in Darukhana. The migration of workers to Darukhana gave rise to informal hutments and *khanavals* which fed those who had arrived without their families. The *khanaval* served as a resting space for these single migrants including Maruti who would sleep in the same space at night.

In the eighties and nineties, with the families of workers migrating to the port land, it was in a state of flux with the shifting of the port and the changing nature of settlements.



Struggle for survival proved successful with the settlement getting status of a notified slum
Source: Author

Maruti did not move to Nhava Sheva as the port shifted because locals there were tremendously protective of their livelihood and would prohibit workers from elsewhere to encroach upon their territory. So, in order to supplement their unsteady income, Maruti and his wife Aruna started a cutlery business sometime around the late 1980s and would set up a hawking stall selling plastic items at the junction of Kolsa Bunder.

Early 2000s brought a struggle for survival for the residents of Darukhana with the Port Trust declaring that it would raze down all informal and illegal 'encroachments' i.e. the houses of workers. With the efforts of the local residents and the Republican Party of India, the settlements on Kolsa Bunder were prevented from demolition. But post the decline of port activity, the migrants involved themselves in industries that are peripherally related to the port.

Laws, acts, regulations, migration and the fear of demolition are some of the factors that affected the space of the informal dwelling such that the unit changed and transformed.

Here, adaptability of the practice of making home is seen as the years progress. The home initially only consists of a cot for the male in a *khanaval*. But as he gets married and his family migrates to the port, the form changes to a temporarily made home. This further gets threatened by the demolition notices and regulations of the Port Trust. Eventually, since the settlement is classified under the informal homes census, the transformation from a *kuccha* to *pucca* house occurs. This shift in the form of the home over the span of three decades speaks about the long-term temporality it embodies.

Yin Fu Tuan in his essay 'Strangers and Strangeness' writes – "In modern society, the experience of the strange- a kind of grace- may have waned as a result of people's power over nature, but contact with strangers and dependence on them has increased." Tuan argues on behalf of the unfamiliar here, by saying that we are more dependent on strangers now than ever before in a way that the lives we lead, the things we use and inhabit and the gestures that we perform- they are all produced by millions of people working on the back end, people that we may have never met and will never meet.

So, whom does a city belong to? A city belongs to everyone. The formal, the informal, the legal, the illegal. One cannot find space for the stories of the 'insurgent' in the proposals and modernist ideas of erasure and renewal. The city 'happens' in temporal shifts. Shifts of the idea of home, of publics, of regulations and orders and of striving for a place in the city. The city thus becomes almost intangible with the people and cultures and histories forming these omnipresent forces.

Bibliography and references:

Mumbai Port Authority, Profile and Introduction, Ministry of Ports, Shipping and Waterways

KRVIA, UDRI. 2001. Study of the Eastern Waterfront of Mumbai: A Situation Analysis, Research and Design Cell publishing

Mumbai Port Trust Land Development Committee. 2014. Mumbai Port Waterfront and Port Land Development Report, Ministry of Shipping, Government of India (Rani Jadhav Committee report)

Holston, J. (2013). Spaces of insurgent citizenship. *The Anthropology of Citizenship: A Reader*, 93.

Tuan, Y. F. (1986). Strangers and strangeness. *Geographical review*, 10-19.

Tanuja Vartak is a final year student at the School of Environment and Architecture, Mumbai. Her undergraduate thesis on Darukhana, a former port precinct on the Eastern waterfront of Mumbai led her to look at the neighbourhood through a sensitive approach and edged her to become critical about the "master planner's" lens of analysing Indian cities that grow organically and afford a variety of rhythms. Her thesis research has made her ever more curious to learn about urban policy making and questioning how architects can intervene in the fabric of the city to the stakeholders benefit.
Email: tanuja.vartak12@gmail.com

SHORTLISTED ENTRY

Behind the Perfections of a City: Journeying through Nigerian Cities

By Ahmed Isaac Madiya

Amidst the dynamics of human civilization, cities stand as a focal point for opportunity, promise, and complexity. Nigeria, with its 36 states, provides an intriguing perspective from which to examine the rich diversity of urban experiences. As we start this journey, let us go beyond mere perception and see the reality of urban life considering how architecture contributes to shaping this reality in Nigeria.

Gender dynamics shape the urban landscape in profound ways, influencing access to resources, opportunities, and social participation. Women in Nigerian cities often face systemic barriers to economic empowerment, political representation, and personal safety. Gender-based violence, including domestic abuse and sexual harassment, remains pervasive, undermining the rights and dignity of women and girls. Addressing gender disparities and promoting gender equality is essential to building inclusive and equitable urban communities. One solution lies in crafting architectural masterpieces that promote inclusivity, gender equality, and the physical and psychological protection of women. For example, designing well-lit and easily accessible public spaces can enhance safety for women walking at night. Implementing gender-neutral restroom facilities in public buildings can ensure inclusivity and comfort for all individuals. Moreover, integrating community centres or women's shelters within urban development provides vital support networks

The beautiful city of Abuja with its breathtaking architecture
Source: Bloomberg via Getty images

and resources for those experiencing gender-based violence. Through thoughtful design interventions like these, cities can create spaces that empower women, ensuring their safety and fostering a sense of belonging within the urban fabric.

The fascination of cities often puts forward images of busy streets, towering skyscrapers, and limitless opportunities. Yet, behind this façade lies a complex reality that says otherwise on the conception of easy triumph. While cities like Ibadan, Abuja and Lagos brag about large populations and economic activity, they also struggle with a lot of challenges. Crime, poverty, and political unrest are serious issues that coexist with the attractive part of urban life. From an architectural perspective, these challenges are reflected in the design and function of the built environment. Inadequate infrastructure, including poorly planned neighbourhoods and deficient public spaces, can worsen issues of crime and social unrest. Moreover, the increase of informal settlements and substandard housing perpetuates cycles of poverty and inequality. Addressing these challenges requires architectural interventions that prioritise social equity, safety and sustainability.

The rapid urbanisation occurring across Nigeria has brought a bunch of challenges and one of the most concerning is the increase in crime rates, including incidents of kidnapping, militancy, and robbery. As cities swell with an influx of people seeking better opportunities, they also become breeding grounds for criminal activities. Kidnapping, a particularly terrifying crime, involves the illegal abduction of individuals for ransom or other purposes, instilling fear and uncertainty among communities. Additionally, militancy poses a threat, with armed groups resorting to violence to advance their political or social agendas, further destabilising regions. Robberies, both petty and organised, add to the sense of insecurity, as individuals and businesses become targets of theft and violence. These crimes not only jeopardise the safety and well-being of residents but also hinder economic development and social cohesion.

Architectural solutions can play an important role in mitigating these challenges and creating safer urban environments. Designing urban spaces with principles of crime prevention through environmental design (CPTED) can deter criminal activities by enhancing natural surveillance, territorial reinforcement and access control. For instance, well-lit streets, clear sightlines and open public spaces discourage illicit behaviour by increasing the perceived risk of detection. Implementing secure building designs with features such as strong door and window locks, security cameras and controlled access points can fortify residences and commercial establishments against intrusions and burglaries. Furthermore, fostering community engagement and social cohesion through mixed-use developments, public amenities and neighbourhood watch programs can strengthen solidarity among residents and empower them to collectively address security concerns. By integrating these architectural interventions, cities can not only enhance safety and security but also foster inclusive and resilient urban environments conducive to economic prosperity and social well-being.

The healthcare environment in Nigerian cities reflects the broader challenges of urban development with inadequate infrastructure and limited access hindering the delivery of essential services. Public healthcare facilities are often overwhelmed, understaffed, and ill-equipped to meet the needs of growing urban populations. The imbalance in healthcare access further worsens socioeconomic inequalities, disproportionately affecting marginalised communities. Architectural solutions can serve as catalysts for addressing these challenges and improving healthcare delivery in urban areas. Designing healthcare facilities with a focus on functionality, efficiency and scalability can optimise the use of available resources and enhance service delivery. For instance, modular construction techniques can expedite the building process and allow for flexible expansion as demand increases. Additionally, incorporating sustainable design principles such as energy-efficient systems and natural ventilation, can reduce operational costs and minimise environmental impact. Furthermore, integrating technology into healthcare facility design, such as telemedicine platforms and electronic health records, can improve access to care and streamline patient management. Creating inclusive and accessible environments, with features like barrier-free design and signage in multiple languages, can ensure that healthcare services are readily available to all members of the community, regardless of their socioeconomic status or physical abilities. Moreover, fostering partnerships between healthcare providers, urban planners and community stakeholders can facilitate the development of integrated healthcare networks that address the diverse needs of urban populations. By leveraging architectural innovation and collaborative approaches, Nigerian cities can overcome the challenges of healthcare delivery and create environments that promote health equity, resilience, and well-being.

The combined impact of industrial activities and transportation on the environment poses significant

health risks to urban residents. Air pollution from these sources can lead to respiratory diseases, cardiovascular ailments, and worsen existing health conditions. Moreover, water pollution resulting from industrial waste and runoff from transportation infrastructure can contaminate water sources, endangering both human health and ecosystems. Architectural solutions can play a crucial role in mitigating these environmental health risks. Designing buildings and urban spaces with sustainable materials and energy-efficient systems can reduce the environmental footprint of industrial and transportation activities. Implementing green building practices, such as green roofs, rainwater harvesting systems and permeable pavements, can help mitigate water pollution by capturing and treating runoff before it reaches water bodies. Additionally, incorporating green infrastructure elements such as urban forests and green corridors, can improve air quality by absorbing pollutants and providing natural filtration. By integrating these architectural interventions into urban planning and development, cities can create healthier and more sustainable environments for their residents, mitigating the adverse health effects of industrial and transportation-related pollution.

The traffic challenges in Nigerian cities, such as Abuja where I resided for six months, are increased by rapid urbanisation, population growth and ineffective traffic management policies. Navigating through congested roads during the morning shuttle to my industrial training destination and experiencing the same ordeal on my return, consistently left me exhausted and frustrated. Sometimes, I would find myself stuck in traffic for hours, adding to the frustration. Despite ongoing efforts to enhance infrastructure and enforce traffic management measures, congestion persists as a formidable problem. Architectural solutions can contribute to alleviating traffic congestion by prioritising sustainable transportation infrastructure and urban planning strategies. Designing pedestrian-friendly streetscapes with wide sidewalks, dedicated bike lanes and efficient public transportation systems can encourage alternative modes of travel and reduce reliance on private vehicles. Additionally, implementing smart city technologies such as intelligent traffic management systems and real-time traffic monitoring, can optimise traffic flow and minimise congestion hotspots. Integrating mixed-use developments with residential, commercial and recreational amenities can reduce the need for long commutes and decentralise urban activity centres, easing traffic pressures on central business districts. By integrating these architectural interventions into urban development plans, Nigerian cities can address the root causes of traffic congestion and

Traffic congestion in Abuja
Source: Channels TV Nigeria

create more liveable, sustainable and resilient urban environments.

Nigerian cities are made up of people from different cultures, languages and traditions, fostering a rich spectrum of diversity and social cohesion. Despite the challenges, urban residents draw strength from their shared cultural heritage, forging bonds of solidarity and mutual support. Cultural festivals, community events and religious gatherings serve as vital forums for celebrating. Architecture plays an important role in nurturing and promoting cultural diversity within urban environments. Designing public spaces that reflect and celebrate the cultural identities of diverse communities can foster a sense of belonging and inclusivity. Incorporating elements of traditional architecture such as vernacular building styles, motifs and materials into urban development projects can honour and preserve cultural heritage while creating visually striking and culturally resonant landmarks. Furthermore, designing mixed-use developments that accommodate community gathering spaces such as market squares, plazas and community centres can provide venues for cultural exchange and interaction among residents from different backgrounds. By embracing architectural solutions that celebrate cultural diversity, Nigerian cities can cultivate environments that promote social cohesion, tolerance and appreciation for the richness of their cultural heritage.

Amidst the challenges and complexities of urban life, cities emerge as beacons of hope, vibrant hubs of innovation and progress. Despite congestion, pollution and the frenetic pace, urban centres serve as fertile grounds where dreams are realised and futures are shaped. Within their busy streets and towering skyscrapers, a rich tapestry of creativity flourishes, fuelled by the convergence of diverse voices and experiences. Entrepreneurship thrives as individuals harness opportunities to overcome challenges, birthing new businesses and industries. Moreover, cities serve as melting pots of cultures, facilitating the exchange of ideas, traditions and perspectives, enriching the urban fabric. In this synergy of minds and energies, hope endures, propelling humanity forward amidst adversity and revealing the boundless potential of urban existence.

Despite facing a lot of obstacles, the fascination of urban life remains strong for many Nigerians, driven by the promise of opportunity and prosperity. In cities like Lagos, Abuja and Port Harcourt, individuals from diverse backgrounds converge with their unique aspirations and dreams. They are propelled by the conviction that within the urban landscape lies the potential for socioeconomic advancement, access to better education, healthcare and employment opportunities. Despite grappling with challenges such as overcrowding, inadequate infrastructure and limited resources, the resilience and determination of Nigerians persist as they navigate the urban complexities in pursuit of brighter futures. Amidst the chaos, the entrepreneurial spirit thrives with many leveraging the vibrant urban environment to launch businesses and pursue economic independence. It is this unwavering optimism and tenacity that continues to drive the influx of individuals into cities, shaping the urban landscape and embodying the enduring quest for progress and prosperity.

As we ponder the realities of urban life in Nigeria, it becomes evident that cities represent much more than mere symbols of success. They embody dynamic, multifaceted environments that are profoundly influenced by the hopes, dreams and struggles of their inhabitants. Within the lively streets and towering skyscrapers, a lot of narratives unfold, reflecting the diverse experiences and aspirations of those who call these urban centres home. However, amidst the vibrancy lies a stark reality of complexities and inequalities, ranging from inadequate infrastructure to socioeconomic disparities. By acknowledging and confronting these challenges head-on, we can begin to pave the way towards a more inclusive and sustainable future for all residents. This entails implementing policies and initiatives that prioritise equitable access to essential services, affordable housing and opportunities for socioeconomic advancement. It also requires fostering community engagement and collaboration to address underlying systemic issues and empower marginalised populations. Through collective efforts and a commitment to social justice, we can strive to create cities that truly serve as beacons of progress, prosperity and inclusivity for every individual.

Ahmed Isaac Madiya is a Nigerian student of architecture at the Abubakar Tafawa Balewa University. He skilfully harmonises his academic pursuits with a fervour for writing, reading, sketching and dedicated research. Isaac's fascination extends to movies. His diverse interests encompass art and architecture, technology and sustainable practices.
Email: isaacmadiya2@gmail.com

SHORTLISTED ENTRY

City – A Canvas of Vivid Hues

By Avanee G

Introduction

City - is it merely a monochromatic and monotonous entity, defined conventionally by dense population, urban infrastructure, and economic activity, overlooking nuanced interconnections? Or is it a vibrant 'canvas', embodying the tones of a complex interplay between human life, culture and the environment? One that encapsulates the vivid hues of collective existence and the potential for harmonious cohabitation. The essence of a city that challenges conventional narratives lies in its ability to embrace a holistic approach. That, which envisions the city as capable of adapting and evolving, nurturing symbiotic relationships between humans, built structures and the kaleidoscope of social life. In essence, humans, structures and social life interweave, defying tedium to create a living masterpiece.

Vivid Hues

In the bustling streets of urban life, a vendor traverses crowded streets daily, content with the day's earnings, seemingly unaffected by the distances covered or the chaotic traffic. Simultaneously, students, businessmen, IT professionals navigate their mundane daily routes and routines, driven by aspirations of future success, often oblivious to the monotonous routine enveloping them. Meanwhile, heritage conservationists and environmentalists battle against the encroaching urban sprawl, determined to preserve the delicate balance of sustenance amidst escalating economic growth. A glimpse of this as seen in Figure 1.

Viewed from the lens of architects, environmentalists, daily wage workers, students, homemakers, IT professionals, and businessmen alike, the city is perceived through different hues, a multi-fold approach with each perspective contributing to the intricate web of urban existence. Each individual functioning as a minuscule part in the vast ecosystem of the city—a system within systems. A complexity comprised of diverse and hardly predictable interrelations between its subsystems. All converging to create a living, although one that, subconsciously, is shifting from 'living a life' to merely 'being to survive.'

Thomas Gordon Cullen, in his work 'The Concise Townscape' describes a city as "a dramatic event unfolding in space" (Cullen, 1961). An 'art' composed of economic forces, employment, people, buildings, streets, and activities is in constant juxtaposition. However, as cities expanded over the years, certain elements took precedence in this piece of art called 'city', while others took to the background and faded. The focus shifted towards industrial, economic and scientific development, sidelining sustainable socio-

Figure 1: Hued cityscape
Source: timesofindia.indiatimes.com

cultural aspects. This developmental trajectory, which connects the past, present, and future, requires a mindful approach. We need to acknowledge that, while space can be remodelled, time remains irreplaceable. Consequently, city development must proceed with utmost care, ensuring that the evolving urban 'art' is an equitable amalgamation of all its constituent elements, forming a harmonious and cohesive panorama.

Shifting Perspectives

The picture of an industrialised urban landscape, once hailed as progress, has revealed its shortcomings over time. The promise of assured employment and economic growth came at the cost of spatial segregation, triggering a surge in automobile dependence, thus leading to environmental and social repercussions. Cities multiplied with a rapid influx of new structures, thus the delicate equilibrium between the black and white, the buildings and the streets as spaces for social congregation, became prey to this unchecked growth. Recognising this disintegrating urban fabric, urbanists sought to develop theories to rejuvenate the fading art of city living.

Aldo Rossi, in his book 'The Architecture of the City,' states that "architecture is inseparable from life and society. People create them with an intention of aesthetic and creation of a better surrounding for living" (Rossi, 1984). This perspective places a significant emphasis on the role and responsibility of architecture and urban design in shaping a wholesome and liveable surrounding, implying a necessary shift from mere urban planning to comprehensive urban 'life' planning. Speaking of this shift, it brings us to the contemporary concept of the '15-minute city' as a sustainable alternative for urban development.

The fundamental philosophy behind the 15-minute city concept aligning with chrono urbanism approach, highlights the importance of urban rhythms in understanding the city's quality of life. This concept emphasises that space gains relevance only when linked to the temporal dimension, stating that "spatial behaviour related to space manifest actions in everyday situations (e.g. going to work, shopping, education), which are related to data on distance, direction of movement, deviations from direction, frequency of trips, time interval between events, the degree of their repeatability, which are recorded and analysed on the basis of their occurrence in space." (Mocák, 2022). Recognising and viewing this intricate interplay between space and time is crucial for creating a cohesive urban environment.

Figure 2: Hierarchical urban space
Source: re-thinkingthefuture

The 15-minute city concept places emphasis on walkability, conducting assessments across different age groups to identify parameters of walkability, ensuring equitable access. Increased walkability implies increased social interactions and a sustainable environment. This concept advocates for a polycentric city model, resonating with the multi-nuclei development framework proposed by Harris and Ullman and also aligning with the traditional planning principles observed historically in India and other dynamic civilisations. The goal is to bring essential amenities within a 15-minute radius, allowing for flexibility and adaptability as circumstances dictate. This approach renders the city polyrhythmic and polychronic, acknowledging the diverse rhythms of daily life among residents and visitors, and the varied uses of different city spaces throughout the day based on schedule of activities.

In addition to the intangible aspects, the city's tangible elements—the buildings and streets—play a crucial role in shaping urban life. Charles Correa, in his book 'The New Landscape,' emphasised that urban living extends beyond the confines of individual rooms (Correa, 1978). He says that urban space is hierarchical, an example exemplified in his Belapur Housing project, Navi Mumbai, as seen in Figure 2. First, comprising private family spaces. Next areas of intimate contact such as front door step, where children play and adults chat with their neighbours. Third, neighbourhood meeting places where people interact and become part of the community, and last the principal urban areas used by the entire city. These layers intricately interweave to form the texture of the city, which historically blended buildings into their context. However, urbanisation has resulted in the perception of each object as an individual entity, each space or building in solidarity, disrupting this harmonious interplay.

Figure 3: Multifaceted streetscape of Jaipur
Source: tripsavvy

The conjunction of these diverse concepts offers a holistic understanding of cities beyond conventional ideals. Cities are no longer viewed merely as mechanised powerhouses but as living, breathing entities that require careful consideration of the symbiotic relationship between their tangible and intangible elements. These concepts, rooted in an understanding of spatial and temporal dynamics, focuses on the paradigm shift in urban development—a shift that prioritises sustainability, inclusivity, and the restoration of balanced urban living. It resonates with the intricate rhythm of human life and showcases it in this new light— as a living, dynamic, multi-hued canvas.

Indian Context and Urban Evolution

India, endowed with cities having a legacy of rich heritage and historically cohesive development, is witnessing a recent blurring of these lines, thus prompting efforts to revitalise and revive its urban essence. Traditionally, Indian cities offered vibrant 'mohallas' characterised by mixed land-use patterns, where commercial and residential spaces harmoniously coexisted. This historical inclination towards mixed-use development aligns with the contemporary agenda of reducing motorised trips, placing Indian cities on a path conducive to the 15-minute city concept. Notably, many Indian cities, especially their robust core areas and fringes, inherently embody the principles of the 15-minute city.

The walled city of Jaipur stands out as an exemplary example of this concept, preceding contemporary urban planning trends by almost three centuries. Developed around 294 years ago, the walled city of Jaipur shows accessibility to essential services, recreational facilities and workplaces primarily on foot—a testament to the sustainable and integrated nature of the city's design. Moreover, the architectural tradition of dedicating ground floors for commercial purposes and upper floors for residential use, as seen in figure 3, further strengthens the mixed-use concept ingrained in India's urban roots.

Taking a closer look at other Indian cities — Varanasi, the spiritual capital on the banks of the river Ganga, represents a vibrant living city. The *ghats*, as seen in figure 4, are a confluence of religious rituals, social interactions and economic activities, capturing the essence of a polycentric and multifunctional urban space. Similarly, the historic *bazars* of old Delhi, with their intertwining lanes and bustling markets, provide diverse services and goods within a compact radius.

Delving into a micro-scale context, the re-development of Gandhi Bazar, a market space in urban South Bengaluru as an urban scape is undergoing a transformation that makes us ponder about the evolving nature of urban public spaces. Traditionally, the threshold between the street and buildings has been considered a dynamic interface, promoting transparency and accommodating various activities seamlessly. However, a notable shift is observed where this threshold is becoming more solid, impacting the fluidity and inclusivity of the urban canvas.

The vitality of urban streets lies in the active participation of residents across age groups and professions. When residents play a pivotal role in shaping the street's creation, preservation, and identity, the shared value of the street is maximised. By viewing this pocket of the city as an 'urban common,' in which all inhabitants utilise, preserve and contribute to its development, it highlights the essence of community-driven urbanism. The effective transformation of public spaces in these holistic neighbourhoods will not only connect communities but also engage the people residing in such areas. Concepts and strategies promoting inclusive public spaces can gradually be adapted by blending the strong principles rooted in traditional values with contemporary urban requirements. This integration is achievable through meticulous planning, thoughtful consideration of essential urban theories and active community participation.

These urban spaces in India inherently embody the concept of the city as a dynamic landscape characterised by a plurality of place and time, with a certain potential to unify these different times-paces. The closely knit streets, characterising Jane Jacobs' 'eyes on the street' philosophy for safer neighbourhoods, serve as a secure harbour for its inhabitants. These streets embody a polychromatic approach, accommodating different age groups engaged in various activities throughout the day, thus contributing to the sustainability of the urban environment. The multitude of activities not only reflects the vivid character of these spaces but also empowers a diverse array of professions, establishing intricate interconnections among them. The assurance of a secure refuge and empowerment promises resilience to the city's inhabitants in the face of evolving urban challenges.

Figure 4: Polycentric urban spaces of Varanasi
Source: timesofindia.indiatimes

As India moves ahead with contemporary urban challenges, embracing and stimulating these historical principles can pave the way for resilient, sustainable and harmonious urban futures.

A Collage?

In the ever-evolving age of technology and scientific advancements, there exists an opportunity to integrate them with the strong planning principles historically followed by various civilisations. These principles, characterised by the creation of high-density, closely-knit, socially liveable neighbourhoods, offer vital insights that, when harmoniously blended with modern scientific developments enable adaptability and agile responses to changing circumstances.

The concept of the collage, in this context, extends beyond being merely a technological advancement; it expresses an understanding of both building structures and the underlying ethos of city planning. It is no longer the city as a simple element, shaped by the accumulation of static entities, but more elements, linked at a variety of levels to each other. As Collin Rowe rightly points out in his book 'Collage City', the collage becomes a transformative tool for fostering diversity in urban approaches (Rowe & Koetter, 1984). The collage seamlessly integrates the old with the new, the traditional with the modern, the local with the global and the private with the public. Something that guides the shift from a monocular vision of cities to a multi-perspective understanding for urban planners seeking to steer through the complexities of contemporary urbanism, ensuring cities that are not only technologically and economically advanced but also culturally, socially and historically rich.

Conclusion

The perception of a city as an 'art' has undergone distortion in recent times, where individual elements are often isolated and viewed monochromatically

with complete emphasis on a few aspects of the whole, rather than the cohesive whole. However, the changing perspectives in the recent past bring in more opportunities to view the city as something that caters to the complex interweaving of built-economic-environmental-socio-cultural aspects. A place where the various hues seamlessly blend to create a texture of the city that's distinct and discrete. A city that transcends the simplistic view as a mere amalgamation of buildings, roads and people into a living and breathing entity, constantly evolving through time, influenced by diverse ideologies, architectural philosophies and urban planning paradigms, each layer seamlessly blending into the next, creating a 'canvas' of textured urban landscape nestled between these extremes.

References

Correa, C. (1978). The new landscape. *Habitat International*, *3*(1-2), 137-140.

Cullen, G. (1961). *Concise townscape* (1st ed.). Routledge.

Mocák, P., Kvetoslava, M. A. T. L. O. V. I. Č. O. V. Á., René, M. A. T. L. O. V. I. Č., János, P. É. N. Z. E. S., Piotr, P. A. C. H. U. R. A., Mishra, P. K., ... & Michaela, D. E. M. K. O. V. Á. (2022). 15-minute city concept as a sustainable urban development alternative: A brief outline of conceptual frameworks and Slovak cities as a case. *Folia Geographica*, *64*(1), 69.

Rossi, A. (1984). *The architecture of the city*. MIT press.

Rowe, C., & Koetter, F. (1984). *Collage city*. MIT press.

Avanee G, a fourth-year student at BMS College of Architecture, is a budding architect who passionately engages in architectural pursuits through documentations, net-zero challenges, competitions, workshops, and article writing. Dedicated to sustainable design, she strives to integrate environmental consciousness into her work, contributing to sustainable design excellence.
Email: avaneeg1@gmail.com

SHORTLISTED ENTRY

Beyond Concrete: Exploring the Soul of the City

By Shah Faisal

A city —a mere word that strikes a billion feelings. Feelings of aspirations, feelings of security, and feelings of alienation. One would often have a rushing response every time you wish to describe a city. A rushing response that is full of technicalities, systems and monotonous structures. It is only when you start living here that you begin to realise that a city is far more than that. A place where paradoxes coexist but where one asserts that the city belongs to all people regardless of their diversity.

Textbook definitions often don't do justice in defining a city. Certainly, a city is crafted through its blocks and juxtaposed in a systematic fashion in which its architecture takes pride in the way it appears. Though a city eludes a rigid, fixed definition, it manifests as a dynamic and living entity, constantly subject to redefinition and interpretation. At its core, a city is not merely a geographical location marked by structures and infrastructure. It is a complex interplay of social, cultural, economic and environmental elements, intricately woven together to form a unique ecosystem. In the intricate dance of urban life, the city serves as a canvas painted with diverse hues of human experience. Beyond the concrete and steel, it echoes the footsteps of those who strive for identity within its complex embrace. As architects shape skylines and construct narratives through design, the city becomes a testament to both progress and tradition. It encapsulates the paradoxes of modernity and the timeless echoes of cultural roots, a dynamic entity that refuses to be confined to textbook definitions.

In the heart of a city, where concrete meets aspiration, a unique argument unfolds—a narrative that transcends the conventional definitions of urban life. As we navigate the bustling streets and towering structures, this essay seeks to unravel the intricate tapestry of identity, diversity and belonging within the cityscape. Beyond the monotonous portrayals of pollution and fast-paced living, a city becomes a living canvas, shaped not only by architects crafting skylines but by the dreams and struggles of its diverse inhabitants. This exploration delves into the paradoxes, celebrations and shared humanity that make a city more than a geographical entity—it transforms into a dynamic ecosystem where individuals, irrespective of background, carve out spaces to belong, creating a narrative that resonates with the pulse of urban existence.

Does the city not belong to the dogs that found solace in the kindness of dog lovers in Pune, who selflessly fed them? Shockingly, these acts of compassion were met with brutality when a female constable resorted to violence, beating the very people offering kindness, and callously discarding the food that would have eased the hunger of these stray dogs. In this distressing scenario, the question arises: should not the well-being of all inhabitants, including the vulnerable stray animals, be a collective concern?

Does the city not belong to the women who have the sole autonomy in choosing their attire? Should their autonomy and freedom not be respected and celebrated? Whether a woman opts to wear

a *hijab*, thus enveloping herself in modest attire or expresses her individuality through more revealing clothing, these decisions should inherently belong to each woman. In the case of women who wear *hijab*, often facing unwarranted scrutiny and mockery for adhering to their religious or personal beliefs by covering themselves completely, and likewise, those who embrace sartorial freedom yet find themselves ridiculed for defying conventional norms with their attire, the core principle remains the same. The city should be a space where women feel empowered by their choices, free from defamation or public harassment.

Does the city not belong to the child who tragically lost their life in the conflict in Palestine? The heartbreaking reality of innocent children becoming victims of violence raises profound questions about the responsibility for such atrocities and the urgent need for solutions that prioritise the safety and well-being of the most vulnerable. In contemplating the responsibility of the child for the conflict, it is crucial to emphasise that children, by their very nature, are not agents of war but are often tragically caught in its crossfire. The burden of conflict resolution should rest on the shoulders of political entities, armed forces and international actors responsible for perpetuating or contributing to the strife. The loss of a child's life in such circumstances is a devastating consequence of broader geopolitical and historical issues, and attributing blame to the child is a morally indefensible perspective.

Architectural solutions, inspired by principles of inclusivity and coexistence, can play a pivotal role in creating a city that embraces its non-human inhabitants. Urban planning should consider spaces that accommodate the needs of stray animals, ensuring they have access to food and shelter. An architect may integrate park benches while designing their sites. Those same benches become shelters for stray dogs serving as havens for both humans and animals, fostering a harmonious cohabitation.

Cities, as spaces where the impacts of conflict are keenly felt, can contribute significantly to peacebuilding efforts. Collaborative international initiatives, guided by the principles of diplomacy and human rights, should strive to create environments where children are shielded from the horrors of war. The establishment of neutral zones, humanitarian corridors and internationally monitored safe spaces within cities can serve as a foundation for protecting the most innocent victims of armed conflicts.

The tragic reality of children being crushed under hospitals, houses and other structures underscores the urgency of creating safe havens in cities affected by conflict. Urban planning, informed by humanitarian principles, must prioritise the establishment of secure zones dedicated to the

Where gazes meet and stories unfold: a diverse array of individuals, each a chapter in the vibrant narrative of our shared humanity, connect through glances that bridge differences and celebrate the rich mosaic of our collective existence
Source: eBook: Bravery & Belonging in the City - Qualtrics

protection of children and other civilians. This involves designing infrastructure that can withstand the impact of conflict, strategically locating hospitals and shelters, and implementing early warning systems to evacuate vulnerable populations.

Does the city not belong to people of all caste, creed, religious, political and economic backgrounds? Is it only for educated and high-profile individuals? A city is for those who hustle hard to build its foundation while developing their own identities. An astonishing identity is created when one lives in a city. An individual is seen as modern, progressive and even educated. Speaking of people who are adamant about city life, they perceive a city with the utmost alienated land. A land that is deprived of the leverages of nature in its purest form. Indeed, a city is quite deprived of the essence of Mother Earth. Often regarded as polluted, crowded, suffocating, fast-paced and whatnot. Someone who doesn't live in a city doesn't need the advances of the world. It often includes people who disregard change and prefer to stay in their comfort zone. And hence architects prefer creating more grounded homes. With homes, it means a place where a design presents warmth, culture and conventional styles. Whereas, a design of a city home might want to portray modern art, lavish structures and contemporary architecture.

The question of belonging comes much after a notion that must be clarified first. The notion of people who sense being and wanting to be. A city includes a blend of both kinds of people. There's always a certain group of people who believe that they belong in a city even before living in a city. Then comes another group that has grown up in a city and hence remains unaware of how a city is perceived by people who don't live here. Whom does it belong to then? To the ones whose hearts belong in a city or to the ones whose lifestyle belongs in it. The former group often feels alienated but chooses to continue living in a city regardless of the lack of satisfaction and acceptance. The latter group simply finds comfort in cities. One cannot assure who a city does not belong to. But one can assure that the city belongs to those who accept it for the way it is. A city belongs to its residents and patrons, it belongs to the fast-paced hustle culture. It belongs to broad-minded individuals who have been working hard for decades. A city belongs to one's true identity of oneself.

Within the contrasting architecture, perspectives are shaped in the minds of people who intend to build their dreams and hence see progressive culture as a part of their future. Where a change in conventional styles invites individuals who aspire to prosper in various walks of life. Hence, we call a place a city when it doesn't remain just a well-planned composition but a community that evolves with its architecture.

Architects often wonder how the world will respond to the perspective that they put forward while creating their art. Will it be judged by sharp shackles of regulations? Or will it be given the liberty of acceptance? These questions often seem to come up on the surface, especially when they are designed in a city where modernity is often questioned by conventional rubrics. More or less, people who live here regard this as a way of expression, where they want their apartments to scream the card of uniqueness and aesthetics.

Drawing parallels with urban planning and the insights from notable works, such as 'The Death and Life of Great American Cities' by Jane Jacobs, it becomes evident that the city is not just about its human residents but encompasses the entire ecosystem within its bounds. In this context, the treatment of stray dogs reflects not only on the compassion of individuals but also on the city's overall humane design.

Jane Jacobs' 'Death and Life of Great American Cities Chapter 2: The Uses of Sidewalks: Safety,' highlights that architectural solutions play a crucial role in fostering a women-friendly environment. Urban planning should prioritise well-lit and inclusive public spaces, designed with an awareness of diverse cultural practices and preferences. Implementing features such as safe and accessible walkways, community gathering spaces and thoughtful infrastructure can contribute to an environment where women feel secure and valued. By ensuring safety and inclusivity through thoughtful design, the state can actively contribute to a city where women of all backgrounds can thrive and express themselves without fear of censure.

In the heartbeat of the city, belonging takes on a nuanced meaning. It extends beyond the physical realm, encompassing the dreams of those who envision a future entwined with its bustling streets and soaring structures. The city is not merely a habitat —it is a community, a living organism that evolves with each architectural stroke.

Yet, amidst the grandeur, questions linger in the minds of architects. Will their creations be embraced by a society often tethered to conventional norms, or will the rigid shackles of regulation stifle the wings of innovation? The city becomes a theatre where modernity grapples with tradition, and each building tells a unique story of expression and aesthetic exploration.

In this ongoing saga, a city is more than a geographical entity —it is a reflection of our collective aspirations, a mosaic of identities striving to coexist. The city belongs to the dreamers who see beyond its flaws, the hustlers who carve their paths amidst its challenges, and the architects who dare to redefine its skyline.

As we navigate the intricate maze of city life, let us recognise that a city is not a static entity frozen in time. It is a living, breathing organism that thrives on the diversity of its people and the bold strokes of its architecture. Embracing the paradoxes, celebrating the differences, and acknowledging the shared essence of humanity within its boundaries, we unlock the true essence of what it means to belong to a city.

Therefore, a city is a vibrant tapestry woven with the threads of human endeavour, architectural innovation and societal complexity. It defies simplistic definitions, transcending the boundaries of mere physical structures. Beyond the superficial impressions of pollution or fast-paced living, a city is a living entity that mirrors the aspirations, struggles and diverse identities of its inhabitants.

To truly understand a city, one must unravel its layers—the stories of empowerment woven into the fabric of daily life, the pulse of diversity that beats in rhythm with its streets and the silent struggles of those who find solace within its borders. It belongs not only to the high-profile individuals but to the unnoticed, the marginalised, and the four-legged inhabitants who also call it home.

As architects mould skylines and individuals carve out their spaces within its confines, the city emerges as a dynamic canvas where tradition dances with modernity. It accommodates paradoxes, shelters dreams, and invites constant reinterpretation. Belonging to a city is not exclusive; it extends its arms to embrace the empowered, the marginalised, and even the creatures that share its streets.

Whether one finds solace in the warmth of conventional styles or seeks expression in the bold strokes of contemporary architecture, a city accommodates diverse perspectives. It is a community in constant evolution, shaped by the dreams of those who hustle hard to build both its foundation and their own identities.

In conclusion, when we navigate the labyrinthine streets, let us acknowledge that a city is not a monolith but a living, breathing entity enriched by the myriad stories of its people. It belongs to those who accept it with all its imperfections, fostering a culture where diversity is celebrated, aspirations are nurtured, and the city becomes a true reflection of the human spirit. In the heart of the city, amidst its contrasting structures and bustling life, we discover a sense of belonging and a canvas that invites us to contribute our unique strokes to the ongoing masterpiece of urban existence.

References

Gehl, J. (2013). *Cities for people*. Island press.

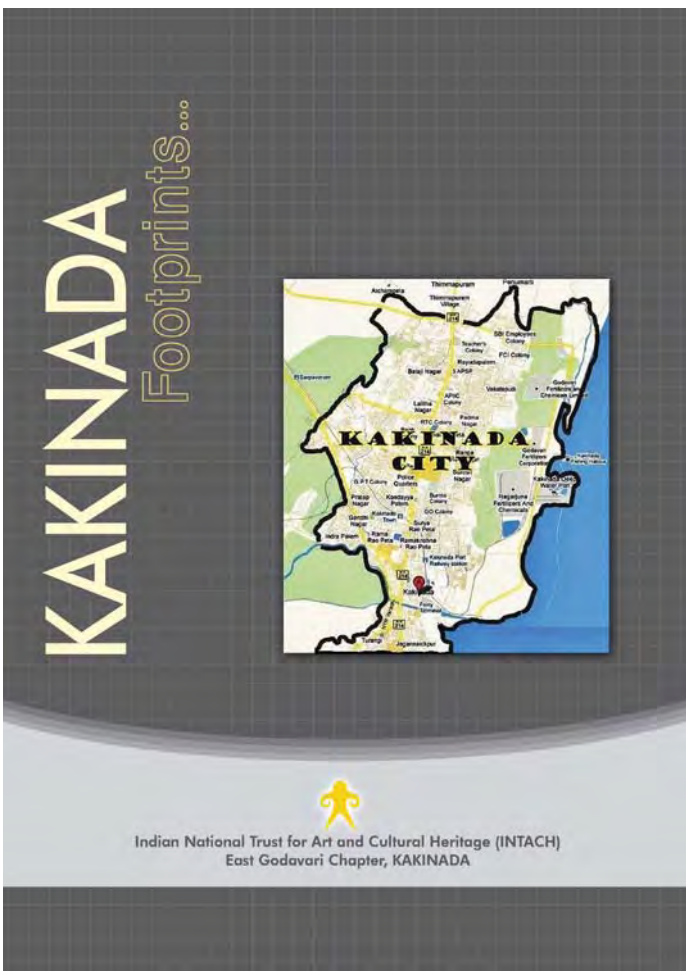
Gehl, J. (2011). *Life between buildings: using public space.* Island Press.

Jacobs, J. (1961). *The death and life of great American cities*. Random House.

Shah Faisal is a student of Pillai College of Architecture in Navi Mumbai. He worked as a research assistant and book designer for *Celebrating India in 75 Buildings* (MES Publications, 2023). He intertwines his academic pursuits with a passion for creating 'emotional and culturally relevant architecture' with the help of computation and AI in architectural design.
Email: faisalmd.shah99@gmail.com

Kakinada Footprints

Author: Ar. Vedula VLN Murthy
Reviewer: Ar. M. Prataprao



Kakinada footprints: book cover

Genre	:	Research
Language	:	English
Publisher	:	INTACH East Godavari Chapter, Kakinada
No of pages	:	104
Year of publication	:	2022

As a part of the documentation of the local heritage of cities and regions, **Kakinada footprints** made by Ar. Vedula VLN Murthy, Convener of the Indian National Trust for Art and Cultural Heritage (INTACH) East Godavari Chapter is a well-documented book useful to architects, planners, historians, archaeologists and researchers. It is published by the INTACH East Godavari Chapter. Kakinada is a well-planned city consisting of streets in grid pattern, open spaces, parks, trees and water bodies, for which it was selected under the Smart city project. The clean city with its Main road for shopping; Temple street, Cinema road, Gold market, Main market and other facilities, carved a place among the 20 cities scoring high on the Ease of Living Index for India.

The valuable messages from Sri M. Gopalakrishna, I.A.S. (Retd.), the State Convener of INTACH, Andhra Pradesh and Telangana and Sri C. Hari Kiran I.A.S., Collector and District magistrate, East Godavari District and Sri Swapnil Dinkar Pundakar, I.A.S. Commissioner, Municipal Corporation, Kakinada and also from the INTACH Head Quarters reinforced the value of the book.

The book begins with the 'Physiological Profile' and continues, in its chapters, the 'History' and the origin of the name Cocanada and Kakinada. It then proceeds with the matters on 'Administration', 'Education', 'Socio-cultural Institutions', 'Economy', 'Natural Heritage', 'Built Heritage' and 'Profile of Legends'. It ends with the changing new landscapes of modern buildings and concludes with the brief chapter about INTACH. The book narrates well the notable historical events held in Cocanada and the institutions that were risen by the social movement of literacy, women education and eradication of child marriages, poverty and superstitions.

The book carries the following contents.

- All India National Congress Meeting held at Cocanada in the last week of December 1923 and the names of freedom fighters who participated pan India and in the East Godavari district.
- Formation of the East Godavari district and the Collectorate in Cocanada in 1925.
- Beginnings of school education from 1874 and the college education from 1884 in the Pithapuram Raja Degree College.
- Socio-cultural institutions established in Kakinada a century ago and still actively running. For instance, Literary Association since 1877, Theosophical Society since 1885, Saraswathi Gana Sabha since 1894, Sri Cocanada Annadana Samajam since 1898, Andhra Sahitya Parishad since 1911, M.S.N. Charities since 1912; Maharani Chinnamamba Ladies Recreation Club since 1914, Young Men's Happy Club since 1916, Cocanada Cosmopolitan Club since 1918, Brahmopasana Mandiram since 1927 and Gandhi Bhavan since 1950.
- Apart from agriculture, Cocanada is a centre for fishing and sea port services and the Cocanada Chamber of Commerce was functioning since 1868.
- Kakinada also possesses great natural heritage and resources and wealth along the sea shore, especially the Coringa Mangroves Sanctuary and the Hope Island. The Coringa Mangroves Sanctuary has the potential to be included in the list of the UNESCO World Natural Heritage sites and the proposal submitted was under examination. Also there are many urban open spaces, parks, trees and water bodies within the city.
- The profile of the legends contains the biographical data of the legendary personalities, who have carved their name for their services, for instance, Sri Yellapragada Subbarao (1895-1948), the scientist who developed medicine for anti-cancer medicine Methotrexate and the drug Diethylcarbamazine (Hetrazan), which was under use by the World Health Organization (WHO) against filariasis; Sri Bulusu Sambamurthy, a lawyer and freedom fighter, who gave up the practice of law for the sake of freedom of the country from the British Raj; Smt. Durgabai Deshmukh (1909-1981) a freedom fighter and a social worker. The Government of India released Postal stamps on these personalities.

Supported by the Reliance Industries Ltd., Kakinada Municipal Corporation and Sri Ramadas Motor Corporation (SRMT) this 104 page colour print book is worth reading.

Author

Ar. Vedula VLN Murthy (A08845) completed his B. Arch from the College of Fine Arts and Architecture, Hyderabad, Telangana. He has been a Faculty in Architecture and Principal for 34 years at Government Polytechnics in Andhra Pradesh until retirement. He is also the Convener of the Indian National Trust for Art and Cultural Heritage (INTACH), East Godavari Chapter and the present Chairman of the Indian Institute of Architects (IIA), Kakinada Centre. He has published extensively in the field of history of architecture.

Email: vvlnmurthy1954@gmail.com

Reviewer

Ar. M. Prataprao (A-6174) is a practising Architect-Planner based in Hyderabad, Telangana. He has thirty years of experience in the field of architecture and urban planning. He was given Research Award for excellence in architecture by the Indian Institute of Architects in 1991, Vastu Shilpa Foundation Fellowship, Ahmedabad in 1995 and Sir M Viswesvarayya Prize of HUDCO for disaster resistant housing in 1999. He participated and presented research papers in various seminars and published six books and several articles in architecture and urban planning journals.

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NEWSLETTER JUNE

PIL Victory

Reinstating the Ghansoli Sports Complex Land

The Indian Institute of Architects, Navi Mumbai Centre (IIANMC), recently secured a landmark victory in a legal battle over the allocation and use of land intended for a sports complex in Ghansoli Node, Navi Mumbai.

The case was about a parcel of land admeasuring about 61 acres of land in sectors 12 and 13 of Ghansoli Node for a sports complex. Out of the said 61 acres, 41 acres of land were earmarked for allotment to Navi Mumbai Municipal Corporation (NMMC) for its sports complex and the remaining about 20 acres were earmarked for allotment to the state government for the Government of Maharashtra Sports Complex.

It is contended that the area of 41 acres earmarked for the NMMC Sports Complex in Sector 12 and Sector 13 in Ghansoli node was reduced by City and Industrial Development Corporation (CIDCO) by about 5 acres in Sector 12 without any intimation or consent of the NMMC, and a letter of allotment dated January 19, 2017 with such a reduced plot area, was issued by CIDCO to the NMMC. CIDCO floated a tender in August 2016 inviting bids to allot a part of the land demarcated as plot Nos. 1, 2 and 4 for residential purposes and plot No. 5 for residential and commercial use. In such a tender, a builder's participation was accepted, and he came to be allotted plot no. 4, which was part of the land proposed to be developed as a government sports complex.

As a result, the Indian Institute of Architects, Navi Mumbai Centre, filed a PIL in 2019 against the actions of City Industrial Development Corporation Ltd. (CIDCO) and of the State of Maharashtra through its Sports Department and the Urban Development Department with the following points:

I) To reinstate the entire plot of land of the sports complex as per the NMMC's General Body Resolution held in September 2013, situated at Sectors 12 and 12A Ghansoli, Navi Mumbai, that was earmarked for the Regional Sports Complex of International Standards as envisaged by the Govt. of Maharashtra vide their G.R. dt. March 26, 2003, as explained or detailed below.

a) To cancel the sub-division and change of use made by CIDCO

b) To cancel the relocated allotment of the tender plot, which was illegally shifted by CIDCO within the plot earmarked for the Government of Maharashtra Sports Complex and to reinstate the use of the sports complex.

c) To cancel the illegal sub-division of plots admeasuring about 5.00 acres in Sector 12 and allot to NMMC the same, along with the area of about 18 acres located in Sector 12-A, as per the NMMC General Body resolution passed way back in September 2013.

d) To restrain CIDCO from further subdividing plots.

The PIL order was finally in favour of IIANMC and the order was passed on 1/7/2024. CIDCO is directed to handover the entire land earmarked for the Government Sports Complex to the State Government, to be utilised for the purpose of the 'Government Sports Complex'.

IIA JHARKHAND CHAPTER

World Environment Day

IIA Jharkhand Chapter organised a Knowledge Session on 8 June to observe and celebrate World Environment Day. A site visit was organised at *Sarla Birla University* campus, situated in Ranchi to educate practicing architects about sewage treatment and water recycling. This visit provided a unique opportunity to learn about the processes involved in water recycling, conservation and sewage treatment in a large institutional setup, and to understand their critical role in environmental sustainability.

Site visit was organised at *Sarla Birla University* campus

The visit was convened by Ar. Arun Kumar, Executive Committee Member, IIA Jharkhand Chapter and Chairman - ASSOCHAM GEM Jharkhand Chapter. The session was guided by Dr. Rajnikant Bidyadhar, an expert on sewage treatment systems. The gathering was attended by several architects of the state and faculty members of the Dept. of Architecture, BIT Mesra. Attendees had the opportunity to see the working of the 30 KLD MBBR based STP, that caters to the 44-acre campus.

The session was then followed by a plantation drive by IIA in the campus, joined by the Vice Chancellor and the Registrar of the University, who informed that the university is working towards a green building certification for the campus.

IIA MAHARASHTRA CHAPTER

IIA Chh. Sambhaji Nagar Centre

As a celebration during the May vacation, IIA Chh. Sambhaji Nagar Centre organised a musical event *Swar Arch* for its members and their families. The event was followed by dinner. Good newspaper coverage was given to *Swar Arch.*

Participants and Office Bearers of IIA Chh. Sambhajinagar Centre during the *Swar Arch* event

IIA Kolhapur Centre

A Heritage Walk was arranged to the important heritage places in the town. Kolhapur Municipal Corporation was in the process of installing light poles made of fibre in the vicinity of heritage structure near River Panchaganga. These fibre lamps were seen to despoiling the character of the historic precinct. As a measure, the members of IIA Kolhapur Centre formed a group and arranged a meeting with the Commissioner to bring a stay upon the fibre lamp installation. Very soon the IIA Kolhapur Centre will be putting up a more appropriate solution to the Commissioner. IIA Kolhapur Centre also celebrated *World Environment Day* by planting trees at Waghbil, Panhala, Kolhapur.

IIA Dhule Centre

IIA Dhule Centre organised a presentation by a representative of the *Bank of India* to explain the importance of CIBIL score and other financial planning-related schemes. A seminar on various waterproofing treatments was also organised.

IIA Yavatmal Centre

IIA Yavatmal Centre organised a workshop on UDCPR and BPMS for the benefit of young architects. They also organised educational visits to furniture shops and various sites to understand MEP services and solar net metering project.

IIA Nagpur Centre

A two-day exhibition of selected thesis works (15th edition) of final year architectural students from seven institutes on 24 May. It was inaugurated by Dr. Subhash Chaudhari, Hon. Vice Chancellor of Rashtrasant Tukdoji Maharaj Nagpur University.

IIA Talegaon Sub-Centre

A panel discussion was organised on the topic of the *Liaison and Approval Process and Documentation*. The guest speakers were Ar. Rajesh Rathod and Mr. Deepak Vadgama. They also organised the second event in the same series on *BPMS, Introduction to UDCPR & Development Plan*. The guest speakers were Ar. Rajesh Rathod and Mr. Kunal Gandhi.

ODISHA CHAPTER NEWS

Echoes of Kalinga Heritage Walk

On 12 May 2024, IIA Odisha Chapter successfully conducted its *Echoes of Kalinga* Heritage Walk aimed at promoting awareness about the architectural legacy of ancient Odisha temples. The event saw a strong turnout, with around 25-30 participants, architects and historians, gathering at the Parsurameshwar Temple at 6:00 am for the guided walk. Two eminent guides, Dr. Arunima Pati, Assistant Archaeologist from the Archaeological Survey of India's Bhubaneswar Circle, and Sri Bibekananda Panda, a resource person from the Utkal University of Culture, led the group through four iconic monuments - Parsurameshwar, Mukteshwar, Kedareshwar and Gauri Temple.

Dr. Pati and Sri Panda meticulously explained the historical significance and architectural marvels of these ancient sites. As the group traversed the monuments, the guides provided insightful commentary on the intricate temple designs, sculptural embellishments, and construction techniques that have withstood the test of time. Participants were enlightened about the rich cultural heritage embodied in these architectural masterpieces.

After the informative walk, the guides, Dr. Arunima Pati and Sri Bibekananda Panda, were felicitated by the

Architects from IIA Odisha Chapter as well as guides, Dr. Arunima Pati, Assistant Archaeologist from the Archaeological Survey of India's Bhubaneswar Circle, and Sri Bibekananda Panda, participating in the Heritage Walk

Mr. Ameet V Kothari presenting and explaining home automation technologies to the members of IIA.

organizers for their invaluable contribution in making the event a success. The participants also engaged in a cleanliness drive around the temple premises before being treated to a sumptuous breakfast, marking the conclusion of this enriching experience.

The *Echoes of Kalinga* Walk, a joint effort by the architects' body and local authorities, aimed to instil a sense of pride and responsibility towards preserving Odisha's invaluable architectural treasures for future generations.

IIA Odisha Chapter Hosts Insightful Session on Home Infrastructure

On 22 May 2024, IIA Odisha Chapter conducted an engaging continuous professional development (CPD) session titled *Understanding Today's Home Infrastructure Options* at Bhubaneswar. The knowledge-sharing event was organized in association with *Smartnode*, a leading provider of home technology solutions. The session, held at the IIA Odisha chapter office, witnessed an enthusiastic gathering of professionals keen to explore the latest trends and options available in the rapidly evolving home infrastructure domain. The event was spearheaded by Mr. Ameet V. Kothari, a renowned expert in the field, along with his proficient technical team. During the insightful session, Mr. Kothari and his team delved into the diverse aspects of modern home infrastructure, encompassing networking, automation, security, entertainment, and energy management systems. They shed light on the cutting-edge technologies, products, and services that are transforming the way we design, build, and live in our homes. Attendees gained valuable insights into the integration of smart home technologies, enabling seamless control, convenience, and energy efficiency within residential spaces. The session also highlighted the importance of robust and secure home networks to support the increasing number of connected devices and IoT applications.

Expressing their gratitude, the IIA Odisha Chapter felicitated Mr. Kothari and his technical team for their informative and engaging presentation. Additionally, participants from the previous CPD session were presented with certificates, recognizing their commitment to continuous learning and professional development.

The event fostered an interactive environment, allowing attendees to seek clarifications, share experiences, and explore potential collaborations within the home infrastructure domain. The IIA Odisha chapter expressed its appreciation for the overwhelming response and affirmed its commitment to organising more such enriching sessions in the future.

PUNJAB CHAPTER NEWS

Discussion on Urban Heat Solutions on World Environment Day Week

Mohali: On June 7, 2024, in celebration of World Environment Day week, the Indian Institute of Architects (IIA) Punjab organised a comprehensive discussion on urban heat solutions, focusing on rethinking architecture and air conditioning. The event, held in Mohali, attracted over 100 professionals across Punjab.

Moderating the discussion was Ar. Pritpal Singh Ahluwalia, Chairman of IIA Punjab, who underscored the necessity of understanding the physics of building materials to create a comfortable built environment for occupants.

Col. Slaesh Pathak, Chairman of the IGBC Chandigarh Chapter, provided insights into the physical parameters of glass.

Ar. Surinder Bagha, Past Chairman of the Chandigarh-Punjab Chapter and Head of IIA Publications, discussed the role of green covers in mitigating heat effects.

Adding to the dialogue, Ar. Kanika Bansal, an award-winning architect recognised for her academic and professional achievements, highlighted the importance of incorporating the study of building materials and green building parameters into the education of future architects.

ER Anvesh K. Tripathi from Voltas explained the optimal use of air conditioning systems for human comfort, stressing energy efficiency and sustainability.

A notable highlight of the event was the launch of the book "Hidden Secrets of Structural Success" by Er. Rakhra. The book, which provides valuable insights into structural engineering, was offered free of charge to all IIA members upon request.

The event was meticulously managed by Ar. Rajinder Brara and Ar. Randeep Singh, both executive members of IIA Punjab. The smooth flow of the event was ensured by Mr. Sharshvir Singh, who served as the Master of Ceremonies.

Among the distinguished attendees were Mr. Nilesh from IGBC, Mr. Money Khanna from PEDA (an ECBC nodal agency), Ar. R.S. Sandhu, Chairman of IIA Patiala, and Ar. Prabhjot Kaur, Vice Chairman of IIA Mohali.

This gathering marked a significant step forward in enhancing environmental awareness and promoting practical, science-based approaches to building design and urban planning.

Ludhiana Centre Hosts Free Health Checkup

Ludhiana: On June 8, 2024, the Ludhiana centre of the IIA Punjab Chapter organised a free multispeciality health checkup at Fortis Hospital, Mall Road, Ludhiana. Numerous architects and their families benefited from the health checkup, which included a complimentary health lunch.

Dr. Davinder Paul, MD Medicine and DM Oncology, conducted a health talk, explaining healthy lifestyles and cancer prevention measures. Ar. Pritpal Singh Ahluwalia, Chairman of IIA Punjab, served as the chief guest and praised the efforts of Ar. Balbir Bagga, Chairman of IIA Ludhiana Centre.

Ar. Rajan Tangari, Joint Secretary of IIA Punjab, was the guest of honour and spoke about the importance of self-care. The event was convened by Ar. Sanjay Kumar, with participation from architects Ar. Varunesh Kumra, Ar. Anchal Gupta, Ar. Niranjan Kumar, Ar. Nirat, Ar. Nidhi, Ar. Ankur, Ar. Navdeep Kumar, Ar. Vivek, and Ar. Akanksha.

(Left to right) Er. A.K. Tripathi from Voltas, Ar. Surinder Bagha, Past Chairman IIA Chandigarh-Punjab; Ar. Pritpal Singh Ahluwalia, Chairman IIA Punjab; Col. Slaesh Pathak, Chairman IGBC Chandigarh; and Ar. Kanika Bansal, Academician and Award Winner, engaged in a discussion on Urban Heat Solutions.

7th COUNCIL MEETING OF THE TERM 2023-2025 (ONLINE) ON 08-06-2024.

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1	Ar. Jeyakumar Srinivasan	Tamil Nadu	F11809
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