April 2023 Vol-18 No-4 ISSN 2582-8304

Design for All

A monthly publication of
Design for All Institute of India

Guest editor: Dr. Rachna Khare

April 2023 Vol-18 No-4 ISSN 2582 8304

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GUEST EDITOR

Dr. RACHNA KHARE

Dr.RachnaKhareis full Professor and Head of Department of Design at School of Planning and Architecture Bhopal, a Government of India Institution of National Importance. She served the institute in several administrative positions like Dean (Research) and Head of the Departments (Architecture, Landscape and Conservation). Starting her career in the early nineties, Rachna is a dedicated teacher and keen researcher for last twenty two years. Rachna's research interests in the field of 'Universal Design' and 'Designing for Special Needs' have earned her grants and awards nationally and internationally. She is recognized as 'Inspired Teacher' by Hon'ble President of India and stayed Scholar-in-Residence at RashtrapatiBhavan in 2016. She is also two times winner of Fulbright Fellowship (2022 and 2007) and availed those at George Washington

University, Washington DC and Georgia Institute of Technology, Atlanta. Rachna has done several sponsored research projects with All India Council of Technical Education, University Grants Commission and Design Innovation Center Project of Ministry of Education in India. She has lectured worldwide on Inclusive Design and has more than 50 papers in various National and International journals and conferences to her credit. She has authored 3 books, 12 book chapters and edited more than 15 refereed journals. Rachna is well known as an activist and is a founder member of 3 NGOs working for the upliftment of vulnerable populations in India. Other than her regular teaching and research at her institute, Rachna founded and chairing a Centre for Human Centric Research (CHCR) that aims to build a body of knowledge that responds to the design needs of diverse human population otherwise marginalized in the past design practices.

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GUEST EDITORIAL

Inclusive Design paradigm has changed over the period of time, globally and locally. New paradigm of 'User Sensitive Inclusive Design' respects human uniqueness and variability rather than fixing those. There are many international policies which are steering this paradigm shift at global level, like United Nations convention of rights for persons with disabilities (UNCRPD), Sustainable Development Goals(Goal 3,5,10,11,16) adopted by all United Nations Member States etc. These initiatives are addressing the issues of equality, discrimination, justice, health, sustainability and human-rights at global level. The developing countries, despite other pressing issues, are also making an effort but there may be gaps in the application due to their limited resources. India also has moved forward with UNCRPD, RPWD Act and Accessible India Campaign but the reality is that the task is huge, and we have only taken baby steps. Today we need two prong approach, first is to stop treating people with functional limitations as special cases requiring specialized solutions but integrate them in the mainstream through more inclusive approach in design of cities, public spaces, city infrastructure, buildings, products, services etc. And the second is to empower the diverse users to question the existing scenario and receive quick justice if they face any discrimination.

Today design and planning professionals are also talking about interdisciplinary approach, engaging with the users, and co-creation to solve real life problems. They are more empathetic to the users and more respectful for their differences. School of Planning and Architecture (SPA-B), Bhopal, is an Institution of National Importance, Ministry of Education, Govt. of India, under an Act of Parliament. Ranked amongst top ten in NIRF ranking, SPA-B is committed to produce socially aware designers, architects and

planners and has embraced Universal Design as priority research areas. To further this agenda, a multidisciplinary Centre for Human Centric Research (CHCR) is housed at SPA-Bhopal since 2010. This centre supports human-centric approach as a multidisciplinary problem-solving approach to design for vulnerable groups like individuals with disabilities, elderly, children, social and ethnic minorities. To attain its objectives, the centre functions in four major areas, 'Identification of Research Priority Areas and Networking', 'Education and Training', 'Research and Design Development' and 'Dissemination'. The centre has conducted several design studios, competitions, training programs, publications and service projects on the theme through a core group of about 8 faculty members and experts. The centre and its associated faculty received Universal Design Awards 2012, 2013 and 2016, instituted by NCPEDP, Mphasis and Access Ability in India.

In the Centre for Human Centric Research, we are constantly working to sensitize future professionals at undergraduate, postgraduate and doctoral research level. There are some direct impacts resulting from sensitization during academic years, when user centric approach is emphasized throughout. Whereas, a few students are indirectly impacted due to such environment in the institute. Taking this opportunity of editing 'Design for All', we have showcased the projects resulting from this direct and indirect impact of our educational initiatives at School of Planning and Architecture Bhopal.

Author Ankit Kumar is a PhD student in the institute and pursuing his research in 'Framework for Safe Evacuation of Older Adults during Fire in High-Rise Residential Buildings in India'. His work is phenomenal and has impacted the understanding about accessibility for elderly in case of disasters. Sukrit, Taruna, Divya, Soha, Rumana and Qamar are undergraduate students at SPA Bhopal, and their paper is based on an inclusive design exercise which was part of their studio. Nayana, Suman, Venkatesh, Manika and Priyanka are

undergraduate students and have done excellent paper contribution which has resulted from the indirect impact of universal design explorations in the institute. ParnaviHarde is a postgraduate student, and is extremely enthusiastic about participating in all initiatives related with universal design in the institute. She has contributed a paper on post covid-19 pandemic scenarios for children, a study which she has conducted in past. Disha Maity is a research intern, and is working in the institute on design innovation project on universal design sponsored by Ministry of Education, Government of India. Her sensitivity towards vulnerable groups is reflected in her paper about marginalized idol makers of Kolkata.

There are seven articles in this issue ranging from Inclusive design research to education; problems encountered by vulnerable groups in historic cores to post covid scenarios; and from social, physical, economical barriers to sensory problems.

Disha Maity in her paper 'Idol makers of Bengal: Case of Kumartuli and Patuapara' has presented detailed study of the idol makers, focusing on their aspirations and challenges, taking two prime stretches of Kolkata as case studies where idol makers have their workshops.

Ashish Saxena and Batul Zainab in their paper 'Inclusive Design: An Introspection of Design Process in Pedagogy' presents teaching strategies of integrating inclusive design with the architecture design coursework to aid the implementation of appropriate inclusive methods and tools within the design process.

'Fire Safety Provisions for Elderly in High-Rise Residential Buildings: A Comparative Analysis' authored by Ankit Kumar, Rachna Khare, Sandeep Sankat and Pratyoosh Madhavi, presents various building codes and standards followed in various countries regarding fire safety for elderly populations. The revelations of this study would sensitize architects, planners and policy makers towards special needs of elderly during fire.

'Reimagining Public Toilets: Alleviating Unconscious Gender Biases Existing in Public Toilet Designs' authored by ManikaGarg and Priyanka Santosh, presents the case of making washrooms inclusive and safe for all, irrespective of gender biases. By critically analyzing user group feedback and existing design approaches, they have presented the strategies which will work best for the purpose.

Sukrit Marwaha, Taruna Aiyyar, Divya M, Soha Kulkarni, Rumana Nishat Qamarin their paper 'Creating an Inclusive Streetscape in a Traditional Market: A Case of Chowk Bazaar, Bhopal' presented streetscape of one of the cardinal axes of a market square in Bhopal. The paper aims to observe and analyze the street through various parameters, and deduce various ways to make the streetscape inclusive to the identified user groups.

Parnavi Harde in her paper 'Child Centric Cities: Understanding the Post Covid-19 Pandemic Scenarios for Child Centric Cities & Reimagining Urban Friction Spaces for Children in the Cities' presents a toolkit for re-establishing and shaping child friendly environment post covid, and reimagining urban friction spaces that grabs the child's attention and offers interaction with the city.

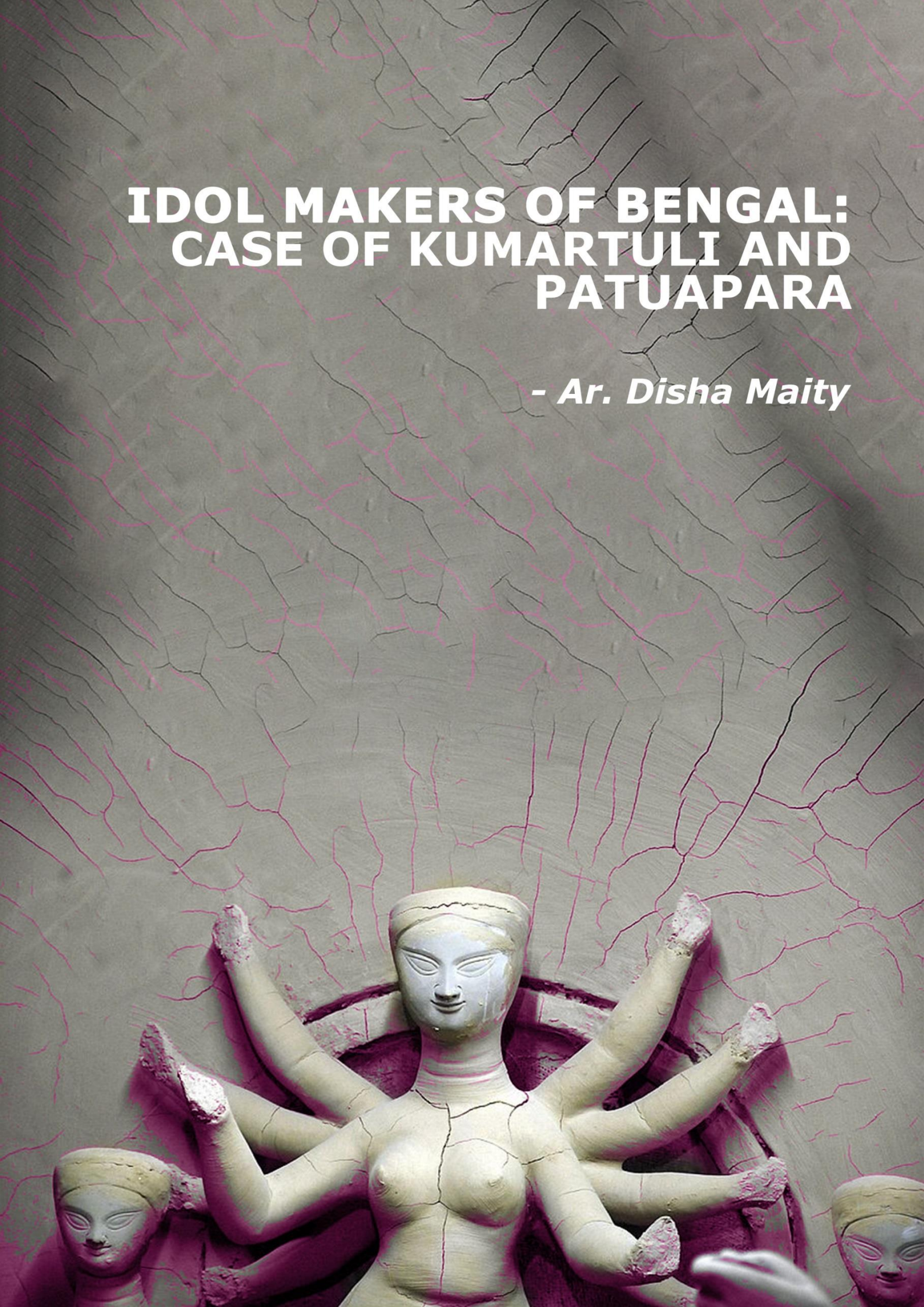
Nayana D, Suman Kumari and Shobhan Venkatesh in their paper 'Rethinking Ergonomics to Improve Sensory Integration in Learning Spaces for Autistic Children' discusses how reconsideration of ergonomics and design elements in furniture design can affect and improve the sensory integration for Children with Autism Spectrum Disorder in the learning spaces. They conducted surveys of all stakeholder, to collect, analyze and synthesize data, that clarified what triggers children with ASD and what affects them positively, to find a solutions for sensory integration.

I sincerely thank all the authors; they were extremely supportive and followed the given deadlines. Students have also helped me throughout in reviewing, designing and formatting the publication. Other than contributing paper, Disha Maity has co-edited this closely

with me, she was involved in this publication from beginning to end. Hope this issue will meet the objectives of 'Design for All' and readers will enjoy this publication as much as we enjoyed putting this together.

IDOL MAKERS OF BENGAL: CASE OF KUMARTULI AND PATUAPARA

- Ar. Disha Maity



ISSN: 2582-8304

Ar. DISHA MAITY

Completed graduation in Bachelor in Architecture in 2022 from Hitkarini College of Architecture and Town Planning (HCATP), Jabalpur, is currently working as a Research Associate in School of Planning and Architecture, Bhopal.

Design for her is not only about making things look aesthetic, but communicating complex things in a way that is easier to understand. Precisely, she is interested in creating a meaningful experience with a focus on inclusive design.

She has a strong inclination towards research with curiosity for problem solving through universal approach and conceptualization.

ISSN: 2582-8304

IDOL MAKERS OF BENGAL : CASE OF KUMARTULI AND PATUAPARA

Ar. Disha Maity

Research Associate - School of Planning and Architecture, Bhopal

ABSTRACT

India as a nation is made to worry about what makes it culturally unique, in the process of becoming a part of a globalized world. India holds a symbolic place in history, along with an efficient association with the iconic festival of Bengal, Durga Puja, and a long practice of artisans making clay idols. Idol making is one of the civic folk art in Kolkata and many people like potters, artisans, clay modellers, etc. are a part of the Idol industry. Kumartuli is the traditional home to clay artisans who work for the entire year to supply idols for various Hindu pujas. Plagued with unawareness and stagnation, this art form will soon be extinct. Through the historical example of the clay artisans of West Bengal, called "Kumars" (a Bengali word meaning potter) or "Patuas" (derived from a Bengali word 'Pota' which means an artist). This paper aims to show how the preservation of this art form depends on maintaining a balance between adapting to remain relevant and therefore economically applicable to a given culture, also preserving a connection to its historical roots by providing the artisans with required resources and infrastructure. In brief, the methodology deploys a detailed study of the idol makers, focusing on their aspirations and challenges, taking two prime stretches of Kolkata where idol makers have their workshops (Kumartuli and Patuapara) as case studies. By explaining the aspiration and problems of the Kumars of Kumartuli and the Patuas of Patuapara (the idol makers) and how they have endured and survived the cultural shifts of the past three centuries, this paper aims to highlight

the complex relationship between India and, and how folk artists make a living from their traditional art. Idol making, in every form, proves that the best way to preserve folk art is through adaptation.

KEYWORDS

Idol Makers, Infrastructural Solutions, Design Thinking, Intangible Heritage, Learning Spaces, Inclusive Design .

INTRODUCTION

Kumartuli and Patuapara are two of the most important centres of idol-making in Bengal. Both these areas are located in Kolkata and are home to hundreds of skilled artisans who create intricate sculptures of gods and goddesses for use in Hindu festivals and ceremonies.

Figure 1 : Image of idols in a workshop

Picture credit –Hirak Das

Kumartuli, a 300-year-old North Kolkata community of "kumars" meaning potter, built up their community in the alleys of North Kolkata. Kumartuli is located in the northern part of Kolkata and is the most famous centre of idol-making in Bengal. The area is home to around 550 workshops, where skilled artisans create idols of gods and goddesses using clay, bamboo, and other materials. The idol makers of Kumartuli are known for their exceptional skill and creativity, and their work is highly valued by devotees and art collectors alike.

Patuapara, on the other hand, is a lesser-known centre of idol-making in Kolkata. Located in the central part of the city, Patuapara is home to around 100 workshops, where skilled artisans create idols of gods and goddesses using clay and other materials. While the idol makers of Patuapara may not be as famous as those in Kumartuli, their work is no less impressive, and they are known for their skill and attention to detail.

The idol makers of Bengal are highly skilled artisans who create intricate sculptures of gods and goddesses for use in Hindu festivals and ceremonies. They are concentrated mainly in the areas of Kumartuli in Kolkata and Krishnanagar in the Nadia district of West Bengal. The tradition of idol-making in Bengal dates back several centuries and is closely associated with the annual Durga Puja festival, which celebrates the victory of the goddess Durga over the demon Mahishasura (Herbert, 1892). The process of making the idols involves several stages, including the creation of the basic structure using bamboo and clay, followed by the application of layers of clay, and finally the painting and decorating of the finished product. The idol makers of Bengal are highly respected and play an important role in the cultural life of the region. Their skill and craftsmanship are widely acknowledged, and their work is highly valued by devotees and art collectors alike. The idol-making industry also provides employment to many people, including skilled artisans and support staff. In recent years, the idol makers of Bengal have faced several challenges, including competition from mass-produced idols and environmental concerns over the use of non-biodegradable materials. Efforts are being made to address these challenges, including the promotion of eco-friendly materials and techniques, as well as the development of new markets for the products of these skilled artisans.

Durga Puja was inscribed on the UNESCO Representative List of the Intangible Cultural Heritage of Humanity in 2020. This festival is celebrated with great enthusiasm and fervour, especially in the eastern and north-eastern regions of India, including West Bengal, Assam, Bihar, and Odisha, as well as in Bangladesh and Nepal. During the festival, people offer prayers and perform various rituals to honour Goddess Durga, who is believed to symbolize female power and the triumph of good over evil.

The UNESCO Intangible Cultural Heritage tag recognizes the significance of Durga Puja as an important cultural tradition that is passed down from generation to generation, and its inscription on the list aims to promote its safeguarding and transmission to future generations.

RESEARCH METHODOLOGY

In this research study, a mixed-methods approach was used, involving the use of three different types of surveys. The first survey was administered by architects, who were experts in the field of architectural design and were able to provide valuable insights into the construction of Durga idols. The second survey was conducted among individuals who frequently visit Kumartuli; specifically targeting students aged 18 to 26, who were likely to have a keen interest in the cultural significance of the Durga Puja festival. The third survey was administered directly to the idol makers themselves, who were able to provide unique insights into their techniques, materials, and cultural practices. By combining the perspectives of architects, visitors, and makers, this study aimed to provide a comprehensive understanding of the complex cultural heritage of Durga Puja and its associated idol-making practices.

HISTORY OF IDOL MAKERS OF BENGAL

The history of idol-making in Bengal dates back several centuries and is deeply rooted in the region's culture and traditions. The practice of creating idols of gods and goddesses for use in Hindu festivals and ceremonies is an important aspect of the region's religious and cultural life.

The tradition of idol-making in Bengal can be traced back to the 16th century, during the reign of the Mughal Emperor Akbar. At that time, many skilled artisans from various parts of India were brought to Bengal to work on the construction of buildings and monuments. Among these artisans were sculptors who specialized in the creation of idols. (Bumiller, 1985).

Over time, the art of idol-making in Bengal evolved and developed into a highly skilled and specialized craft. The idol makers of Bengal began to create elaborate and intricate sculptures of gods and goddesses, using a range of materials, including clay, bamboo, and plaster of Paris. (George, 1956) The idol-making industry in Bengal grew rapidly during the 19th and 20th centuries, as the popularity of Hindu festivals such as Durga Puja and Kali Puja spread throughout the region. The idol makers of Bengal became highly respected and their work was widely sought after by devotees and art collectors alike.

In recent times, the tradition of idol-making in Bengal continues to thrive, with skilled artisans working in centres such as Kumartuli in Kolkata and Krishnanagar in the Nadia district. While the industry faces challenges such as competition from mass-produced idols and environmental concerns over the use of non-biodegradable materials, efforts are being made to preserve and promote this important aspect of Bengal's cultural heritage.

HISTORY OF KUMARTULI:

Kumartuli is a neighbourhood in the northern part of Kolkata, India, known for its traditional potters who specialize in making clay idols of gods and goddesses. The history of Kumartuli dates back to the late 17th century when it was established as a settlement for the potters who used to create clay idols for the Durga Puja festival.

During the British colonial period, Kumartuli expanded rapidly as the demand for clay idols grew not just in Kolkata but also in other parts of India and even abroad. The potters of Kumartuli also started making idols of other deities like Saraswati, Lakshmi, and Ganesha, apart from Durga. (Datta Roy, 2008)

In the early 20th century, Kumartuli faced a major challenge when a devastating earthquake destroyed many of the idols and workshops. However, the potters persevered and rebuilt their workshops, and the tradition of idol-making in Kumartuli continued to flourish.

Today, Kumartuli is not just a hub for traditional clay idol-making but has also become a center for contemporary art and sculpture. The neighborhood is a popular tourist attraction during the Durga Puja festival, as visitors flock to see the idols being made and take part in the festivities. The potters of Kumartuli continue to keep the tradition of clay idol-making alive, passing on their skills and knowledge from generation to generation.

HISTORY OF PATUAPARA:

Patuapara is a historic neighborhood located in the central part of Kolkata, India. It is known for its traditional handloom industry and textile weaving. The history of Patuapara can be traced back to the late 19th century when the area was inhabited by weavers from different parts of Bengal who migrated to Kolkata in search of work.

The weavers of Patuapara used to specialize in weaving traditional textiles like sarees, dhotis, and lungis using handlooms. The textiles woven in Patuapara were known for their intricate designs and superior quality and were highly sought after not just in Kolkata but also in other parts of India and abroad.

During the British colonial period, the handloom industry in Patuapara faced a major setback due to the import of machine-made textiles from Europe. However, the weavers of Patuapara persevered and continued to produce high-quality textiles, catering to the needs of the local market.

In the 20th century, the handloom industry in Patuapara witnessed a revival as the demand for traditional handloom textiles increased. The weavers of Patuapara adapted to the changing times and started producing textiles with modern designs and patterns, while still maintaining their traditional techniques and quality.

Today, Patuapara is a hub for traditional handloom textiles and weaving. The weavers of Patuapara continue to produce high-quality textiles, which are sought after by both local and international customers. The neighborhood is a popular tourist attraction, with visitors coming to see the weavers at work and to purchase the exquisite textiles that are produced here.

INFRASTRUCTURAL PROBLEMS THE IDOL MAKERS FACE -

The idol makers of Kumartuli and Patuapara face several infrastructural challenges, which can impact their livelihoods and the quality of their work. Some of the major infrastructural problems faced by the idol makers are:

***Poor working conditions*: The workshops of the idol makers are often located in narrow lanes and lack proper ventilation and lighting, making it difficult for the artisans to work for long hours. This can lead to health problems and impact the quality of their work.**

Figure 2 : Image showing the streets of Kumartuli

Source – The Wire

***Lack of basic amenities*: The workshops of the idol makers lack basic amenities such as clean drinking water, sanitation facilities, and healthcare services, which can affect the health and well-being of the artisans.**

Insufficient raw materials*:* The artisans often face problems in sourcing good quality raw materials at affordable prices. The lack of proper storage facilities can also lead to damage and spoilage of raw materials.

Inadequate transportation facilities*:* The transportation facilities to and from the workshops are often inadequate, leading to delays in the delivery of raw materials and finished products. This can impact the timely completion of orders and the profitability of the artisans.

Lack of modern equipment*:* The idol makers still use traditional techniques and equipment, which can limit their production capacity and the quality of their work. The lack of modern equipment can also lead to physical strain on the artisans.

Addressing these infrastructural challenges will require the government and other stakeholders to invest in the development of the necessary infrastructure, including workshops, storage facilities, transportation facilities, and basic amenities. This will help to improve the working conditions of the artisans, enhance the quality of their work, and support the preservation of their cultural heritage.

SOLUTIONS TO THE INFRASTRUCTURAL PROBLEMS THE IDOL MAKERS FACE-

Infrastructure development can play a crucial role in improving the lives of idol makers in Kumartuli and Patuapara. Some of the infrastructural solutions that can be implemented include:

Upgradation of workshops*:* The government can provide financial assistance to upgrade the workshops of the idol makers. This can include the provision of better lighting, ventilation, and equipment, which can improve the working conditions of the artisans and enhance the quality of their work.

Creation of a common facility centre: *A* common facility centre can be set up to provide shared infrastructure and services to the idol makers. This can include facilities such as raw material storage, design support, quality control, and marketing support. This will help the artisans to reduce their costs and improve their overall efficiency.

Provision of raw materials*:* The government can set up facilities to provide the artisans with raw materials at subsidized rates. This

will help the artisans to reduce their costs and improve their profitability.

Improvement of transportation facilities*:* The transportation facilities to and from the workshops can be improved to ensure the timely delivery of raw materials and finished products. This can include the provision of better roads, public transportation, and logistics support.

Provision of basic amenities*:* The government can provide basic amenities such as clean drinking water, sanitation facilities, and health care services to the artisans. This will help to improve their health and well-being and create a better working environment.

By implementing these infrastructural solutions, the lives of the idol makers in Kumartuli and Patuapara can be significantly improved, and their artistic skills and cultural heritage can be preserved for generations to come

GENERAL PROBLEMS THE IDOL MAKERS FACE IN THEIR DAILY LIVES-

Both Kumartuli and Patuapara face several challenges in the modern era, including competition from mass-produced idols and environmental concerns over the use of non-biodegradable materials. However, efforts are being made to address these challenges, including the promotion of eco-friendly materials and techniques, as well as the development of new markets for the products of these skilled artisans.

The idol makers do face multiple problems, from improper infrastructure to not availability of proper materials. The lack of government support makes it difficult for the artisans to modernize their production techniques or compete effectively in the market.

Despite these challenges, the idol makers of Kumartuli and Patuapara continue to play an important role in the cultural life of Kolkata and engal, and their work is an essential part of the region's rich artistic and religious heritage.

The idol makers of West Bengal face several challenges in the modern era, including:

Figure 3 : Image showing the condition of the workshops after cyclones

Source – The Wire

Competition from mass-produced idols*:* The rise of mass-produced idols made from cheaper materials such as plaster of Paris has made it difficult for traditional idol makers to compete in the market. These idols are often sold at lower prices, which makes it hard for artisans to earn a living from their craft.

***Environmental concerns*: The use of non-biodegradable materials such as plaster of Paris in the creation of idols has led to environmental concerns, particularly around the issue of water pollution. The immersion of these idols in water bodies after festivals like Durga Puja has been known to cause significant harm to aquatic life.**

Lack of government support*:* The idol-making industry is largely unorganized and lacks government support in terms of infrastructure and financial assistance. This has made it difficult for artisans to modernize their production techniques or compete effectively in the market.

Decline in traditional skills*:* With the rise of modern technologies and changing consumer preferences, there is a risk that traditional skills and techniques used in idol-making may be lost over time. This could lead to a decline in the quality of the art form and its cultural significance.

Efforts are being made to address these challenges, including the promotion of eco-friendly materials and techniques, the development of new markets for traditional idols, and the creation of government support programs for the idol-making industry. These measures will help to preserve the rich cultural heritage of idol-making in West Bengal and support the livelihoods of skilled artisans in the region.

SOLUTIONS TO THE GENERAL PROBLEMS THE IDOL MAKERS FACE IN THEIR DAILY LIVES-

There are several solutions that can help improve the lives of idol makers in Kumartuli and Patuapara:

***Diversifying their products*: The idol makers can diversify their product range by creating new and innovative designs of idols, including idols made from eco-friendly materials. This will help them to reach a wider market and increase their income.**

Government support*:* The government can provide support to the idol makers in terms of providing them with infrastructure and financial assistance. This can help them to modernize their production techniques and compete more effectively in the market.

Market development*:* Efforts can be made to develop new markets for traditional idols, including international markets. This will help to increase demand for their products and support the livelihoods of the artisans.

Skill development*:* The government and other organizations can provide training and skill development programs to the artisans, including training in new techniques and designs, as well as business skills. This will help to improve the quality of their work and increase their income.

Promotion of eco-friendly materials*:* The use of eco-friendly materials in idol making can help to reduce environmental pollution and protect the health of the artisans. Efforts can be made to promote the use of eco-friendly materials and encourage consumers to choose these products over those made from non-biodegradable materials.

By implementing these solutions, the lives of the idol makers in Kumartuli and Patuapara can be improved, and their rich cultural heritage can be preserved for future generations.

HOW CAN THE TAG OF INTANGIBLE HERITAGE TO DURGA PUJA BE BENEFICIAL FOR THE IDOL MAKERS –

The UNESCO Intangible Cultural Heritage tag for Durga Puja has brought several benefits for the idol makers, who are an integral part of the festival. Some of these benefits include:

Recognition*:* The UNESCO tag has brought international recognition to the art of idol-making associated with Durga Puja. It has highlighted the craftsmanship, skills, and knowledge of the idol makers, which were previously not widely known or appreciated. This tag along with adding prestige to the festival of Durga Puja, will also bring acknowledgment for the artisans being the actual heroes.

***Economic Opportunities*: The recognition has also created economic opportunities for idol makers. The demand for their unique and traditional art has increased, not just in India but also in other parts of the world, leading to more business opportunities and income for them.**

Figure 4 : Idol makers working in their workshops

Picture credit – Hirak Das

Preservation of Traditional Skills*:* With the increased demand for traditional idols, idol makers are encouraged to continue practicing their skills and passing them down to future generations. This helps to preserve the traditional knowledge and skills that are unique to this craft.

Increased Support*:* The recognition has also led to increased support from the government and other organizations for the preservation and promotion of the traditional art of idol-making. This support includes financial assistance, training, and skill development programs, which help the idol makers to improve their craft and expand their business.

Overall, the UNESCO tag for Durga Puja has brought many benefits for the idol makers, including recognition, economic opportunities, preservation of traditional skills, and increased support from the government and other organizations.

There are several things that can be done for the idol makers after Durga Puja got the tag of UNESCO intangible heritage tag.

Some of these include:

Providing Skill Development and Training*:* One of the most important things that can be done for the idol makers is to provide

them with skill development and training programs. This can help them improve their craft, learn new techniques, and develop their business skills.

Financial Assistance*:* The government and other organizations can provide financial assistance to idol makers. This can include grants, loans, and other forms of financial support that can help them to expand their business and invest in new equipment and materials

Promoting their Art*:* The recognition from UNESCO can be used to promote the traditional art of idol-making associated with Durga Puja. This can be done through various channels, such as exhibitions, cultural festivals, and online platforms. This can help to raise awareness about the art and attract new customers.

Encouraging Sustainability*:* The idol makers can be encouraged to adopt sustainable practices in their craft. This can include the use of eco-friendly materials, such as clay and natural dyes, and promoting recycling and waste reduction.

Creating Markets*:* The government and other organizations can create markets for idol makers. This can be done by organizing fairs and exhibitions, providing them with marketing support, and creating opportunities for them to sell their products locally and internationally.

Overall, providing support to the idol makers can help to preserve and promote the traditional art of idol making, provide economic opportunities, and ensure that the craft is passed down to future generations.

CONCLUSION

In conclusion, Bengali idol makers, especially those in the communities of Kumartuli and Patuapara, are essential to the region's religious and cultural traditions. The reduction in demand for traditional idols and the emergence of less expensive, mass-produced substitutes are just two of the difficulties that idol producers must overcome. Establishing a museum that is devoted to the history and tradition of idol making and that displays the journey of idol makers and their contributions to the art form may be the best solution to this problem. Additionally, the museum can offer training for idol makers to improve their abilities and methods and transmit their legacy to the following generation. It is possible to plan the museum to give visitors a thorough and immersive experience while underlining the cultural and historical relevance of idol manufacturing and showing the distinctive methods and aesthetics created by many communities and areas. Visitors can learn more about the craft and participate in the idol-making process through interactive exhibits and demonstrations.

The museum can act as a training ground for the upcoming generation of idol-makers in addition to serving as a platform for the promotion and preservation of idol-making. The museum can provide new and aspiring idol makers with the knowledge and skills necessary to carry on the tradition by offering courses and training programmes.

Overall, a good way to preserve and promote the traditional trade of idol creation is to set up a museum with workshops where idol makers may teach the next generation and pass on their history. The survival and development of the art form as well as the chance for future generations to understand and appreciate the cultural and artistic value of idol-making can be supported in this way.

ACKNOWLEDGEMENT –

This research would not have been possible without the support of a number of people. I want to convey my sincere gratitude to the people listed below for their crucial contributions to this research project.

I would like to start by expressing my gratitude to my research supervisor, Dr.Rachna Khare (Professor, Department of Architecture, Head Design and Head CHCR), for her unwavering direction, inspiration, and support during the whole study process. She has helped me mould and improve my ideas, and I appreciate her knowledge, insights, and helpful criticism.

Also, I want to express my gratitude to my parents and my sister who so kindly contributed their time and insight. I would not have been able to conduct this research without their participation and efforts. I would like to take this opportunity to thank Ar. Gaurab Das Mahapatra (Ph.D. Scholar, Hokkaido University, Japan), Ar. Ayush Shrivastava (Architect), who provided me with the resources, facilities, and access needed to carry out this research, Hirak Das (System engineer at Infosys), Shivam Gupta (Music Producer, Sound engineer) and Oendrila Das helped me with the surveys and photography. Their assistance and collaboration were crucial to this project's success. Last but not least, I want to express my gratitude to my relatives, friends, and co-workers who supported, encouraged, and understood me as I conducted my research. Their unwavering support and belief in me were a constant source of motivation and inspiration. Once again I want to take this opportunity to express my sincere gratitude to everyone and specially the idol makers who has helped me with this study endeavour. I'm hoping that this research will increase our understanding of this subject and benefit other people's lives.

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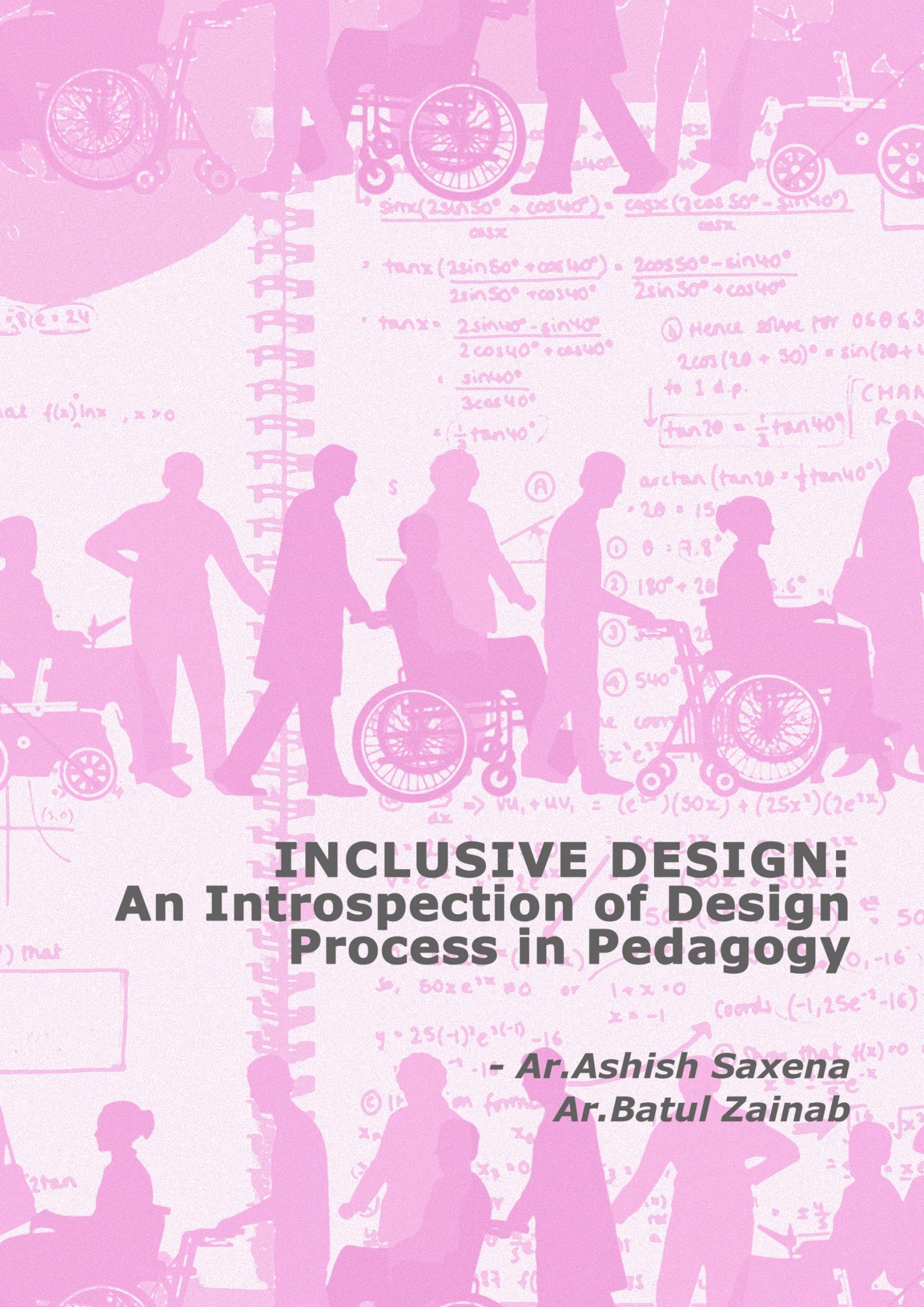

INCLUSIVE DESIGN: An Introspection of Design Process in Pedagogy

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ISSN: 2582-8304

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ISSN: 2582-8304

INCLUSIVE DESIGN: AN INTROSPECTION OF DESIGN PROCESS IN PEDAGOGY

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ABSTRACT

Inclusive design is a user-centred approach pivoted on diversity, equity and social inclusion. The architecture design process addresses inclusivity by focusing users' capabilities, needs and expectations. However, incorporation of such criteria faces constraints in formal integration of inclusive design due to lack of structured design course work and teaching strategies in architectural education. The aim of the study is to develop design process strategy in architectural education pedagogy from an inclusive design perspective. The methodology involves investigating the spectrum of phenomenology from experience to accessibility based on capability parameters: sensory, cognitive and physical aspects. Bloom's Assessment Tool for Inclusive Design (BAT-ID) based on capability parameters and Bloom's learning order is formulated. The paper presents the results of identified challenges based on assessment in architectural education; defining parameters; validating through survey among students and teachers. The study concludes by proposing teaching strategies of integrating inclusive design with the architecture design coursework in addition to the development of a framework to aid the implementation of appropriate inclusive methods and tools within the design process. The research outcome provides the basis of detail research which can further inform and integrate in architecture design coursework in B.Arch.

KEYWORDS: ***Architecture Design Pedagogy, Accessibility, Bloom's Taxonomy, Design Thinking, Inclusive Design***

INTRODUCTION:

The social responsibility of the architect is an important tool to enhance accessibility awareness in the society. Physical spaces are intended for everyone, have a significant impact and are undeniably require consideration in design education. Therefore, a shift and modification in 'existing' design approach towards 'universal user' is must for future professionals who will work in shaping the upcoming build environment (Universal design teaching in architectural education, AsliSungurErgenoglu, 2015).

Accessible design, barrier free design and universal design are internationally discussed concept intended to allow build environment inclusive for all people (Mulligan et al., 2018). However, teaching inclusive design faces several challenges to undergraduate students in design education. Dong (2010) identifies three major challenges i.e., positioning inclusive design in the design programme, making students to think consequence of impairments on user abilities and putting design projects into realistic situations.

There is a need to improve and develop the inclusive design structure of learning and teaching in architectural education. This paper will focus on positioning of inclusive design in the architecture design learning process. The aim of the study is to develop inclusive design process strategy in architectural education pedagogy. The objectives of the paper are:

- **To identify important aspects of inclusive design learning requirements in architecture design education,**
- **To classify the learning requirements into complexity levels,**
- **To develop integration strategy of inclusive design in architectural design pedagogy.**

Our study review spectrum of phenomenology from diverse user perspective to identify range of learning aspects related to inclusive design. It further explores various models of learning and thinking in design followed by design process models concern to architecture design. The methodology identifies challenges concerns to inclusive design learning and classification of learning content based on complexity. A framework is proposed to teach inclusive design process wise and stagewise. The paper discusses the gaps, recommendation and importance of further studies to make inclusive design integral part of architecture education.

INCLUSIVE DESIGN:

The inclusive design paradigm is founded on an attitude to design seeking to include as many people as possible. It is an approach to design striving for the greatest possible application that can address themes like diversity, equality and social inclusion (Heylighen et al., 2017). Barrier-free design, design for all and universal design are diverse design approaches those promote accessibility along with inclusive design. "Barrier-free" concept evolved to make building accessible and usable for physically challenged early during 1950's by American National Standard Institute (ANSI). "Design for all" is much more related concept to others defined as design for human diversity, social inclusion and equality according to the European Institute for Design and Disability (EIDD). Concept of universal design shoots from Barrier-free and accessible design approaches defined as ''The design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design'' (Persson et al., 2015). Apparently, "disability" and "capability" becomes two paradigm approaches focusing user-centric design.

Inclusive design focus of heterogeneous capabilities of a user.Keates et al. (2000) emphasis on design approach that should principally

concern about physical capabilities rather on disabilities. Greater diversity in user needs and capabilities are anticipated with growth in aging population. Thus, capability range becomes important paradigm for user-centric design approach (Johnson et al., 2010). Keates et al. (2000) proposes conceptual user diversity model based on capability range and levels in design methodology. Capability range includes sensory, cognitive and physical parameters whereas capability level focus severity in impairment of the users. According to the National Baseline Survey on Disability, 2011 and other similar document, the sensory range is classified into visual impairment, hearing impairment and speech impairment. The major physical impairment is classified as strength and stamina, dexterity and locomotion, and the cognitive impairment is broadly classified as mental illness, autism, mental retardation. The capability range maps spectrum of user's phenomenology from experience to accessibility well implied to build environment with greater sensitivity in architecture design process.

ARCHITECTURAL DESIGN PEDAGOGY

Key dimensions of architecture design are elements, order and experience. It is a process of elements such as arches, vaults, domes (Roth & Clark, 2014); organised in certain order or principles (Ching, 2015) resulting in value-based experience such as functional satisfaction, emapathy and aesthetic experience (Hayes, 2002). Architectural curriculum is composed of fundamental courses that strengthen design, technology and artistic knowledge applied to the architecture design studio conducted in a non-traditional class room environment. Demirbaş&Demirkan (2003) describes design studios as conducive environment for organisational as well social process thus offering mediation between mental activity (invention) and social activity (realisation).

Design studio problems are formulated and spread in five-year graduate from program based on user size and scale of project. Design problems range from small scale – single user exercise such as personal room design in initial year, to large scale – dynamic users in an urban scale design exercise. User group can be classified based on number and relationship with the type of design environment. User group can be individual to small size for residence design, focus large for resort design and dynamic for public places. Experiential approach of teaching provoke reflection assisting development of concepts and changing practice. This provides greater satisfaction in process along with learning outcome among students (Mulligan et al., 2018).

Design empathy is designer's willingness to personally connect to user that motivates him to commit to a project (Kouprie&Visser, 2009). The capability to empathize with the user is crucial for inclusive designer. A user-expert designer is one who has developed natural experience in dealing challenges of build environment similar to the people who experience spaces differently (Heylighen et al., 2017). Kouprie&Visser (2009) proposes a framework describing process of empathy in design practice according to four phases, i.e., discovery, immersion, connection and detachment.

The objectives of inclusive design education are to increase awareness, foster responsibility, understand the rules and circumstances of the present, and grasp the historical context. By its very nature, universal design education takes an interdisciplinary and multi-professional approach. The area-specific courses are crucial instruments for reflecting "positive intentions" as the "correct actions and designs." Ergenoglu (2013) highlight insufficiency of appropriate knowledge content in architecture design syllabus as main cause of proper awareness of inclusive design. He emphasis

over mixture of active and passive methods of learning inclusive design as social model instead of medical model of disabilities.

DESIGN THINKING

Design thinking is an activity that is implicit in the process of design. However, design thinking emerged only in the latter part of the twentieth century (Koh, J. H. L., Chai, C.S., Wong, B. and Hong, H. Y., 2015). Theoretical perspective of design thinking attracts wide range of discourses. Johansson-Sköldberg et al. (2013) identifies five sub-discourses of design and designerly thinking as: creation of artifact, reflexive practice, problem-solving activity, way of reasoning/making sense of things and creation of meaning.

Design thinking is a people-oriented approach of solving problems. It is a process that provides designers with abstract divergence and convergence of ideas (Sandars&Goh, 2020). Divergent thinking is defined as psychological operation of generating a large number of alternative original, unexpected, or unusual ideas to an open-ended question. Whereas, convergent thinking is a focussed process of finding single correct answer out of many ideas or facts (Razumnikova, 2013). Partial models of the problem and solutions are constructed during the design process. Bridging is described as recognition of perceptual act by the designer in effort of mapping relationships between problem and solution. Such moments are described as flash of insight, creative leap, illumination, or "Aha" moment (Cross, 2010).

However, design thinking models have become an effective toolkit for the innovative design process, integrating various design tools and methods into the design process. Design thinking models represent structured framework of design thinking process. Mesarovic et.al.proposed Iconic model consisting of Analysis–Synthesis-Evaluation–Communication; similar to Archer's model structured as Programming-DataCollection-Analysis-Synthesis-

Development-Communication (Rowe, 1987). Imaging, Presenting and Testing are activity-based stages during design process (Zeisel, 2002). Institute of Design at Stanford propose five modes of design process: empathize; define; ideate; prototype; and test. Empathizing required three activities: one, observation of user's behaviours; two, engagement – interacting and interviewing users; and lastly, immersion – experiencing what user is experiencing. Luka (2020) conclude design thinking stages applicable to pedagogy are understanding problem; observing user; interpreting results; generating ideas; building and experimenting prototypes; and testing, implementing and improving the design.

BLOOM'S TAXONOMY: EXAMINING AND ASSESSMENT TOOL

Benjamin Bloom, defines the set of taxonomies in 3 different domains of learning which were the cognitive, affective and psychomotor (Anderson LW, Krathwohl D. 2005). The cognitive domain involves conscious intellectual activity (Goel S, Sharda N. 2004). It consists of 6 cognitive levels of: Knowledge, comprehension, application, analysis, synthesis and Evaluation. The first three levels are generally referred to as lower levels of thinking and the last three are referred as higher levels of thinking (Narayanan S, Adithan M. 2015). The learning processes in blooms taxonomy in each level can briefly summarized as:

- **Knowledge- an ability to recall and remember information**
- **Comprehension- an ability to understand and define concepts**
- **Application- an ability to use information in a new setting**
- **Analysis- an ability to analyse and distinguish parts**
- **Synthesis- an ability put things together and develop a new product**
- **Evaluation- an ability to judge, justify a decision or point of view**

Bloom's taxonomy is mostly applied in designing as well as assessment course works at undergraduate level (Britto&Usman, 2015). It greatly helps in designing examination which further improves quality of program assessment (E. Thompson et al., 2008). A. R. Thompson & O'Loughlin (2015) developed Blooming Anatomy Tool (BAT) utilizing Bloom's taxonomy for designing and evaluation of anatomical science assessments. The BAT-rubric provides discipline specific guidelines to develop multiple choice questions (MCQs) based on two dimensions, i.e., learning levels based on bloom's taxonomy and discipline specific knowledge domain. The learning levels are divided as lower (knowledge and comprehension) and higher order (application and analysis) whereas MCQs are formulated representing knowledge domain of the basis of feature of question, key skill assessment, type of information assessed and characteristic of enquiry. Assessment based on Bloom's taxonomy can be formulated with inclusive design parameters to evaluate gaps in current architectural curriculum from accessibility point of view.

METHODOLOGY:

It is important to understand complexities involved concerning incorporation of inclusive design into architectural pedagogy.

	CAPABILITY PARAMETERS	CNS-Social Policy & Planning Division, Calgary, 2010	Centre for Excellence in Universal Design, 2012	GOI-Ministry of Urban Development, 2016	Keates, S., Clarkson, P.J. , 2003	World Health Organization Geneva, 1980	Govt of India Ministry of Statistics and Programme Implementation, 2021	PARAMETER ASPECTS
USER-CENTRIC PHENOMENOLOGY	Sensory	Auditory	Speech	Visual impairment	Seeing	Speech	Speech	Visual, Hearing & Speech
		Visual impairment	Hearing	Blindness	Hearing	Hearing	Hearing	
		Blindness (partial / full)	Sight	Speech		Sight	Sight	
			Touch	Hearing				
	Physical	Agility: Loss of Dexterity	walking, balance, handling,	Inability/difficulty -walking	(Motion) Locomotion	Walking	Locomotor disability	Strength & Stamina, Dexterity & Locomotion
		Mobility: Ability to walk, move or carry	pulling, pushing,	Reliance / Mobility Aid	Reaching	Dressing		
			lifting	Lack of stamina	Stretching			
			strength and stamina	Limited motor movement	Dexerity			
	Cognition	Ability to pay Attention & Percieve	cognition,	Difficulty in Interpretation	Communicatio n	Behaving	Mental Retardation	Memory, Intelligence & Behaviour
		Memorize, Judge, Imagine	intellect, interpretation, Learning	Reacting to Sensory information	Intellectual Functioning		Mental illness	
		think and speak	Memory					

Table 1: User-centric Phenomenological Capability Parameters & Aspects

Therefore, assessment of inclusive design awareness among architecture students and their empathy evaluation to capability specific users becomes important. User-centric phenomenological capability parameters were analysed based on literature review, i.e., sensory, physical and cognitive (refer Table-1). Range of capability parameters became subject aspects of MCQs.

BLOOM'S ASSESSMENT TOOL FOR INCLUSIVE DESIGN (BAT-ID)				
	LOWER ORDER		HIGHER ORDER	
	Level 1 (Knowledge)	Level 2 (Comprehension)	Level 3 (Application)	Level 3 (Analysis)
Key skills assessed	Identify, recall, repeat, memorize	Describe or distinguish	Infer or predict	Interpret, judge, critique or analyse
Types of information assessed	• Basic definitions • Facts	• Basic understanding and overview	• Functional aspects	• Applying information • Interpretations
Characteristics of multiple choice questions	Only requires the information to recall Knowing the 'what' but not understanding 'why'	The direct questions, but more than simple definition	Applying information in new context	Students may go through multiple steps and 'Apply' those information to a situation
Sample Multiple choice questions	Blindness is the disability with: a. Those who rely on their sense of hearing, touch and smell b. Those who have very low vision c. Those who can recognise colours **d. None of the above**	Severe case of Intelligence disorder is: **a. Mental retardation** b. Autism c. Anxiety & Mood disorders d. Dyslexia	Hearing impaired people can be assisted in build environment by: a. Creating a less noisy environment b. To provision of assistive devices for better audible signals c. Supplementary visual information should be provided in public buildings **d. All of the above**	Office spaces for speech impairment should have: a. Writing boards **b. Mobile assistive technology or electronic** communication c. Separate corner d. None of the above
Inference (Author)	Requires only basic understanding or knowledge over the topic	Students can connect to the topic and relate with it	Students can recall and know how to apply in the real time situation	Students can relate detailed understanding and analyse after applying whether it is associated with the problems or not

Note: Bold font indicates the correct answers

Table 2: Assessment Tool (BAT-ID)

Similar to BAT (A. R. Thompson &O'Loughlin, 2015), assessment tool for inclusive design (BAT-ID) was developed with range of capability parameters as key aspects of knowledge domain. Lower order (knowledge & comprehension) and higher order (application and analysis) multiple choice questions (MCQs) were formulated using BAT-ID (refer Table-2) for the survey among architectural students representing five years of graduate program to understand two aspects: one, existing knowledge about user capabilities, and two, their self-rating to empathize with user capability range in respective design studios. A Faculty survey aim to validate the complexity level including inclusive design along with distribution of complexity in five-year design coursework was conducted separately.

32 students and 18 faculties participated in the survey conducted in architecture institution in national capital region of India. Year-wise distribution of students was as follows: first year (20 students), third year (8 students) and fifth year (4 students). Three capabilities with three aspects covering range of severity formulated 9 themes of users. Total of 36 MCQs were formulated considering four questions (2 lower order and 2 higher order) were formulated based on BAT-ID. Students were asked to rate at the end of each theme about how much connected they felt while empathizing in context of architecture design. At last, each participant was asked to rank capabilities based on complexity according to their perception.

A parallel faculty survey was conducted to understand feasibility to integrate similar inclusive design user-centric capability parameters along five years of design studios according to architecture curriculum. The syllabus of architecture design was analysed for entire course work. The recommended design problems were analysed based on user group and project scale. The result was analysed with current student's knowledge about inclusive knowledge and empathy ratings to understand existing gap and complexity levels from the perspective of inclusive design in architecture design studios along with faculty survey.

RESULTS AND FINDINGS

It was found that accuracy rate of lower order questions was consistently greater than higher order questions in almost all three student groups. Accuracy level was found almost similar among first year and third year student groups regarding inclusive design capabilities, though fifth year student group performance was considerable higher than other two groups. Students scores highest in physical capabilities and lowest in Sensory capabilities. Self-rating regarding empathizing with capability focused users was found to be constant and moderate in all three capability criteria. Though,

students scored least in sensorial capability but preferred it easiest to empathize. Students ranked cognitive capabilities highest and sensory capabilities as lowest in terms complexity from design point of view. None of the student rated sensorial empathy as difficult.

CAPABILITY-BASED COMPLEXITY DISTRIBUTION IN DESIGN STUDIOS			
DESIGN STUDIOS	SENSORY	PHYSICAL	COGNITIVE
II-IV SEM SMALL GROUP SMALL SCALE *(personal space, residence, resort)*	LOW	LOW	MODERATE
V-VI SEM FOCUS GROUP PUBLIC BUILDINGS *(sports stadium, shopping mall)*	LOW	LOW	HIGH
VII-IX SEM DYNAMIC GROUP URBAN SCALE *(Multi-purpose complexes, urban design)*	MODERATE	LOW	HIGH

Table 3: Capability-Based Complexity Distribution in Architecture Design Studios

Similar to students, inclusion of sensorial perspective is most feasible as compare to cognitive perspective which was rated most challenging in design exercises according to faculty survey. Third year design studios dealing with problem related public building with focused user groups such as shopping mall, stadium or a group housing found to be most viable for comprehensive (sensory, physical, cognitive) inclusive design learning capabilities. Viability of teaching inclusive design for dynamic group at urban level design studios was found to be most challenging.

DISCUSSION

It is required to understand gap to develop integration strategy of inclusive design in architectural design pedagogy. The gap can be understood by analysing complexity and feasibility in current

situation. Our study presents one of the case studies to analyse complexity and feasibility based on Bloom's assessment tool for inclusive design (BAT-ID). Capability parameters (sensory, physical and cognition) becomes one the ways of teaching and learning that make inclusive design approach feasible in architectural design process as one of the key imperatives of design studios is user beside building type. It is realised that certainly capability parameters can be classified based on ease on understanding, application and empathy based on students and teachers survey in our study. Sensory found to be most convenient and therefore most feasible as compare to Cognition which was rated most complex.

The paper provides fundamental structure of framework distributed based on capabilities range and design problem diversity which can be further developed based on detail studies. Teaching strategies must consider distribution of complexity along five years of course work based on learning capacity and feasibility to comprehend in studio-based design problems. It was also realised that learning of inclusive design is more viable in first three years of design studio whereas last two years of design studios are more applied and analytical. Thus, knowledge of user capabilities range should be imparted by third year either by introducing dedicated electives or creating user-centric capabilities-based design problems in design studios. The project sizes and design problem complexities further support such strategies. Dong (2010) suggest to initiate simple abilities in design exercise concern to small user group along with spreading the learning content in different levels.

Developing empathy among students becomes critical to inculcate user-capabilities in architecture design. Learning by doing or similar experiential approach allow to concept formation, reflection and greater satisfaction (Mulligan et al., 2018) promote affective learning. Empathetic learning could be developed based on Kouprie&Visser (2009) framework (discovery, immersion,

connection, detachment) among students. Studio design process also require detail introspection from users' capabilities range perspective. Thus, it becomes important to analyse and integrate design thinking models with empathetic learning framework. We propose design thinking approach in seven stage process: Discovery, Immersion, Connection, Detach and Define, Ideate, Prototype; and Test.

Architecture design process in itself is a user-centric approach. Inclusive design approach is aligned with greater sensitivity towards user. Empathy allows intimate connection to learn user experiences. Learning range of capabilities makes designer more aware about user need, capacity and expectation thus succeeding the purpose of inclusive design promoting diversity, equity and social inclusion.

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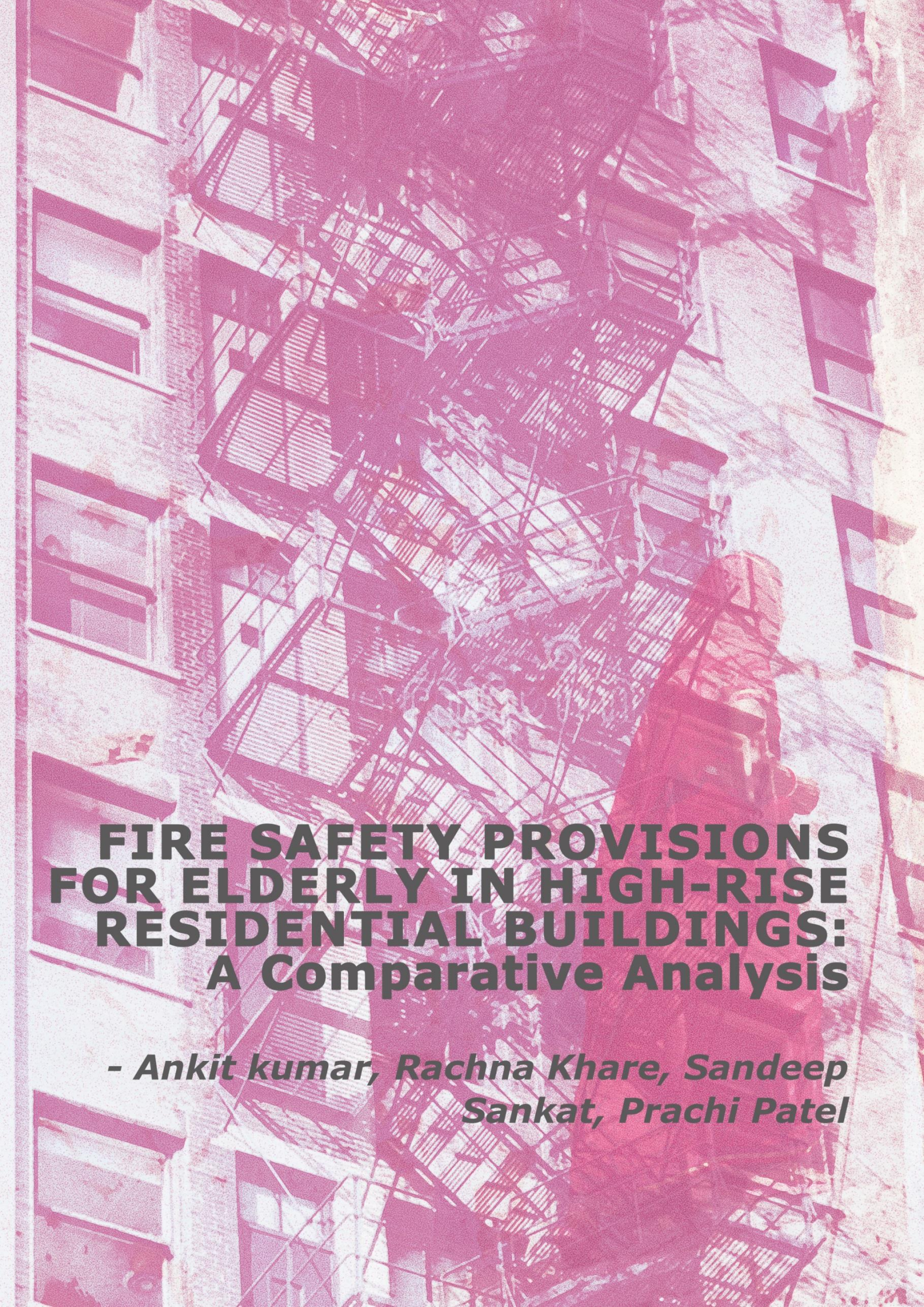

FIRE SAFETY PROVISIONS FOR ELDERLY IN HIGH-RISE RESIDENTIAL BUILDINGS: A Comparative Analysis

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ISSN: 2582-8304

FIRE SAFETY PROVISIONS FOR ELDERLY IN HIGH-RISE RESIDENTIAL BUILDINGS: A COMPARATIVE ANALYSIS

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ABSTRACT:

The safety of the elderly during a fire in high-rise residential buildings is of significant concern. Most metropolitan cities worldwide have high-rise structures because of the scarcity of space. Vertical living comes with its pros and cons. Not only, it costs less and accommodates more people but also makes people residing more vulnerable to disasters like Fire. This study compares various codes and standards related to provisions made in the built environment for fire safety in a high rise for the elderly population. The study is based on the secondary data extracted from various national building codes and standards followed in various countries. Results reveal interesting facts about how some countries are much ahead regarding fire safety provisions for elderly populations. In India, this issue needs to be addressed immediately and precisely because the rate of urbanization, the rapid growth of the elderly population, and rural-to-urban migration are very high.This scenario is pushing people to live in such vertical structures, which in disaster need much attention. The current building designs and codes for fire safety in a high-rise are ergonomically designed for the able-bodied population. Still, they fail to include the needs of the elderly population. The revelations of this study would sensitize Architects, Planners, and Policymakers toward the unique needs of the elderly during Fire.

KEYWORDS: ***Fire safety; high rise buildings; elderly; building codes***

1 INTRODUCTION

Cities in India, like Delhi, Mumbai, Chennai, Bangalore, Kolkata, etc., are becoming increasingly urbanized. They act as magnet cities that pull populations from other regions for work and survival. This pull pressures these cities' available infrastructure, services, and facilities. A shift from low-rise living to high-rise is one outcome that has emerged due to development pressure on land. These buildings provide dwellings to many migrants who come for work and to the natives who find it an economical option compared to having a plot on land. High-rise buildings have many challenges which are not found in traditional low-rise buildings. Management of these buildings requires much attention to evacuation strategies, fire man's accessibility, and smoke control.

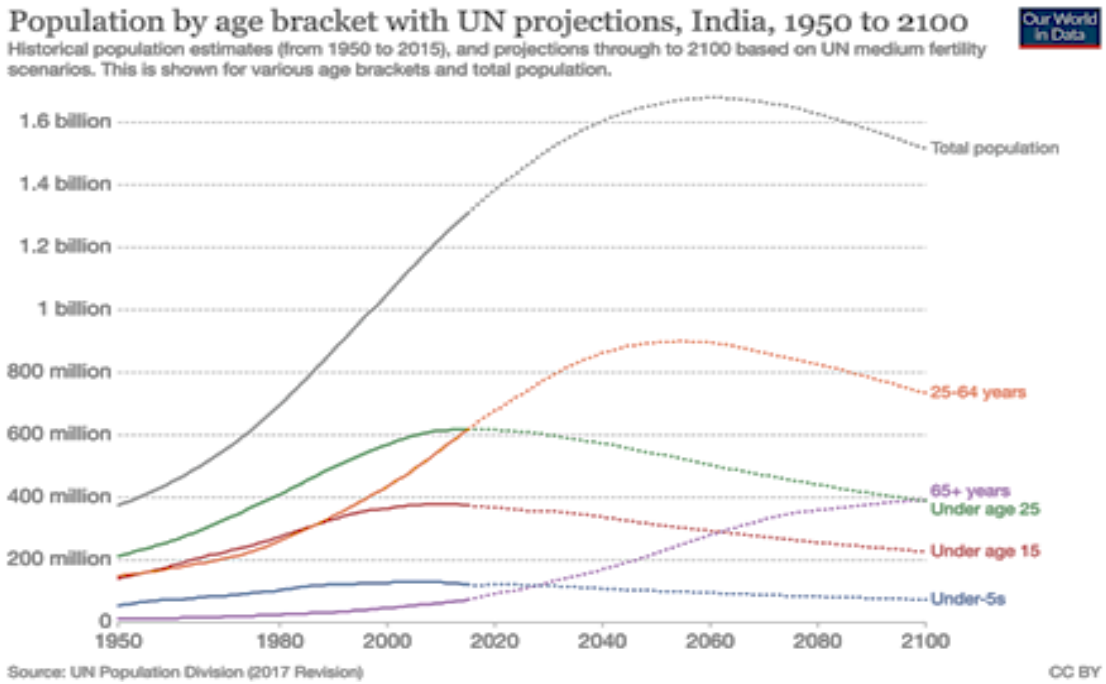

Figure 1 Population with age bracket, India, 1950-2100
Source: U.N. Population division (2017 Revision)

Evacuation during Fire is a significant issue in high-rise buildings. People on a high rise must travel great vertical distances to evacuate the building (NFPA, 2020). This issue is of much greater concern for the elderly as their physical ability to deal with disasters is less than younger people. The young and the adults living in high-rise buildings can take care of themselves during Fire, but when it comes to the elderly, they fail to evacuate the building safely. This issue needs urgent attention as the elderly (60 years and above) are growing faster than the general population (UNFPA, 2017). Today, people over 60 constitute 11 percent of the global population. By 2050, this proportion will be doubled to 22 percent, i.e., 2 billion older people. In India, the rate of growth of the elderly population is also high. It is likely to increase from 8 % in 2015 to 19 % in 2050 and, by the end of the century, to nearly 34 % of the total population in the country (USFA, 2017). The elderly population will outnumber children by 2050 as they constitute the fastest-growing segment due to longevity and a declining fertility rate. The improvements in health facilities, infrastructure, and medical care have led to the growing population of elderly globally. We cannot avoid living in high-rise buildings, but we can make them safe for all age groups. Fire is one of the significant issues in high-rise buildings.

Fire is one of the most frequent and widespread threats to public safety among all kinds of disasters. As per National Crime Records Bureau, 35 people in India die from Fire daily. Among the total fatalities of 12,748 in 2018, 63% of the fire deaths were of the country's vulnerable population (National Crime Records Bureau, 2018). The building codes and standards are obsolete and not as per the need of the vulnerable population. The fire departments in India need to be equipped more to handle the complexities involved in the safe evacuation of all the people.

Furthermore, many old high-rise buildings in India need to comply with the regulations of National building codes. Thus, the safety of

the elderly has become a significant concern in high-rise living in India, and there is an immediate need to re-look at the fire safety codes and standards. The paper attempts to understand the fire safety provisions, especially for the elderly, by comparison of building codes and standards across the globe.

2 HIGH RISE LIVING: A SOLUTION WITH PROBLEMS

The term "High rise" is also called Skyscrapers, tower blocks, tall buildings, multi-storey structures, and a building with many stories. Various countries have their definition of high-rise buildings, and it also varies from region to region. As per National Fire Protection Association, high-rise buildings are defined as "buildings greater than 75 feet (approximately 23 m) in height where the building height is measured from the lowest level of fire department vehicle access to the floor of the highest occupiable story" (NFPA, 2020). As per Emporis standards, high is defined as "A multi-story structure between 35–100 meters tall, or a building of unknown height from 12–39 floors" (Emporis, 2020). Buildings above 15 meters are high-rise per the National Building Code of India, 2016. The International Conference on Fire Safety in High – rise Buildings defines a high rise as "any structure where the height can have a severe impact on the evacuation. Building above 40 m is categorized as Ultra High-Rise Buildings. The China Fire code defines buildings over 100 m as Super Tall Buildings (Chow, Fong, Liu, Tai-keung, & Tsz-kit, 2013).

The advancement of technology has made high-rise living possible. Today more and more people prefer to stay in high-rise buildings. High-rises come with many benefits. It occupies less area on the ground giving room for open green spaces commonly used for recreation. If well-oriented, they give way to natural light ventilation and fresh air. The more you go high in a high rise, you are assured of being free from traffic noise. High-rises are also easily secured as the

building has fewer entry points. They can also offer better views. As residents share utilities, these buildings are easily maintained and managed. In the past few decades, high-rises are also considered lucrative investments by some in cities where they can be rented or leased easily. Apart from these benefits high-rises also have issues like limited gardening, as they offer only balconies. Moving heavy items from the ground floor to above is another challenge associated with such buildings. These buildings depend on elevators and staircases for movement. As elevators depend on power, if it fails, one can imagine the kind of endeavor the situation requires, depending on which floor one needs to reach. That is why elevators have alternate power backups to cope with such situations. Another major challenge with high-rise buildings is evacuation concerns during earthquakes or fires. Earthquake in the architectural profession is dealt with by by-laws associated with regions of different seismic zones, which governs building height, techniques, and design. This disaster is natural, so man has less control over its occurrence but provisions for the same help in coping with them. The high-rise buildings in Japan are built to survive earthquakes. It has one of the most resilient earthquake buildings in the world, as the buildings dance to the moves of the earth below them during an earthquake (Henriques, 2019). Among all the disasters, Fire is considered one of the worst disasters across the globe. Fire can occur anywhere, but when it happens in a high-rise building, it threatens a significant population as high rises are highly dense with limited exits. High-rise buildings are very complex and require extensive fire safety measures. The sharing of utilities and services becomes a significant concern. During a Fire, there is panic amongst people, which could lead to a stampede or mismanagement, resulting in loss of lives. One of the significant challenges in high-rise buildings is that all the fire safety management systems, such as fire alarms, smoke control, egress systems, and egress components, work together in an

integrated manner. (Heffelmire, Jalayerian, & Quiter, 2014). In a study by Rai, although the most significant motivating factor for people to live on high rise was better views and less pollution of noise and air, around 70 % of the respondents felt that fire safety is the biggest concern in high-rise living (Rai, 2011). This concern gravitates to the elderly as with age, their physical ability to quick response during disasters like Fire deteriorates. The other writing elaborates on specific issues and challenges of the elderly, which puts them at risk when they stay on a high rise.

3 ISSUES AND CHALLENGES OF ELDERLY LIVING IN HIGH RISE BUILDINGS

High-rise living evokes unsettling fear in all the residents, especially the elderly. One of the major problems faced by the elderly is their inability to move correctly. The various types of impairment which are the result of old age are:

a) **Mobility impairment, where the speed of movement and the distance that can be traveled is affected.**
b) **Sensory impairment affects the ability to see, hear, or smell**
c) **.**
d) **Intellectual or cognitive disability or mental health impairment, where the ability to understand what is happening and respond is affected.**
e) **Hidden disabilities, where the disability is not apparent or is triggered by the emergency. Hidden disabilities could include conditions like asthma or heart problems. (Census of India, 2011)**

This age-related problem increases the risk of the elderly during Fire. The elderly struggle to recognize the emergency and respond quickly during fire evacuations. This further delays their evacuation time. Hearing and vision also decrease with age, and due to this reason, they are unable to hear the fire alarm and act immediately. The

people suffering from low vision find it very difficult to see the Fire and smoke, causing delays in reacting and evacuating the buildings or reaching a safe place. The problem is further increased when they must escape through vertical means, including stairs and lifts. The vertical means of egress are not designed to meet the needs of the elderly and persons with disabilities.

Similarly, other chronic conditions like asthma and heart-related problems make the elderly more vulnerable to fire evacuations. Various studies also show that the average travel speed of the elderly is comparatively slower than non-disabled people increasing the travel time of evacuation. Further, fire safety provisions are often neglected, and the buildings must be designed per the codes and standards. The Fire safety codes and standards are also not as per the need of the elderly residents, and they become significant victims during fire safety evacuations.

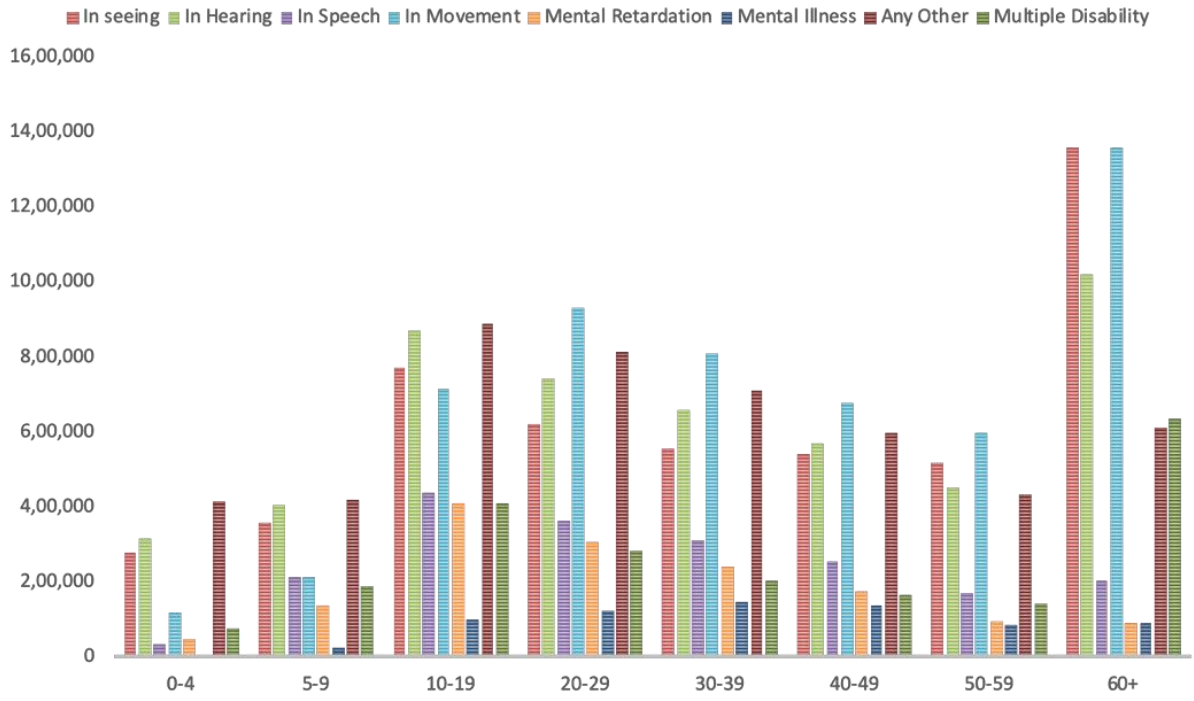

Figure 2: Disability of population with Age

[Source: C-Series, Table C-20, Census of India 2011]

4 MEANS OF EGRESS SYSTEMS IN HIGH RISE RESIDENTIAL BUILDINGS

Egress means moving out of the building safely during emergencies. A proper egress system ensures the occupant can safely exit the building during fire evacuations. Any obstruction faced by the occupants during exit may lead to severe consequences.

A means of egress is a continuous travel path from the apartment or any point in the building to a place of safety outside the building. The travel path shall be continuous and free from obstruction. The various components of Means of Egress include horizontal and vertical travel paths through corridors, stairs, ramps, lift lobbies, public ways, and familiar passages. A proper egress strategy and proper means of egress system ensure that all the occupants reach a place of safety without any hindrance. After September 11, 2001, and Grenfell Tower Fire on June 14, 2019, many studies were conducted on fire safety issues in high-rise residential buildings.

4.1 COMPONENTS OF THE EGRESS SYSTEM

The Means of Egress System consists of three major parts: Exit Access, Exit, and Exit Discharge.

1) **Exit Access: This component of the egress system leads from the last point of the occupied unit to the exit. This includes corridors, passageways, rooms, lobbies, and any other path of travel.**
2) **Exit: It is that component of the egress system which leads to a place of safety from the inside of the building or the exit access. The Exit system can be both horizontal and vertical. The Vertical Exit system is used for ascending or descending from the building and includes a staircase, ramps, fire towers, etc. The Horizontal Exit system is a place in the building or the adjoining building separated by a fire-resistant door, allowing the occupants to wait until any external help arrives.**

3) **Exit Discharge: It is that part of the means of the exit system from the termination of the Exit System to a place of safety or open area outside the building through a public way. (Nair, 2020)**

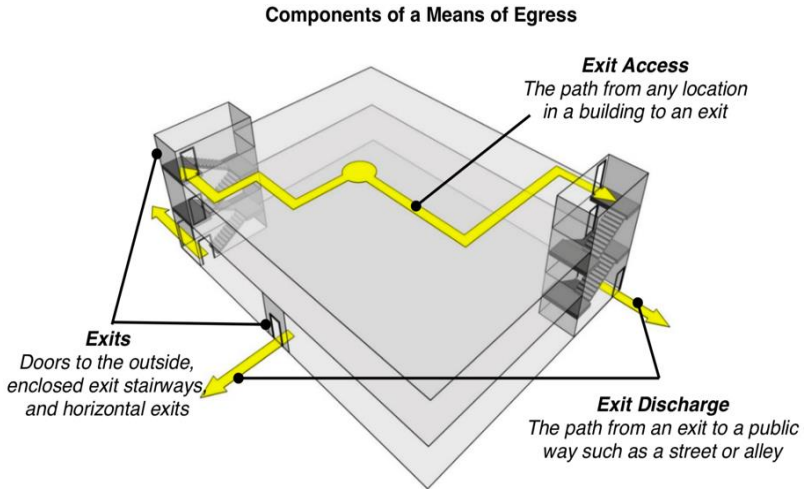

Figure3:Components of the Egress System

[Source: International Building Code (I.B.C., 2017)

The primary objective of any egress system is to facilitate the occupants to move from a place of hazard to a place of safety. The concept of an egress system becomes more critical in high-rise buildings because reaching a place of safety takes considerable time in high-rise buildings.

4.2 STATUTORY LEGISLATION IN INDIA

In India, the National Building Code, 2016 is the statutory code for fire safety provisions in the means of exit systems. Though some states in India have their own set of rules and regulations for fire safety, the provisions are majorly based on the National building code. The fire safety provisions in building design should be addressed and are not as per the codes and standards of India. This results in a lot of fire safety disasters in high-rise buildings. Further, no special provisions exist for the safe evacuation of the elderly and persons with disabilities. The government is trying to make all the buildings accessible by introducing various policies and regulations.

With the government policies like 'Sugamya Bharat Abhiyan,' most buildings are becoming accessible and barrier-free, especially public buildings in India. But we fail to address the problem of the elderly during Fire. The problem further increases regarding the safety and evacuation of elderly living in high-rise buildings. Through initial survey and case studies, it was found that the significant challenges faced by elderly living in a high rise are a) Safety equipment creating hindrances in the exit route, b) no proper fire exit map, c) poor illumination system, d) No provision of refuge floors, e) difficulty in opening the Fire rated doors of the exit route, f) no provision of firefighting lift, g) blockage of exit route due to various combustible material in the corridor, etc. The non – compliance with various provisions increases the risk of casualty of the Elderly population during a fire disaster. It is, therefore, necessary to analyze the building codes and provision of fire safety for the elderly and persons with disability systematically. Thus, through this study, various means of egress system provisions, especially for the elderly and persons with disabilities, are carefully analyzed and compared. There are various requirements for fire detection and suppression systems in the building regulations and codes. Still, the provisions that influence building design are only considered for the analysis.

5 PROVISIONS IN MEANS OF EGRESS SYSTEM FOR ELDERLY IN CODES AND STANDARDS: A COMPARATIVE ANALYSIS

For this study, the norms for fire safety from various countries were compared and analyzed. The various rules related to exit requirements, arrangement of exits and capacities of the exits, and special considerations for the elderly and persons with disabilities are considered for the study.

5.1 GENERAL EXIT REQUIREMENTS

The minimum number of exits required in any building in most countries is two, except for low-rise buildings ranging from 15m – 24 m. In some countries, occupancy per floor governs the total number of exits. As the occupancy per floor increases, the number of exits increases. As per Australia and Singapore's Fire safety building codes, a minimum of two exits are required for buildings over 24m and 15m, respectively. In the rest of the countries like the U.K., Hongkong, U.S.A., the number of exits depends on the number of Occupants per floor of the building (Refer Table 1). The I.B.C., U.S.A. requires at least two means of egress from all spaces and buildings with few exceptions. Some spaces and buildings can have one means of egress if the travel distance to an exit is short and the occupant load is low. The I.B.C. also mandates the provision of accessible means of egress in newly constructed buildings. The Approved Document B, U.K., states that one exit would suffice if it is through the Fire protected lobby.

As per the National Building Code of India, 2 Fire exits are only required in buildings that are more than 500 sqm in area. Ironically, many buildings in India are less than 500 sqm and are high-rise. As the Indian codes do not specify exits as per the height of the building or Occupancy per floor, there is no provision for alternate exits in most high-rise buildings. Building code discrepancies allow builders and developers to skip emergency exits for their monetary benefits. This puts the occupants at risk during Fire as two exits provide alternate routes if one exit is blocked. Besides several exits, maximum travel distance and dead-end corridors are crucial parts of the egress system. The maximum travel distance in all the codes ranges from 22.5m – 38 m in the case of Non- sprinkled buildings. The Indian code specifies 22.5m, which is better than other countries. The shorter the travel distance, the faster it takes to reach the exit. The means of egress during a fire are filled with smoke and

it takes a lot of time for occupants to orient themselves rightly and find a way to exit. So, it is essential to reduce the travel distance to reach a place of safety. The building codes of India fall very weak when it comes to the elderly and disabled population as there is no consideration in the means of egress system considering their specific needs.

Table 1. Number and Arrangement of Exit

PROVISIONS	INDIA	AUSTRALIA	U.A.E.	THE U.K.	U.S.A.	SINGAPORE	HONG KONG
NUMBER OF EXITS	**2 Exit If Floor Area > 500 m2**	**2 Exits If storey >6 or ht> 25 m**	**1if ht ≤15 m 2 ~ (0-500p) 3~ (500-1000) 4 >1000p**	**1 (Fire Lobby) 1~(0-60p) 2~60-600p 3 >600 p**	**1~0-50p 2~51 500p 3~501-1000p 4 >1001p**	**2 Exits > 24 M.**	**1~ 4-30 p 2~ 31-500p 3 ~501-750p 4 ~750-1000**
MAXIMUM TRAVEL DISTANCE	**22.5m (N.S.) 33.75(S)**	**22.5 M**	**61 m (S), 30 m (N.S.)**	**30 M**	**38 M**	**75M (S), 30M (N.S.)**	**24 M 45 M (Balcony Approach)**
DISTANCE BETWEEN EXITS	**22.5 M**	**45 M**	**1/2 Ds , 1/3 Ds**	**30 M**	**38 M**	**1/2 Travel Distance**	**48 M**
DEAD END CORRIDOR	**15 M (S) 7.5m(N.S.)**	**6 M**	**15m (S), 10.7(N.S.)**	**7.5 M**	**6.1 M**	**15m (S), 20m(N.S.)**	**24 m**

P- PERSONS (OCCUPANCY PER FLOOR), S – SPRINKLERED BUILDINGS,

N.S – NON – SPRINKLERED BUILDINGS, D.S. – DIAGONAL DISTANCE OF FLOOR

5.2 REFUGE AREA / HOLDING POINTS AND HORIZONTAL EXITS

The refuge area is an important component of the egress system. It holds occupants during Fire when evacuation is not possible. As the area is Fire and smoke-proof, occupants wait until external help rescues them. Compared to other country codes, India and U.A.E. do not emphasize having refuse areas. As per National Building Code, 2016, high-rise buildings with balconies do not require a refuge area till the height of 60 m (N.B.C., 2016). However, in other buildings, the refuge area shall be provided above 24 m and at every 15 m. Countries like the U.S.A., U.K., and Singapore insist on providing Refuge Areas with Voice Communication Systems for those unable to use the stairs (I.B.C., 2017). The Location of refuge areas shall be inside Fire protected lobbies directly connected to external stairways. The height of a building does not determine the need for a refuse area; rather, it is recommended to have it on every floor as a fire safety measure. This shows that Indian codes completely neglect the needs of the elderly and disabled population in an emergency. These people cannot escape by themselves, so the refuge area on all the floors should be a mandatory provision. Other provisions related to the number of wheelchairs, corridor width, and Location of refuge areas are at par with other countries' recommendations. (N.B.C., 2016)

Table 2. Refuge Area / Holding Points and Horizontal Exits

PROVISIONS	INDIA	AUSTRALIA	U.A.E.	THE U.K.	U.S.A.	SINGAPORE	HONG KONG
REFUGE AREAREQUIREMENT	**Above 24m, thereafter 15m**	**All Floor**	**Above 90 M**	**All Floors**	**All Floors**	**All stories except at the first floor**	**Every floor has more than an area of 200 m2.**
PROVISION OF WHEELCHAIR (N.O.S.)	**1 ~ 200 Ps**	**1**	**1 ~ 200 Ps**	**1**	**1 ~ 200 Ps**	**2**	**1**
SIZE OF WHEELCHAIR IN REFUGE AREA	**0.9 sq. mt**	**-----**	**0.76m x 1.22m**	**0.9 x 1.4m**	**-------**	**0.9m x 1.4m**	**1.5 m x 1.5 m**
WIDTH (CORRIDOR)	**1.2m**	**1 m ~ 100 ps**	**1.2 m**	**0.9m**	**1.21m**	**1.2m**	**0.85 m**
LOCATION OF PWD HOLDING POINTS	**Separate &Dedicated Area**	**Separate &Dedicated Area**	**Inside Protected Stairwell**	**Inside Protected Stairwell**	**Inside Protected Stairwell**	**Evacuation Lift lobby, Fire Lift, Staircase**	**Evacuation Lift lobby, Fire Lift, Staircase**

PROVISION OF A VOICE COMMUNI-CATION SYSTEM	**Yes**	**Yes**	**Yes, with the provision of pre-recorded messages**	**Yes**	**Yes, with Audio and Video Signals**	**Yes, with 24 hrs operated control point**	**Yes, with a closed-circuit intercom link**
HEIGHT VOICE COMMUNICATION SYSTEM	**-----**	**-----**	**0.9m 1.68 m**	**------**	**----**	**0.8m 1.2m**	**-0.9m - 1.2m**

5.3. FIRE ALARMS, SIGNAGES, AND ILLUMINATION SYSTEM

The Fire alarm is essential in the Means of Egress system to warn occupants during a Fire. The alarm gives the first clue of fire occurrence and implicitly signals the occupants to initiate the evacuation process at an individual level. Many countries have enhanced Fire alert systems by introducing a vibrating alert system along with flashlights to assure that the initial warning of Fire reaches everyone. The Fire Safety code of Singapore stresses Home Fire Alarm Devices(HFAD) with indicator lights installed in the Circulation area/ Escape Route, living room, corridor, and Stair Landing. Similarly, the codes of the U.S.A. and U.K. also stress on the importance of Fire alert system by the use of flashing beacons, vibrating pagers or pillows, and similar alert devices to consider the needs of people with hearing impairment. The National Building code of India though have provision of Fire alarms along with Visual

Alarms with flash lights but it fails to address any specific requirements inside the house within the apartment buildings.

Along with Fire Alarm systems, the signages and Illumination systems play a crucial role in guiding the Occupants to place of safety during fire evacuations. As fire results in a situation associated with panic, confusion, and anxiety, a proper orientation through signages can ease the evacuation process. The International Building Codes of U.S.A. requires all the Exits and Exit Doors to be marked with illuminated exit signs. Also, the code mandates the provision of tactile "EXIT" sign adjacent to doors and egress staircase, corridors, and the exit discharge route. The standard requires that all the signages meet both tactile and visual criteria. Both U.K and Australia also mandate the provision of tactile and braille signs in all the exits, exit access and exit discharge in order to address the needs of the Elderly. On the other hand, there is no clarity on the provisions in the National Building Code of India as both visual and tactile consideration are not provided in the signages. Lack of clarity in the codes and standards results in poor illumination and signages makes the vulnerable population at risk in India.

Figure 4 Examples of Signs Required to Meet Tactile and Visual Criteria [Source: (I.B.C., 2017)]

5.4 EXITS – STAIRS, CORRIDORS, RAMPS, EVACUATION LIFT

Stairways, handrails, Ramps and Evacuation lift forms the major part of the means of egress system. The I.B.C., 2018, mandates the provision of visual contrast on tread nosing or the leading edges of

treads which are helpful for people with low vision. The treads and landings should be designed in such a way to prevent the accumulation of water which will create problem for Elderly during evacuation Process. Further, as per A.D.A. standards, handrails are required on both sides and must be continuous within the full length of each stair flight. The handrail surfaces should be free from abrasive and sharp elements and facilitate power grip along the handrail length. The Building Code of U.A.E. also mandates the provision of a marking strip which can be applied as a paint that is integral with the nosing of each step (CDFCC, 2018). Singapore Codes also has the provision of non-slip mats or tiles at the upper landing of the staircase or placing of non-slip strips with contrast in color at the edge of each step of the staircase. All these provisions are very helpful for elderly people while evacuation. Almost all the building codes have the provision of slip resistant tiles or materials to allow the elderly to safely evacuate the building. Again, as per National Building Codes, dedicated provisions for safe evacuations of Elderly are missing in the mandatory provisions.

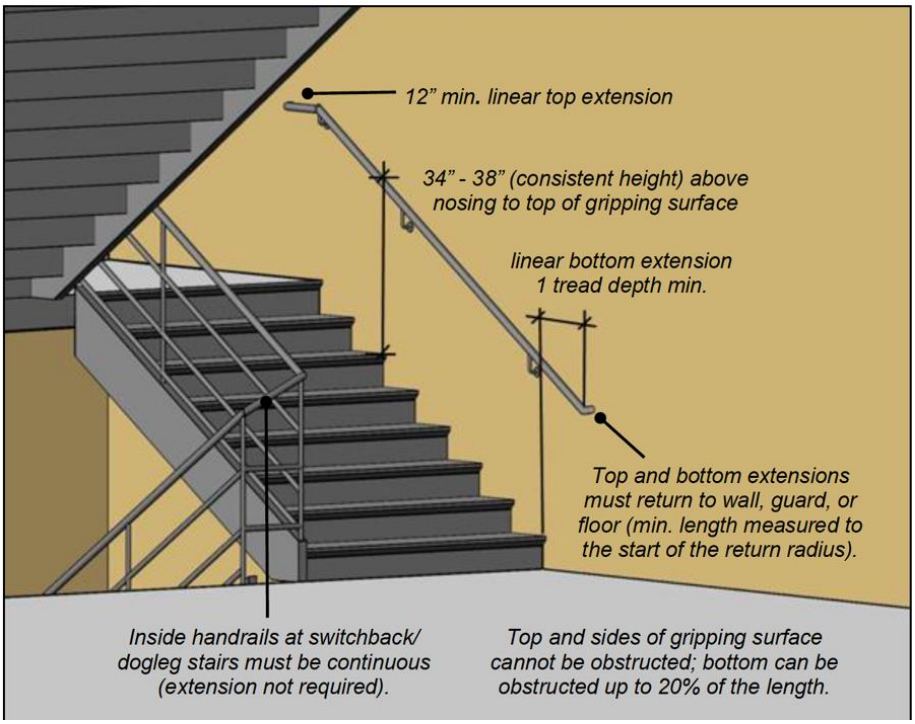

Figure 5 Stairway and Handrail Requirement[Source : (I.B.C., 2017)]

Most of the Building codes like U.K., U.S., U.A.E. and Hong Kong across the world talk about the provision of Evacuation lift, Wheelchair lift, Platform lift to be used by person with disabilities during fire evacuations. The Indian Code again have very less clarity on the use and provision of Evacuation Wheelchair lifts during fire evacuations.

The provision of Ramps in high rise building help in easy evacuation of elderly and person with disabilities. As per the Approved Document M, U.K., ramps can be used as a part of the Exit route. Similarly, Singapore Codes also allows the use of ramps as a Internal and External Means of Escape. The provision of slope in most of the codes are in the range 1:10 – 1:14. Again, the Indian code fail to address the clarity in ramps being used as a means of escape.

6 CONCLUSION

With the increasing urbanization, one finds a shift towards a high rise living. These buildings have a major challenge of coping up with disasters, especially Fire. The resilience of these buildings towards Fire depends on human measures in the form of architectural solutions. Some countries like U.S.A., U.K. and Singapore are much considerate towards specific provisions of Fire. Their Means of Egress system defined in building codes have been developed with much precision and tested simulations. Ironically, India being most populated, and it's cities being highly dense neglects major fire considerations as is reflected in the building codes. Most of the buildings in India also face management and maintenance issues. The fire safety equipment's are not fitted in the proper locations, which also leads to panic among the occupants. Lack of provision of signages and information hinders the evacuation of Elderly and Persons with Disabilities. Due to no clarity in the building code, most of the staircase lobby are open to lobby and corridor without the

provision of fire door which leads to smoke and Fire entering the stair lobby making it unusable during fire evacuations. This leads to people getting trapped and are not able to evacuate. Some basic necessary provisions like minimum two exits and availability of refuge area on every floor is not mandate in the code. This leads to panic situation during fire evacuations. As the general egress provision are weak, one finds a complete dearth of address towards specific needs of the elderly and people with disability. Thus there is a major need to develop a performance based fire safety framework for elderly to provide decision makers, professional bodies, local authorities a sound indicator of fire safety in high rise residential buildings for Elderly.

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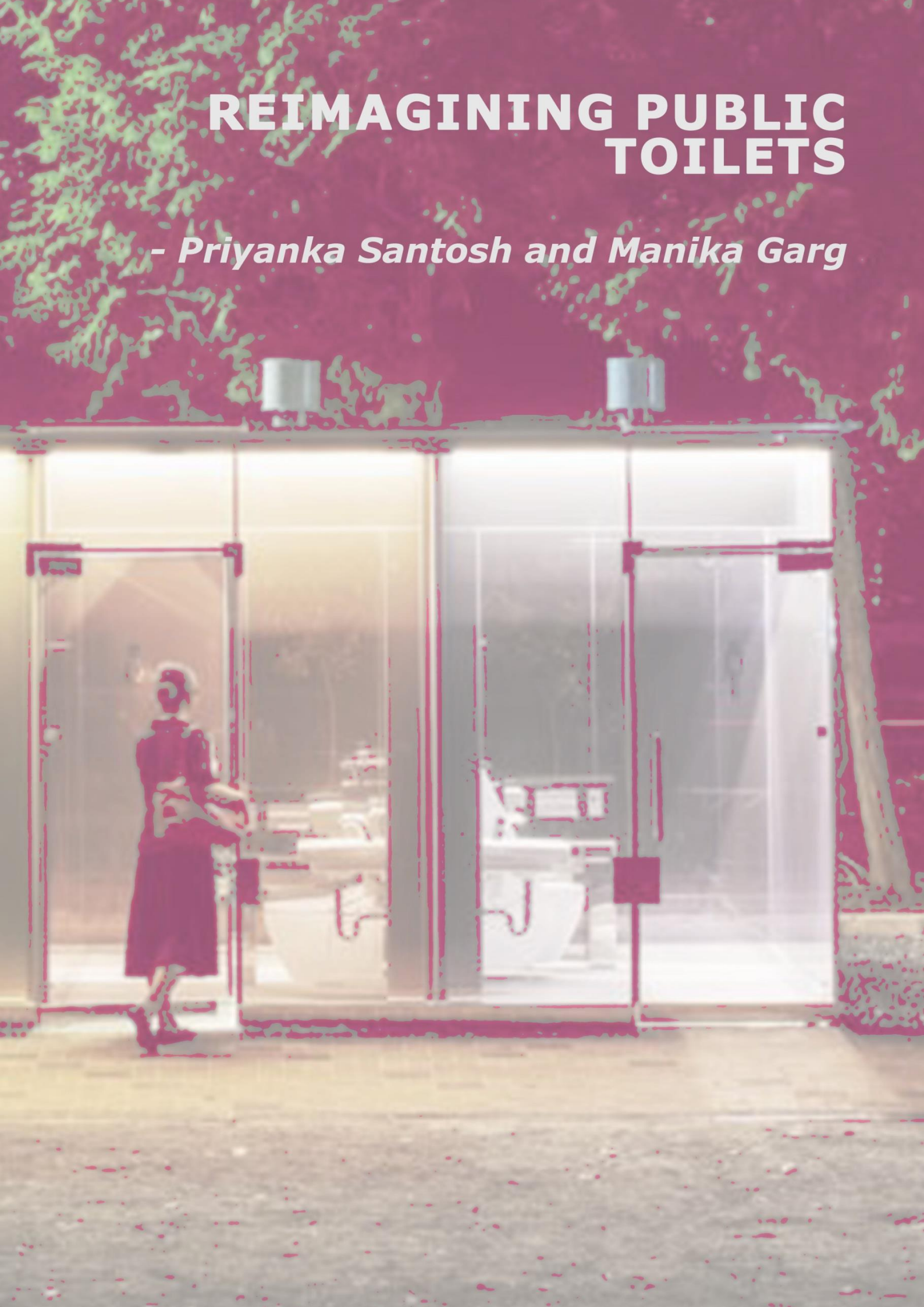
REIMAGINING PUBLIC TOILETS

- Priyanka Santosh and Manika Garg



ISSN: 2582-8304

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Hello! I'm Priyanka! I'm a highly motivated individual and a competitive learner. Through these many years, architecture has kept fascinating me and has also been teaching me a way of life. I'm a graduate of the School of Planning and Architecture Bhopal which happened to be the second-ranking institute in India to pursue Architecture while I enrolled (equivalent to an IIT - Indian Institute of Technology). I have completed my 6 months internship under Sir Sanjay Mohe at Mindspace who is one of Bangalore's and India's renowned Architects. And during my internship, I was working on the project IIM - Indian Institute of Management Bangalore which is a top premiere Management Institute under the Government of India and was first designed by the then PritzkerLaurette B.V. Doshi.

ISSN: 2582-8304

MANIKA GARG

Hi, my name is Manika, and I am a fresh graduate in architecture. I always had a particular affinity for arts, logical and sequential thinking and so in my pursuit of creative endeavors six years back I had chosen to pursue architecture at School of Planning and Architecture, Bhopal, INDIA. Since then, I have been constantly exploring new methods of creatively solving a question in hand. I not only learnt how to design buildings but also how they affect our surroundings. I like designing people's centric structures that have a holistic approach. I like staying connected to earth and so whenever I get some time away from my daily routine, I do gardening and sometimes pottery.

ISSN: 2582-8304

Reimagining Public Toilets: Alleviating Unconscious Gender Biases Existing in Public Toilet Designs

Authors: ***Manika Garg and Priyanka Santosh***

ABSTRACT

A journal from Sage Pub stated how "More Indians have mobile phones than toilets" made sensational headlines in 2010. The Swachh Bharat Abhiyan was launched in 2014 to address this issue. Under the campaign a few 'Third Gender Toilets' were built. Although a laudable move, it pleads the question, why opt isolating exclusivity and not progressive inclusivity? Various surveyors including CNN have studied transgender–non binary groups and have reported a high degree of harassment ranging from 25.9% to 53% in public lavatories. When a user group is forced to 'hold it' they are throwing themselves at potentially serious health hazards. These problems include gender minorities but are not limited to the disabled, the blind, pregnant women or even the elderly and toddlers.

Our purpose was to aid in making washrooms inclusive and safe for all. Architecture is a social art, a change in it would resonate in society. To aid this change we began studying such pre-existing structures. Further, we got in touch with the involved user groups to understand their perspective and conducted surveys.

These studies helped us apprehend how often exclusive choices were made than inclusive. By critically analyzing both user group and design, we concluded that a few design guides would work better than a standardized model. Like, understanding the unique demographic needs of a place. Also, to include and not speculate the neglected user group views while making the design decisions. Lastly, we'd suggest designing based on functionality like urinals or water closets rather than groups like men or women.

KEYWORDS: ***Gender Minorities, Inclusivity, Exclusivity, Health and Sanitation, Public toilets, Universal Design, Social Architecture***

INTRODUCTION

A toilet is one of the most private spaces and so it becomes difficult for many to use it in public. Public toilet usage in India is a habitual action rather than a conscious choice with the men and women directly heading to their allocated spaces. While this is simple for the binary group, what about the gender minorities like the Trans gender. Do they head where they identify with, or where society thinks they must? Choosing one's identity could call for uninvited scorns, stares, taunts and threats of harassment. And finding a unisex toilet or a "gender-neutral" is rarely a possibility.

The Supreme Court of India in 2014 accorded "third gender" status to transgender people and a right to individual's to determine the gender they identify with. The judgment included a directive for transgender individuals to be provided with separate toilets in public places including hospitals.

This judgment is far from being widely implemented even almost a decade later. However, subsequently, the 'Third Gender Toilet' was built in 2017 in Mangalwara, Bhopal. Situated in proximity to the Eunuch's community, it is only India's second of such kind out of the three. While this move is laudable for the acceptance of a neglected user group, it still doesn't demonstrate inclusivity. Moreover, it reflects the lack of understanding that society inherits by calling the rest of the genders under the umbrella of 'Third Gender'.

The current segregation of washrooms doesn't do justice to everyone. Inclusivity in the washrooms isn't only a cavernous concern for gender but also various age groups and degrees of physical abilities. Although tiny, these spaces reflect the psychology of our society.

Proper thought while designing a toilet or even merely the presence of a third toilet usually allotted for the disabled addresses not only disabled and trans folks but also parents who might need to take their small opposite gender children to the bathroom, and for older people who may need to be assisted by someone who happens to be of the opposite gender.

Hence, we'd like to raise the question of why not have a design that serves the local community in toto?

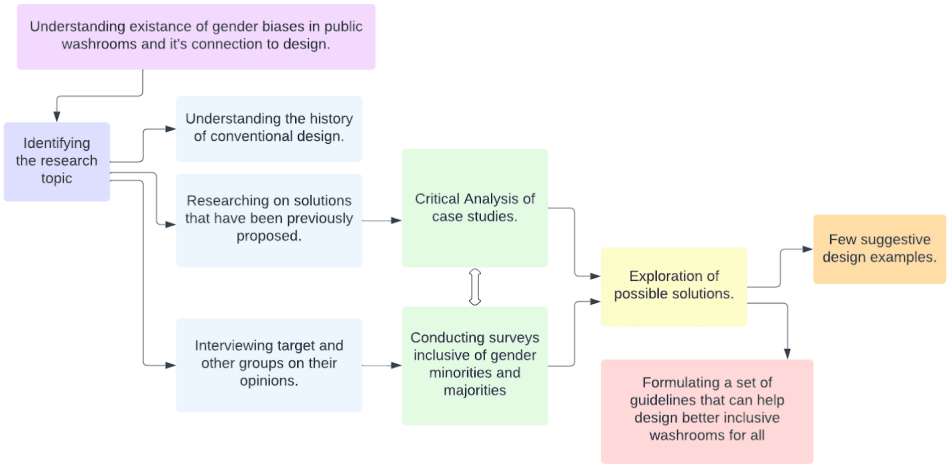
GENDER RELATED ISSUES WITH PUBLIC TOILET

a. **Dysphoria is a cut off between how they are perceived socially or the gender they identify with and their body. For instance a trans woman may feel dysphoria if she is referred to as 'he'. Having to make consequential choices while accessing basic sanitation facilities can be debilitating and can add severely to the dysphoria. Studies have also linked a drop in suicide rates of transgender people with access to facilities that match their identities.**
b. **Another issue that commonly surfaces while discussing this issue is of women not feeling safe in gender neutral toilets due to presence of 'men'. In this context, it is when trans women are referred to as men which is derogatory. Trans women are women and they have the right to access women's toilets just as much as any cis woman would have. And the converse is true for transmen.**
c. **When a person from the gender minority uses a washroom to which they are not perceived as conforming to, socially, by the people present there, harassment has been a common occurrence. For example if a trans woman was to use a women's washroom she could possibly face humiliation while if she were to access the mens washroom she could possibly face**

abuse. These cases could get more complicated with the group of people who haven't come out yet.

d. **While having a separate washroom for non-binary or transgender people may help sort a temporary problem, in the long run it creates labels and makes them a target for violence or harassment. And this is especially true in India where social acceptance is still a faraway dream.**

RESEARCH METHODOLOGY



SECONDARY DATA- Chosen Case Studies:

1. **Third Gender Toilet, Bhopal**

The Swachh Bharat Abhiyan was launched, under this campaign, a 'Third Gender Toilet' was built in Mangalwara, Bhopal. Situated in proximity to the Eunuch's community, it is India's second of such kind. This however may cause more 'labeling' or may open a new conversation.

2. **Lootel Cafe, Indore**

This washroom is an example for places like highways where there's a few people who may want to use it but because harassment is an issue a surveillance point of view is placed adjacent to it, like the café in this case. Here, people can take a shower, use the loo and rest for a while with no labels as to who can use it. The concept behind is 'pay, use and redeem'. Washroom access receipts are dispensed by a machine installed behind the café for INR.10 that could be used to redeem food at the café.

3. **Toilet in a courtyard Rohan Chavan, Mumbai**

The toilets design has been conceptualized surrounding a courtyard for two good reasons. One is to promote the courtyard as a natural disinfectant since it would bring in a lot of sunlight and help eradicate foul smell. Second is to match up with the floating population during rush hours at the Bandra Station. Nonetheless, the planning of this design is functioning based segregation which may help reduce safety issues.

4. **Kochi's first gender-neutral 'container' toilet**

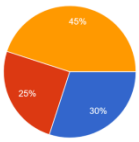
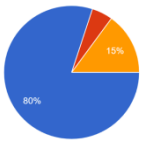
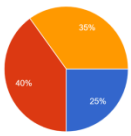
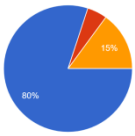
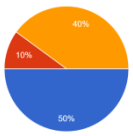
Maintained by CREDAI under its 'Clean City Movement' campaign this is a gender-neutral concept, the toilet will be open for all genders. This will probably be the first public toilet for transgenders in Kerala.

5. **Tinted glass toilets by Shigeru Ban, Tokyo**

Public toilets have a notorious reputation for being dirty, dark and dangerous. Tokyo recently introduced new washrooms in two public parks that aim to address the concerns. These are colorful, brightly lit and transparent. Through this, those who need to, can check out the safety and cleanliness of the stalls without needing to walk in or touch anything. When a person checks in and locks properly, the stalls' tinted glass toilet would turn opaque and frosted. When the door unlocks, an electric current passes that realigns the crystals in the glass allowing more light to pass through it, thereby creating a transparent effect.

ANALYSIS:

Parameters	Third Gender Toilet' Bhopal	Lootel Cafe, Indore	Toilet in a courtyard RohanChavan, Mumbai	Kochi's first gender-neutral 'container' toilet	Tinted glass toilets by Shigeru Ban, Tokyo

USABILITY Yes No Maybe					
Rating on the scale of 10	**7.1**	**8.55**	**5.5**	**8.75**	**7.9**

Parameters	**Third Gender Toilet' Bhopal**	**Lootel Cafe, Indore**	**Toilet in a courtyard RohanChavan, Mumbai**	**Kochi's first gender-neutral 'container' toilet**	**Tinted glass toilets by Shigeru Ban, Tokyo**
INCLUSIVITY	**yes**	**YES**	**NO**	**YES**	**NO**
EXCLUSIVITY	**YES**	**NO**	**NO**	**NO**	**NO**
DESIGN AND PLANNING	**INTROVERT PLANNING**	**EXTROVERT PLANNING**	**EXTROVERT PLANNING**	**INTROVERT PLANNING**	**EXTROVERT PLANNING**
PRIVACY	**HIGH**	**MID**	**LOW**	**HIGH**	**LOW**
SUITABLE LOCATION	**-**	**STREETS/ HIGHWAYS**	**SCHOOLS/GYMS/ POOLS/WORKPLACES**	**STREETS / MARKETS**	**STREETS/ MARKETS/GYMS/POOLS**

CRITICAL ANALYSIS OF CASE STUDIES

While studying the case studies we discovered that every typology has its own benefits and issues. Segregated binary washrooms don't provide for third gender/ non-binary people. Separate toilets for non-binary people leaves them vulnerable to violence. Having a single washroom for all would make women feel unsafe because they'd

have to share it with men. While having a cubicle large enough to accommodate both a WC and a urinal may be acutely expensive.

PRIMARY DATA- EXCERPTS FROM THE INTERVIEW:

"I think Gender Neutral washrooms are enough, because there are so many gender identities and it should be for all of them, in India it will be very difficult to just create transgender washrooms where we don't even have enough gender neutral washrooms. I as transwoman feel comfortable in gender neutral washroom"

"Once I was going to the men's washroom and one person got to know that I'm a girl. He asked me in a very weird way...do you have a penis?? Or should I give you mine!! ....it was so terrible..so traumatizing!! I just left from there "

"Woman mentioned me as 'chakka' with another woman in the toilet when I was inside the toilet. This happened in a hotel owned toilet. Location is in the middle of Mangalore and Bangalore. Time : 2:30."

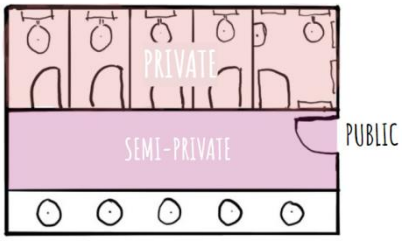
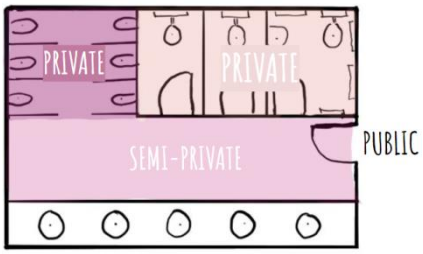
"I'm a transman, I've done all the surgeries! But not the bottom. I couldn't stand and pee, I was traveling from Bareilly to Delhi. The bus driver stopped the bus where male washroom didn't have a close column/ western seat! And I face this problem many times."

"Even if there is a separate restroom for other genders even then it might difficult to use it due to the society as some community peoples are still not yet came out hence we need a equal rest room without anyone's knowledge the we are community this is for some people who are not been out for society."

"There is shortage of gender neutral washrooms. In my company gender neutral washroom is shared with disabled people. On a bright side its there but they just put all gender label on a disabled person washroom. To show that they are inclusive."

When asked on the third gender toilets in Mangalwara, we heard: "This looks decent but I feel this create a attraction for audience and

makes it uncomfortable to use , as unnecessary judgemental looks or opinions can raise."

GENDER	TYPICAL WASHROOM LAYOUTS	ISSUES
FEMALE		**When a person walks into that door and enters the semi-private space, they are judged by physical aspects like appearance and voice and are morally policed by the surrounding crowd if they are deemed fit to access the toilet. A woman would not conform fully she would be at threat of humiliation or harassment.**
MALE		**Again, when a person walks into that door and enters the semi-private space, they are assessed if they are fit for access. Not to mention that this becomes even more problematic in the area allotted for urinals due to the absolute lack of privacy. It also usually lacks dustbins which makes it hard for those men/transmen who may be menstruating.**

GUIDELINES FOR A MORE INCLUSIVE DESIGN:

These guidelines are suggestive of what could help create better washrooms. These are however not one size fits all scenario, so each case type must be uniquely handled, while the quest for a perfect solution may continue.

1. **The design of a washroom is subject to factors like its footfall, the location, its geography, and the demography of the user**

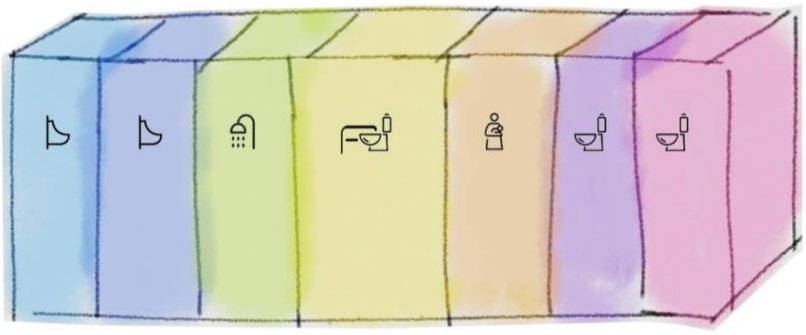
group. It is important to consider all of these factors before executing the design. For instance, a washroom design for a school with heavy footfall would vary largely from a design for a highway stop with sparse footfall.

2. **Inclusivity is a mindset that must be attuned to while designing. It is important to remember that people come in all forms and everyone is equally deserving of basic dignity. Hence it is important to keep in mind to design for more than just simply men or women.**
3. **Often, in an attempt to provide an easy temporary solution, a 'third label' is created, which does not help in the longer run. And makes it an easy target for harboring violence and harassment.**
4. **Depending on location and footfall the architect/designer can choose between Introvert planning or Extrovert planning. Introverted Planning would have more privacy if compared to extroverted planning. In places with higher footfall more privacy is desirable so it's advised to go with introverted planning. However, in places with controlled footfall or the places that are located in isolated regions, needs less privacy so it's better to have an extroverted toilet layout.**
5. **Privacy is a critical element and issue to be tackled. Everyone must be entitled to privacy yet feel safe in semi-private spaces. These spaces are usually the point of harassment, these spaces can either be eliminated or worked around with clever manners to reassure safety.**
6. **A surveillance point adjacent to the washroom helps create a sense of security and provides for reaching out to someone if things were to go down south. Especially in locations such as highways.**
7. **If it is affordable, including both a WC and a urinal in the same cubicle aids inclusivity.**

8. **When space and affordability is a tight constraint, the least that could be done is to include a gender-neutral disability-friendly toilet if segregation is a must. This not only reduces the harassment chances for non-binary people using this facility, but also has the benefit of creating a public space that's more accessible for people with disabilities. This space can also double up where people could breastfeed their infants, in cases where it would not be viable to provide a parted nursing room.**
9. **Again, when either affordability or space is a concern, or the footfall sparse then a single space with urinals, water closets and handrails would serve best for all the people involved without discrimination and was also found to be a very welcome model during the survey.**
10. **It’s important to place a dustbin for disposal of sanitary waste in the men’s washroom. There are some trans men who menstruate, and would require this facility.**
11. **Most importantly, it is important to take inputs from the local crowd for whom it's being designed and any non-binary or trans people who could provide suggestions on how to improve the washroom layout. It may happen that not all suggestions are feasible but having an open mind and working around them is key.**

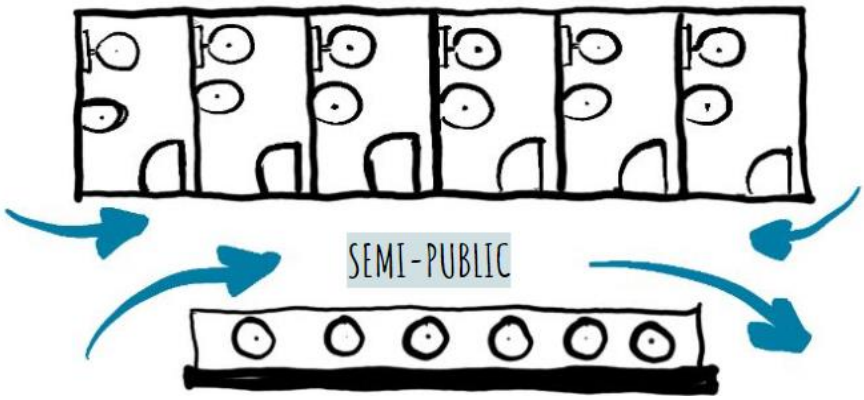
SUGGESTIVE DESIGNS:

1. **Inclusive design idea type A:**



Deriving from Shigeru Ban's design, this format can be adopted in public places that expect a considerable amount of footfall. Multiple single stalls with elimination of semi-privates spaces. However, rather than segregation based on gender or disability, it is separated by function and fixtures. And also, the design need not necessarily be translucent as during the survey we encountered a higher preference of privacy.

2. **Inclusive design idea type B:**



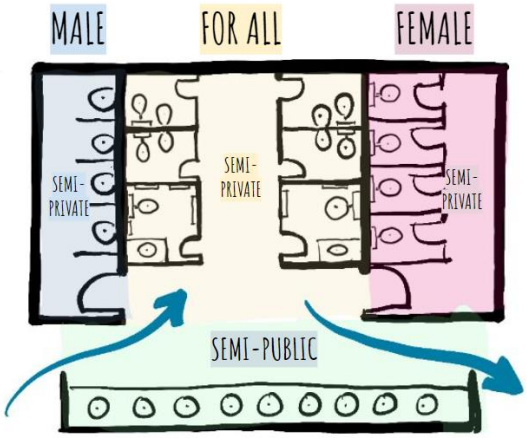
In this layout all toilet stalls are identical as each one of them have a water closet and a urinal. Here the semi private space has been made a semi public so that all genders can use it together. This kind of layout can be used majorly in workspaces, universities, pools and gyms.

3. **Inclusive design idea type C:**

This layout will work best in isolated/less populated locations such as Highways, bus stands, etc. Having a small cafe right next to toilets

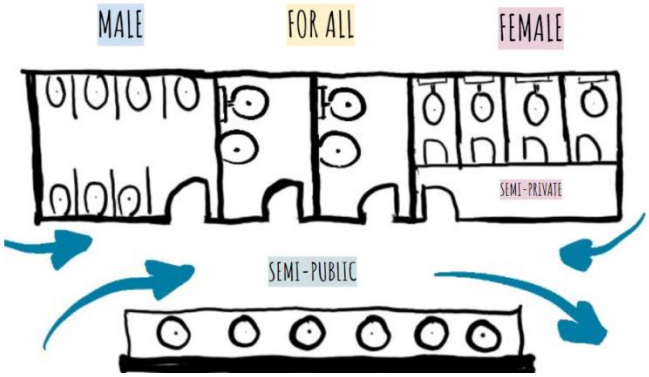
can make the user feel safe. Each stall is made gender neutral with a wash basin attached so that there is no need for a common semi private space.

4. **Inclusive design idea type D:**



This layout will work best in places that experience a high footfall such as malls, shopping complexes, markets, etc. Here the conventional male and female toilets are connected to each other through a neutral zone in the center. This neutral zone consists of toilets that can be used by any gender/age/disability group. This neutral zone has direct connectivity to the common hand wash area which is made semi-public as it is open from two sides. In this design the privacy that male and female gender groups required has been kept intact by providing an introverted planning. On the other hand the neutral zone has an extrovert planning so as to avoid any harassment situations.

5. **Inclusive design idea type E:**



This layout will work best in places that experience a large but controlled population such as workspaces, hotels, etc. Here the conventional male and female toilets are connected to each other through a free standing neutral toilet stalls at center. These stalls at the center can be used by any gender/age/disability group. This neutral zone has direct connectivity to the common hand wash area which is made semi-public as it is open from two sides.

CONCLUSION:

Having a public toilet design that satisfies all genders, age, disability group poses multiple challenges. These challenges vary due different site specifications, user group and many other regional factors. It's important for the designer to have a deep understanding of the site and location. Before designing it is always advisable to interview the user group and take their views on gender neutral toilets. Every toilet can be made inclusive with few design strategies. Remember that inclusivity shouldn't lead to exclusivity.

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ANNEXURE I

SURVEY QUESTIONNAIRE DATA COLLECTION:

General questions

1. **Name**

_____

2. **Please choose your gender identity :**

Male | Female | Transman | Transwoman | Transgender | Intersex | Nonbinary | Others

3. **Your sexual orientation :**

Heterosexual (Straight) | Lesbian | Gay | Bisexual | Others

4. **Do you identify with any of the following user groups? :**

Physically with disabilities | Senior citizen | Pregnant women | I do not

5. **How often do you use public toilet facilities? :**

Every time | Sometimes | Rarely | Never

6. **Are there any concerns that you face while visiting a public toilet facility? :**

Yes | No | Maybe

7. **If yes, what are the concerns that you face while visiting a public toilet facility? :**

Security | Gender Labels | Sanitation | Inappropriate design | Discomfort in usage | No concerns | Others

8. **Have you ever been harassed while visiting a public toilet facility? :**

Yes | No | Maybe

9. **If yes, can you please share some information about your experience and time and location.**

---

10. **Have you seen/heard about Transgender Toilets? :**

Yes | No

11. **What are your thoughts on transgender toilets? :**

Excellent | Good | Fair | Bad | No opinion (Unaware)

12. **If bad, then why? :**

Needs Improvement | It is creating more labels and not helping | It is needless | Others

13. **What are your thoughts on gender neutral toilets? :**

Excellent | Good | Fair | Poor | No opinion (Unaware)

14. **At which place have you felt most vulnerable while using a washroom? :**

Streets/Roads Highways | Markets/Plaza | Malls/Indoor Complexes | Gym/Pool | Restaurant/Club/Bars | Movie Theaters | Workplaces

15. **Any suggestions you would like to give us for Public toilet designs?**

Questions related to rating each case study

16. **Please rate this washroom on a scale of 1-10.**
17. **If you were presented with a choice to use this washroom, would you? : Yes | No | Maybe**
18. **Any suggestions or opinions?**

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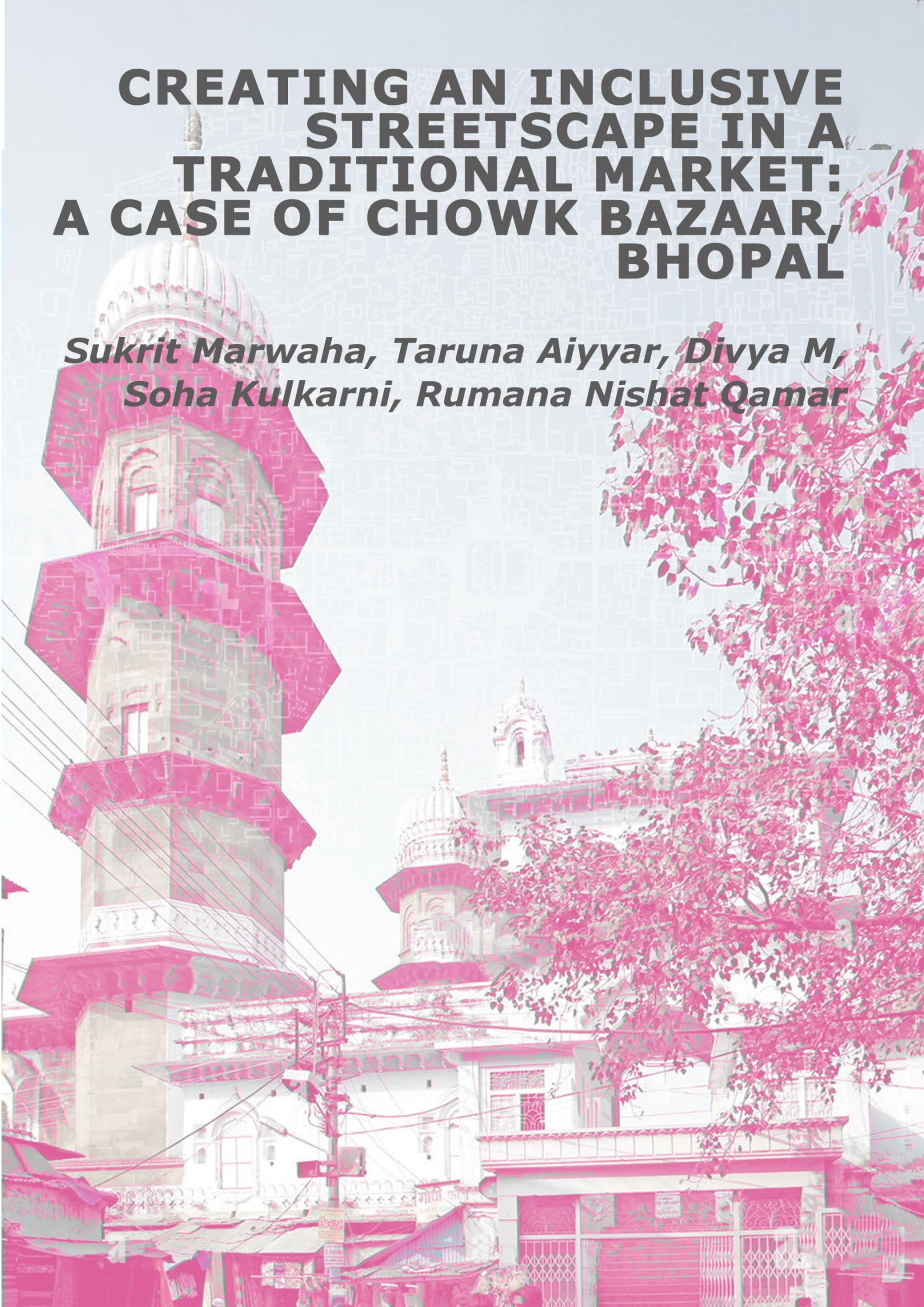
CREATING AN INCLUSIVE STREETSCAPE IN A TRADITIONAL MARKET: A CASE OF CHOWK BAZAAR, BHOPAL

Sukrit Marwaha, Taruna Aiyyar, Divya M, Soha Kulkarni, Rumana Nishat Qamar



ISSN: 2582-8304

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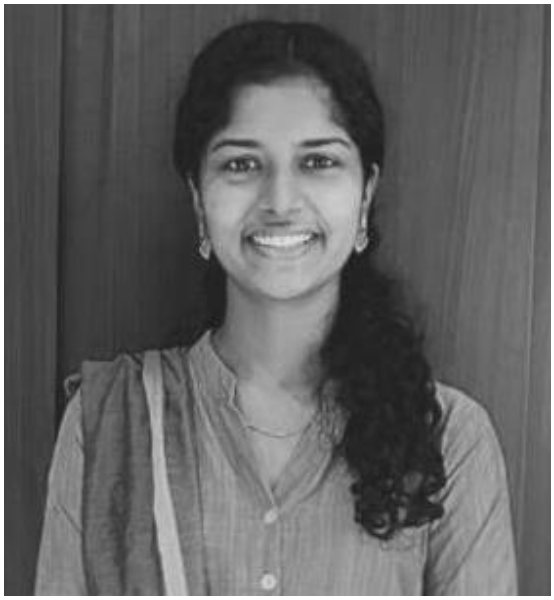
ISSN: 2582-8304



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Sukrit Marwaha, Taruna Aiyyar, Divya M, Soha Kulkarni, Rumana Nishat Qamar.

Abstract

Streets are the living rooms of our cities where we experience the city up-close and personal. They are not just a means to get to the desired location but a window into the life that lies on either side. Indian streets experience a plethora of activities, festivities and general day to day interactions which shape our city. Chowk Bazaar is one such market square located in the heart of the then walled city of Bhopal. Now the central historic core, the market is the epicenter of Bhopali culture, cuisine, traditions, and commerce. Under the guidance of our Urban Design studio as well as pour Inclusive Design studio in the ninth semester, we explored the streetscape of one of the cardinal axes of the market square. With the aim to observe, analyze the street through various parameters and deduce various ways to make the streetscape inclusive to the identified user groups.

Introduction

Chowk bazaar or the hub for all markets, is an integral part of old Bhopal. Located in the heart of Bhopal, it hosts varied communities that together create 'a mosaic of subcultures.' As one of the oldest markets of Bhopal, this grid-iron pattern bazaar has a high heritage value with Jama Masjid at its center acting as an anchor point that attracts a large footfall. The market grows, accommodates, and adapts to the current trends; it is restricted by the area of an old city. This leads to haphazard growth of buildings, shops, marketing and so on, that creates conflicts between the users and their movement

patterns. This results in the unavoidable situation of over spilling onto the streetscape thus, making it inaccessible to all.

The research aims to identify the diverse user groups and the physical obstacles they face while accessing and interacting with the East-West cardinal axis street of Chowk Bazaar, Bhopal. The study embodies the notion of a barrier-free streetscape that promotes inclusion while stimulating the community to respond favourably to its urban setting.

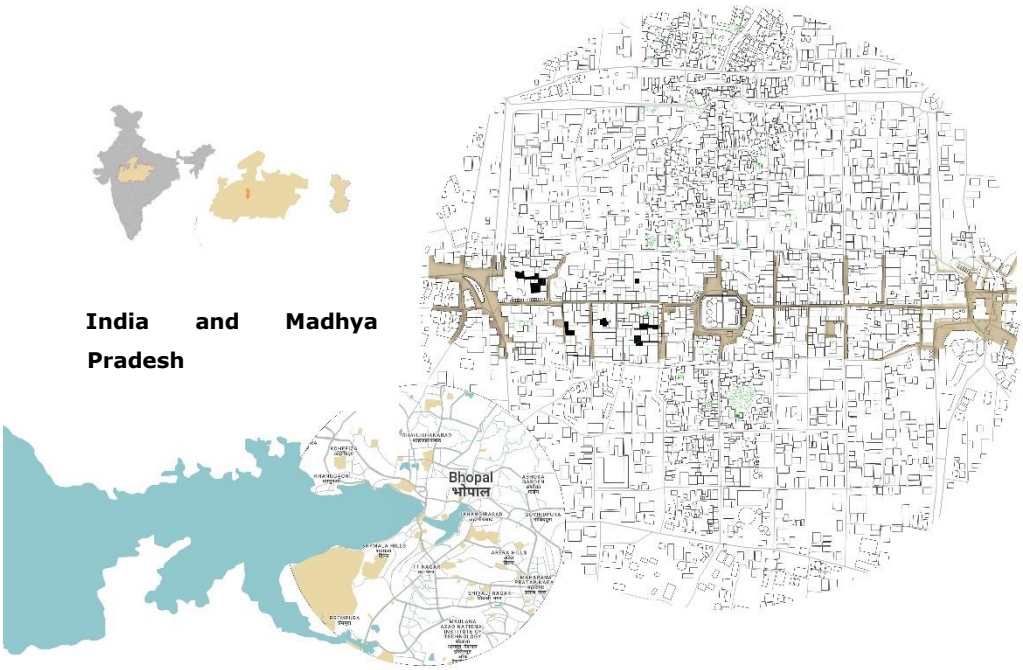


Fig 1. Location of Chowk Bazaar

Scope:

- **The research paper focuses on the study of the traditional market streetscape of Chowk Bazaar in Bhopal, covering the stretch from Peer Gate to Itwara Gate.**
- **The main objective of the study is to identify the existing barriers to accessibility and to propose inclusive design**

solutions to create a barrier-free streetscape in the traditional market.

- **The study being a product of both urban design and inclusive design studios, analyzes the streetscape from a macro to micro level.**
- **The research covers various aspects such as physical, sensory, and cognitive barriers faced by all including people with disabilities, elderly people, and parents with strollers.**
- **The study also evaluates the current design and infrastructure of the market street and proposes design recommendations to enhance accessibility and inclusiveness.**

Limitations:

- **The study is limited to the specific stretch of the traditional market street in Bhopal and may not be generalizable to other market areas or cities.**
- **The research is based on the observations and analysis conducted during the studio for the past six months and may not cover all aspects of the traditional market street.**
- **The study does not consider the economic feasibility of the proposed design solutions, which may impact their implementation.**

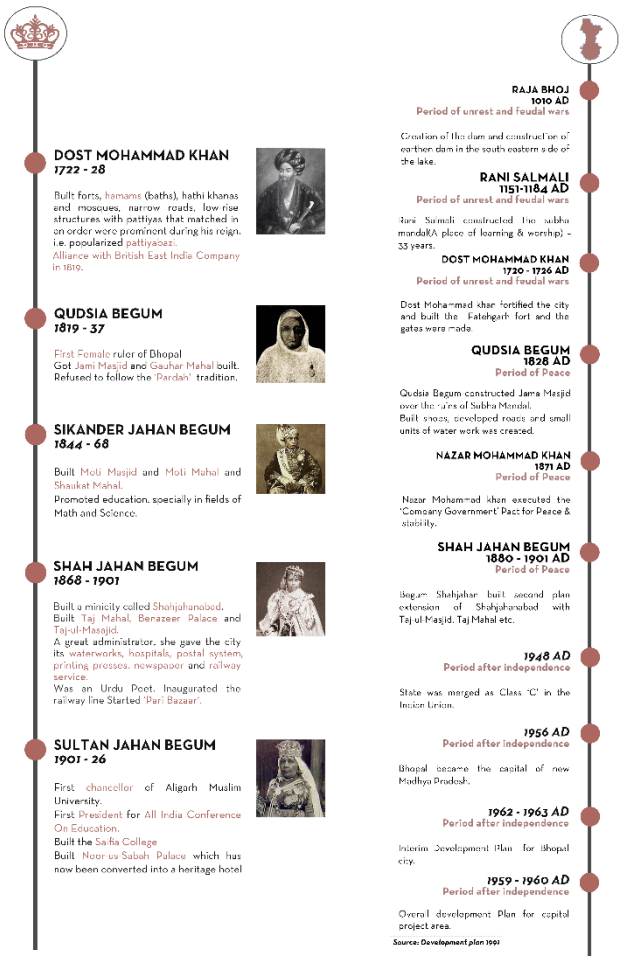
History

The history of Bhopal is primarily divided into three periods.

1. **Period of Unrest and Feudal Wars from 1010 – 1870 AD**

This period led to the discovery of Bhopal city by Rajabhoj in 1010 AD and to the creation of upper lake with the construction of earthen dam in the southeastern side of the lake.Dost Mohammad Khan ruled from 1720-1726 AD. During his time in power, he contributed to the

creation of the precinct, which included the Fatehgarh Fort. He also fortified the city with six major gates that were named after weekdays: the Imami Gate, the Peer Gate, the Jumerati Gate, the Itwara Gate, the Budhwara Gate, and the Ginnori Gate.



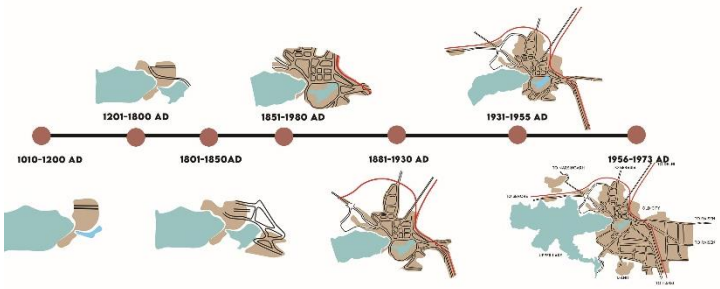


Figure 2,3,4. Evolution of the rulers, Evolution of the city

2. Period of peace from 1828 to 1901 AD:

A total of four begums were in-charge of Bhopal. Jama Masjid was built by the Qudsia Begum over the SubhaMandal ruin. It is said that the Chowk Bazaar was set up by Qudsia Begum for herself. She brought jewelers and traders from different corners of the country and started a small market. The city thrived under the Begums, who built numerous, many palaces, Shops, road development and small units of water work.

3. Post-independence period(1947)

During this period, Bhopal became the Capital of New Madhya Pradesh and hence led to the construction of residential quarters, secretariat, and other office buildings. Planned Townships arose along with better connectivity and services. Markets were shifted from the city center to other peripheral locations.

Figure 5. Ward Map of the old city

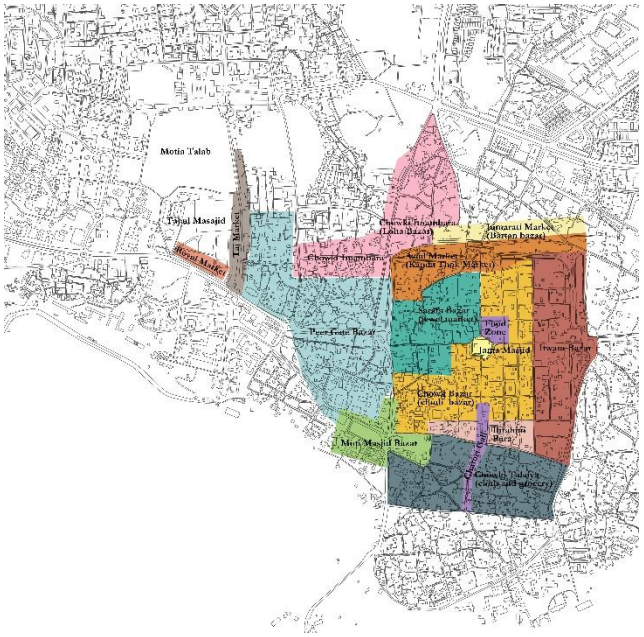


Figure 6.Markets of the old city

Contextual study:

To understand the streetscape in a comprehensive manner, various studies were conducted based on observation and mapping.

Cluster mapping

Cluster mapping allows us to understand the built density and fabric of the built. Deducing the cluster patterns allows us to study the history and evolution of the city and typology of dwellings and their shapes coming up on the street.

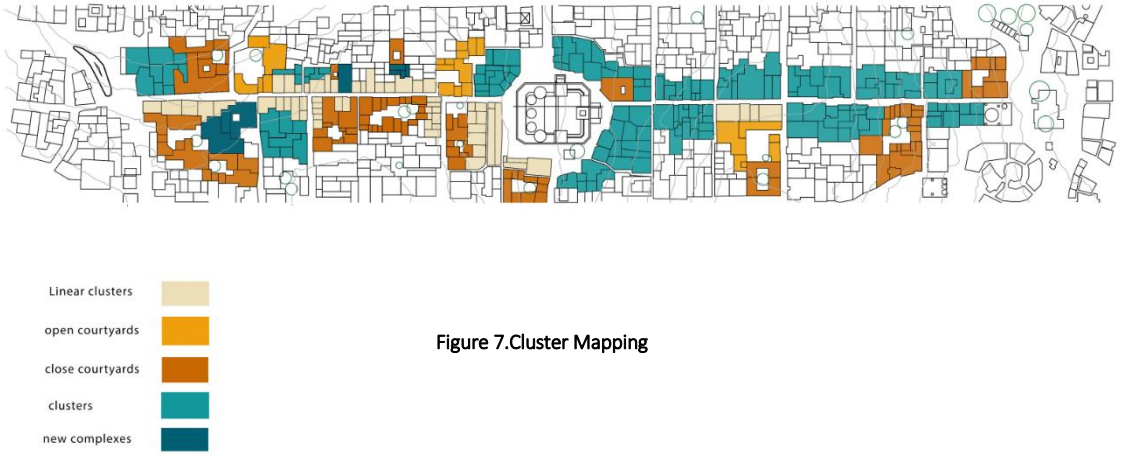


Figure 7.Cluster Mapping

Height Map

The street due to commercialization has higher building heights in the first half between Peer Gate and Jama Masjid as compared to the second portion of the street.

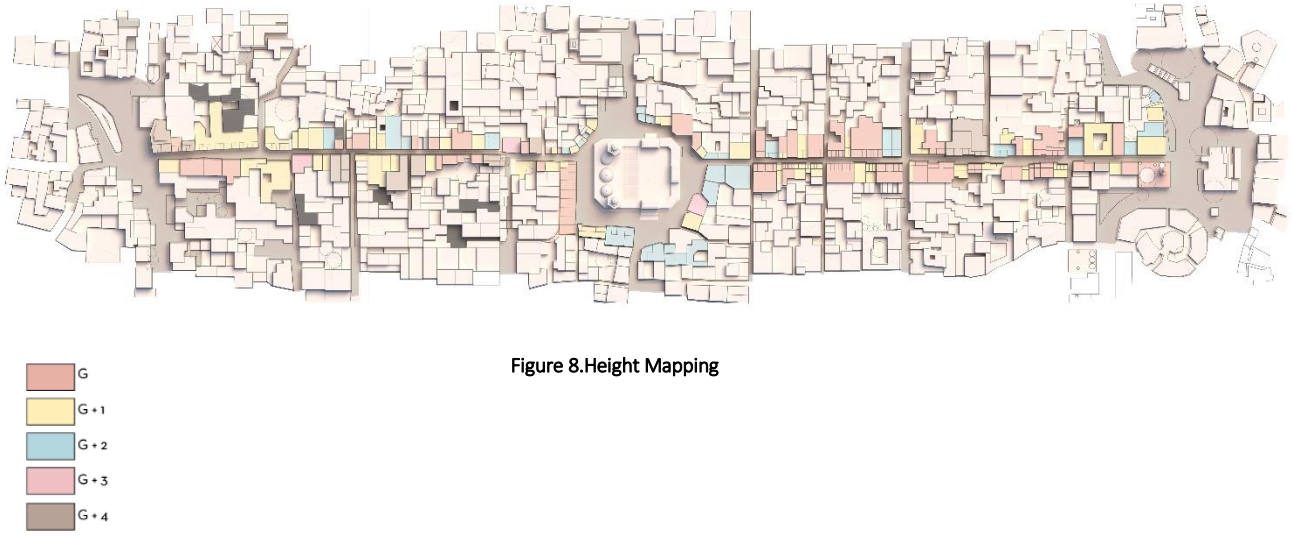


Figure 8.Height Mapping

Typology Map

The street majorly consists of commercial shops as well as big and small religious places. The entire street has a dense fabric of stores. While the first portion of the street has streets catered to clothing and apparel, the second half consists of electronic and hardware stores.

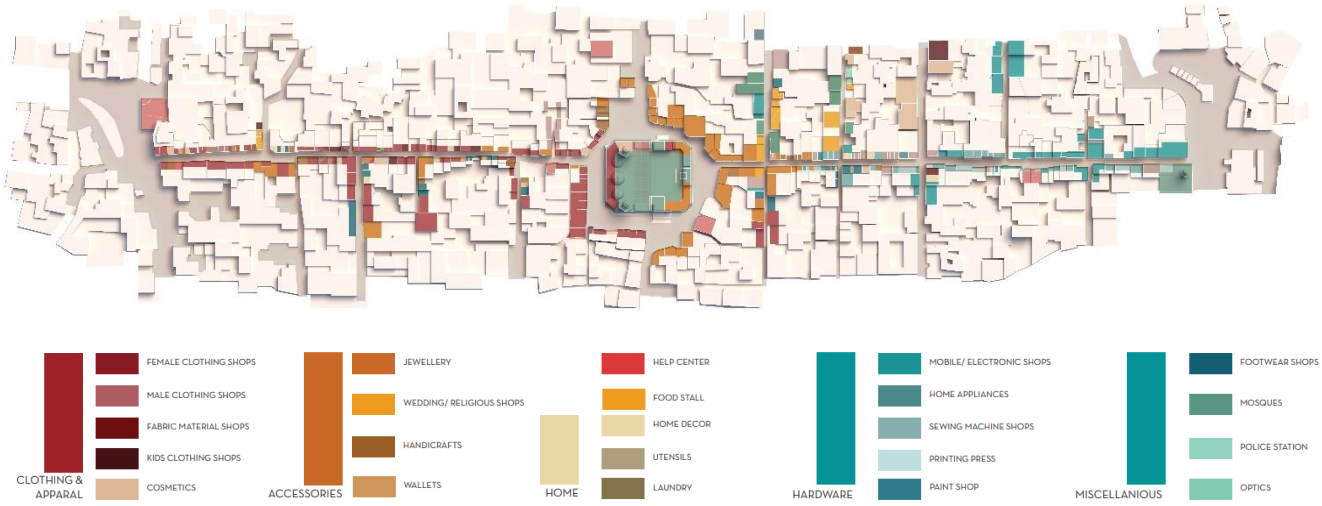


Figure 9.Typology Map

Physical Mapping

The site is flat with a slope and natural drainage towards the main Bhopal Lake. The drop in the contour is of 18m over 875 meters.

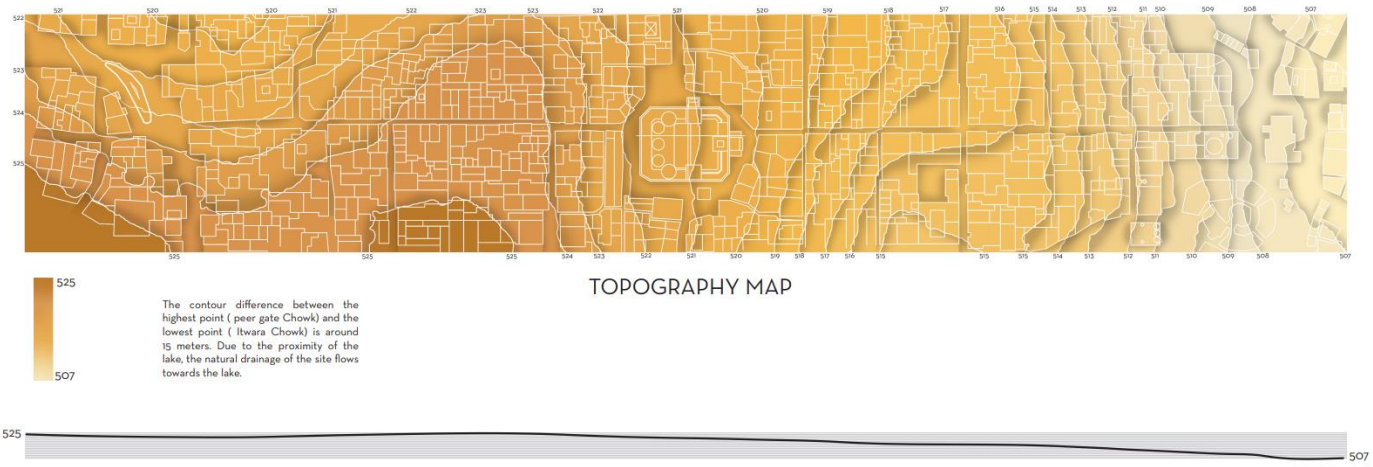


Figure 10.Physical Mapping with section

Figure Ground Map

The map illustrates the density of the built fabric of the area.

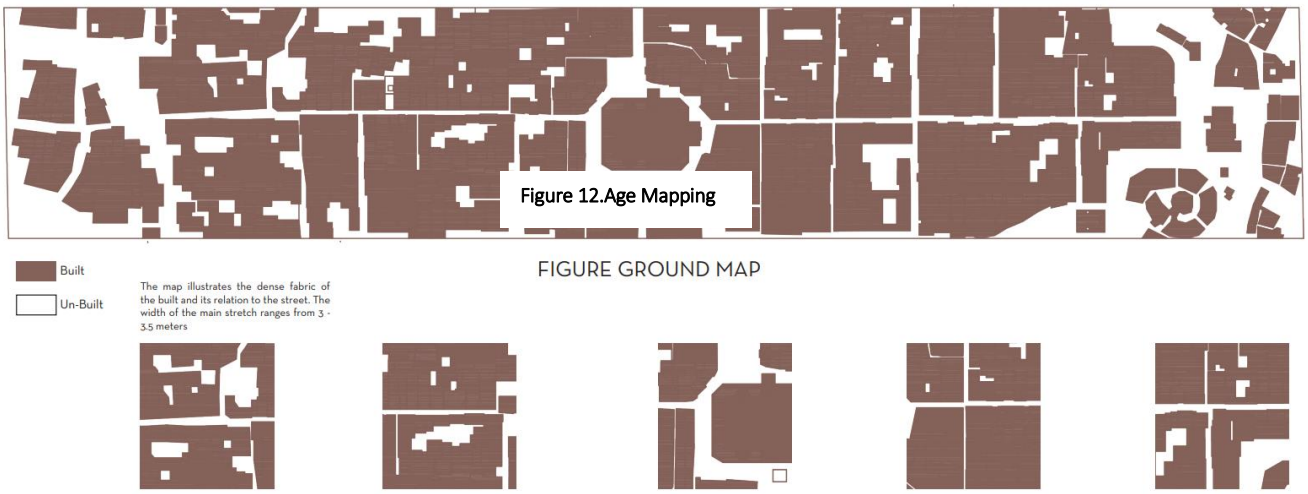
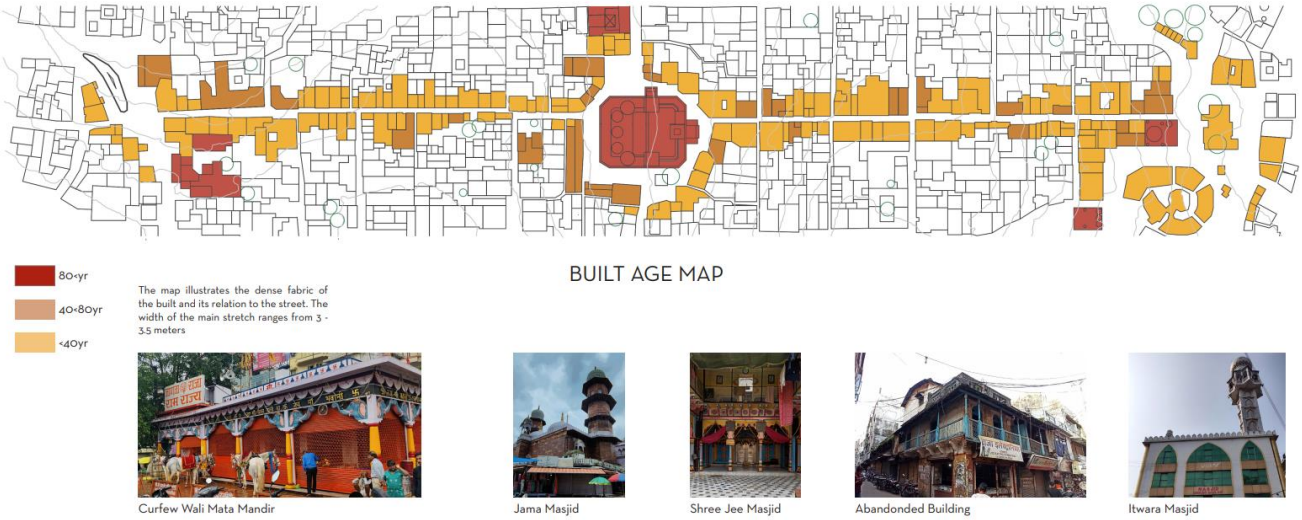


Figure 12.Age Mapping

Figure 11.Figure Ground Mapping

Age Map

The map illustrates the historic buildings in the area and the need for protection, conservation or adaptive reuse. The map also illustrated the importance of the streetscape.



Noise Mapping

While the outer main spine is noisy due to the presence of shops, the inner streets are narrow and quiet. The same can be observed in the main spine buildings.

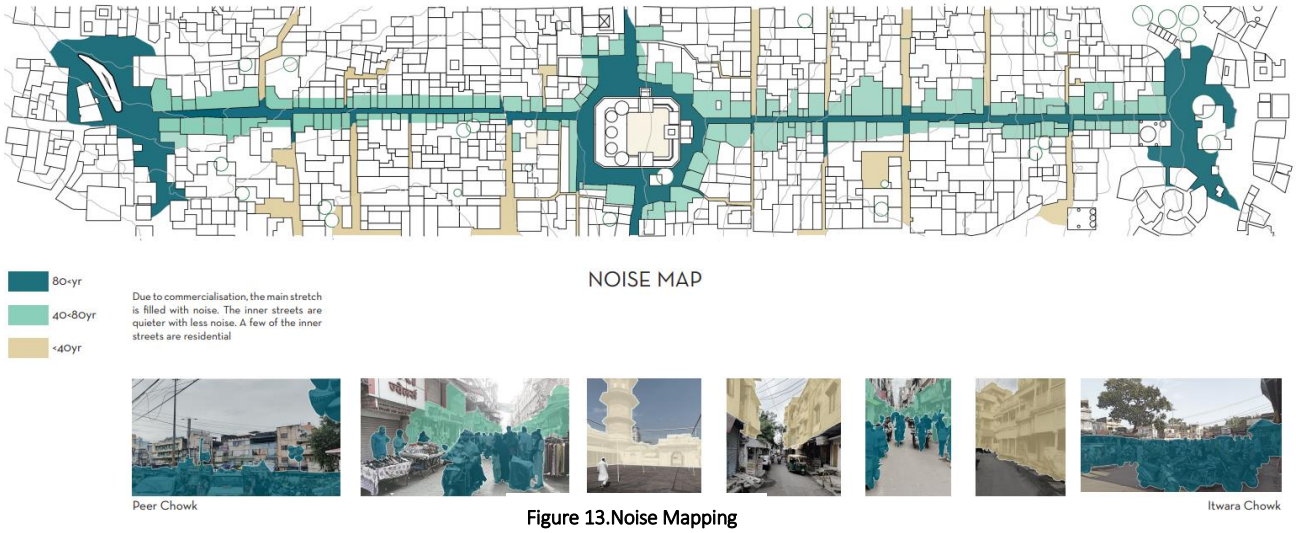


Figure 13.Noise Mapping

Activity and Circulation Mapping

The street is enamoured with a plethora of activities. While the first stretch of the street has more pedestrian movement and overspill due to the typology of activity, the second half of the street observes a more vehicular movement. Religious activities and vegetable markets are the majority of the activities in the morning. In the day, the commercial activities dominate the street while the same continues at night.

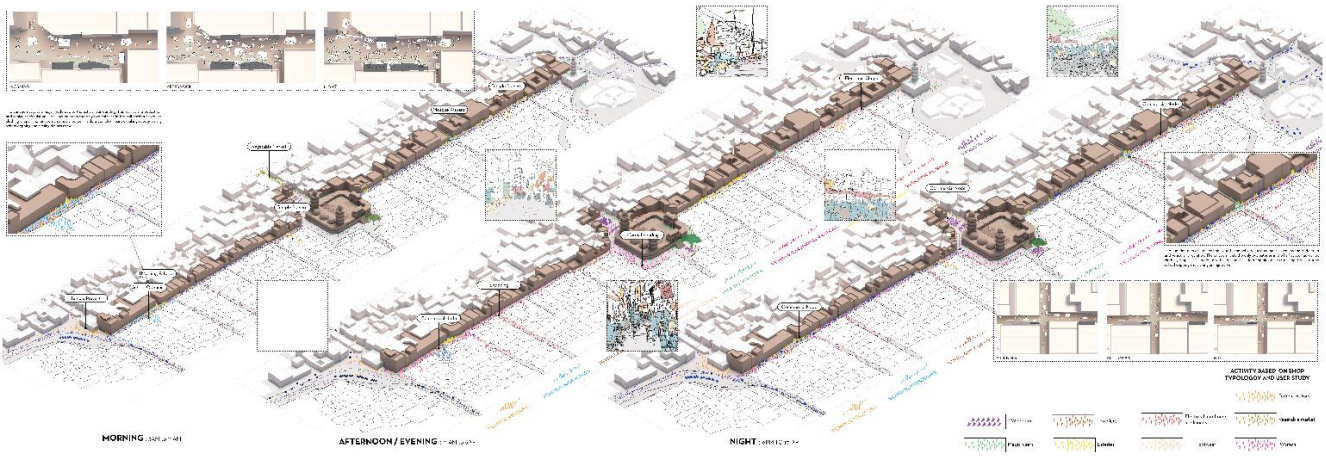


Figure 14.Activity Mapping

Figure 15.Pedestrian Movement

Figure 16.Vehicular Movement

Identifying the users:

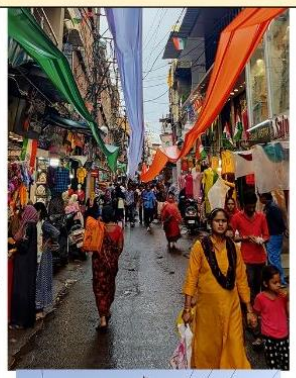
To create a barrier free streetscape, one must first identify the barriers and whom all they restrict. The on-ground site documentation showcased the inability of this 3M wide primary streetscape to accommodate even a well-abled person; from open drainages and potholes to uneven thresholds and surfaces, this street is a high-tension experience for everyone who passes through it. To name some of the users who are heavily challenged by the accessibility of this street are:

- **Elderly**
- **Children**
- **Users with Vision impairment**
- **Users with Auditory impairment**
- **Users with Mobility impairment**

Site Conditions:

Figure 17.On-ground site photos

Access audit:

S.No:	Question	Portable Answer (Y/N)	Existing conditions	Current Images of the Site	Possible Solutions
Entry/exit					
1	Are there sufficent number of accessible entry/exit points to the street?	No	Accessible points are narrow and broken at places with less visiblity and signage or demarcation		repair the access point and provide proper signage.
2	Are there signages provided on the street?	Yes	No parking, and other regulation signages present		proper signage has to be provided.
3	Is the width of the entrance to the street sufficient?	No	the width of the entrance is insufficient for the existing circulation of both vehicular and pedestrian accessing the street as two way		
4	Is the surface material slippery?	No	majorly concerete or asphalt is used, however there are plenty potholes prone to accidents		
5	Are the pedestrian and vehicular movements on the street segregated?	No	it's a 3m wide road forced to accommodate both pedestrian and vehicular circulation in two way along with informal vending and vehicles parked in the road which is very chaotic and accident prone		Divider and signages should be installed to seggrigate the movement.

Staircase					
6	Do the staircases provided have uniform depth of tread and height of riser?	No	several old buildings have narrow and uneven stairs		
7	Is there an angled riser provided?	No			
8	Do we have safety marks at the edge of the treads?	No			install saftey marks at the edge of the treads.
Parking provisions					
9	Are adequate number of accessible parking spaces provided?	No	vehicle parked on road edge		parking areas or multi-level parking should be provided.
10	Are vehicular zone and access aisle defined?	No			vehcular zone should be provided with defined accessible aisle.
11	Is there an accessible aisle joining an accessible route?	No			accessible aisle and accessible route should be provided at desired space.
12	Can you identify accessible parking space?	No	No parking space is there to park vehicle		accessible parking space should be there with signages.
13	Is there ramp provided on curbs along the accessible routes?	No	no crubs is present at the site.		crubs should be provided to hold the pavements of walking area, and ramp should be provided at limited interval.

S.No:	Question	Portable Answer (Y/N)	Existing conditions	Current Images of the Site	Possible Solutions
Street furniture					
14	Are street furnitures provided at regular intervals?	No	there is no street furniture. that area is quite busy.		street fruniture should be provided at regular interval.
15	Are they an integral part of the design?	No			
16	Are they easily allocated?	NA	no street furniture present. Plinths are used as vernacular sitting places. Patiyabaji		street furniture should there to make that area accessible for all.
Street design					
17	Are sufficent garbage points provided in the area?	No	very poor waste management		garbage points should be intalled at regular interval with signages.
18	Is there provision made for pedestrian crossing?	No	As there is no clear demarcation between any zones, pedestrians cross from any space. Being a commercial street, we obsereve heavy pedestrian crossings		zebra crossing should be designed at minimum interval
19	Are footpaths provided?	No			use non slipry materials to avoid any misshapping.
20	Is there any obstruction on the footpath?	NA	street vendors and people sit there.		design a designated space for street vendors.
21	Is there any differentiation in the grade of the footpath near street interaction?	NA			higher grade footpath should be used near street interaction.
22	Do you find the pavement material slippery?	NA			desired materials should be used for pavement.
23	Are contrasting colours present in the pavement to show change in grade/level?	NA			pavement of diffrent colours should be used if there is any change in grade or level of footpath.
24	Are ramp provided to cater change in level of the building and road?	Yes			ramp should be provided wherever there is change in level of footpath.
25	Are the materials used for construction are durable so as the quality should sustain for longer period of time?	No	No, roads are in a deteriorating state and gets worse during monsoon		good quality materails should be used.

S.No:	Question	Portable Answer (Y/N)	Existing conditions	Current Images of the Site	Possible Solutions
26	Are services provided in a continious stretch?	Yes	there is no such service is present on any of the strech.		
27	Is there a free walking lane on the footpath?	No	Absense of footpath. Street itself used for informal vending, pedestrain movement, vehivular movemement and everything in between		remove any of such practice and make the footpath clear to walking.
28	Is fencing provided at street intersection over footpath?	NA			
29	Do we have clear height of signages , windows, balcony etc. over the footpath?	Yes	while there's a clear height there is a lot of visual clutter obstructing the view of signages		standard height of 2.3 m should be floowed.
30	Are there any vertical obstructions faced by pedestrians on street?	Yes	the shopping style of the area adds overspills and stalls which are visual as well as physical barriers. there are multple banners aswell.		
31	does the ratio of street width and building heights facilites good ventilation and natural light.	No	the places feels claustrophobic at certain points due to lack of breathing spaces		
32	Do we have proper street lights on the street with proper illumination?	Yes	Being a commercial street, it is well illuminated with heavy light and hoarding neons and LED		street light should be provided at regular interval.
			Street design - way finding		
33	Are traffic signals provided at junction for pedestrian crossing?	NA	absence of any kind of crossing bay on any strech.		
34	Do we have directional tactile?	No	only exposed concrete and asphalt is used as flooring material.		directional tactile should also be used on footpaths.
35	Are warning tiles provided at change in direction or major halts such as ATM, information pylons, etc?	No	only exposed concrete and asphalt is used as flooring material.		warning tile should be used to warn users on footpath.
36	Are flagsigns with directions provided?	No			flagsign can also be used to notify people about place or activity.
37	Are finger-signs provided to increase legibility from longer distances?	No			fingersigns should be installed near normal sign boards.
38	Are tactile indicators present near the pedestrian crossing?	NA			install tactile indicator at pedestrian crossing to warn users.
			Pylons on street		
39	Are directional and detailed maps of the area provided on street?	No	no we dont have directional maps provided on streets, some direction signages are also mising		directional maps can be installed near sitting areas.
40	Are emergency contact numbers and website address provided on the map?	No	unsufficent number of maps are there at site.		emergency contact no: and QR code should be provided on map.
41	Is the information provided in the braille/audio format?	No	no we dont have any information present in braile/audio.		install braile and audio information booth near normal maps or sign boards.
42	Are tactile indicators provided . on the pavement to identify location of the pylons?	No			tactile indicator along with signage should be installled.
			Maps on street		
43	Does the map give information about nearest important destinations such as bus stops, phone booths, tourist information bureaus and kiosks?	No	no maps present on site		maps with given information should be installed at site.
44	Are maps provided near bus stops, transit hubs and other important places of the city?	No	no designated bus stop is there.		maps with given information should be installed at important places..

S.No:	Question	Portable Answer (Y/N)	Existing conditions	Current Images of the Site	Possible Solutions
			Public Amenities		
45	Are public toilets provided?	Yes	existing but are not used properly by the people		public toilets with accessible standards should be installed at regular intervals.
46	Are the public toilets accessible?	No			
47	Are public toilets provided at regular intervals?	Yes			public toilets should be installed at regular intervals.
48	Are accessible drinking water facilities available on the street?	No	the road is one of the busiest and congested road of that area. there is no place where these installation can be made		accessible drinking water facility should be installled at regularr interval.
49	Are basic medical and police services, ATM, available in proximity?	Yes	ATM services are provided near hospitals.		
50	Is the area under natural surveillance?	Yes	hospitals and others shops have personal CCTV cameras for survillance.		high vision cameras should also installled.
51	Is the area under CCTV surveillance	No			
52	Are thresholds to the shops provided?	Yes			
53	Are the thresholds uniform?	No			
54	Are there inter generational spaces	No			
55	Are all drainages closed?	No			

Inferences:

- **Peer gate being the primary access point to chowk bazaar has a massive crowd incoming that further stresses out the selected stretch.**
- **Since the street was originally designed for bullock carts and pedestrians, the 3M wide streetscape struggles to cater to the population it hosts today.**
- **In present, during market hours, the street is choked with shops and their overspills, informal vending, vehicular and pedestrian traffic thus, making it inaccessible even for a fully healthy person.**

- **Owing to this and a lack of formal parking forces people to park their vehicles on the street thus, hindering all circulation pathways.**
- **The stretch is shared by diverse user groups, the residents, shopkeepers, shoppers, students and so on.**
- **However, rapid commercialization has compromised the needs of the residents and children leaving them with no recreational spaces.**
- **Public amenities are insufficient or poorly maintained.**
- **Tarpaulins and shop banners hinder the signages adding to the visual cacophony of the street.**
- **The individual buildings are inaccessible given the irregularity of thresholds, steps and ramps or lack of elevators.**
- **Jama masjid being the focal point of the street acts as the only relief point however falls short while catering to people with mobility issues.**

Design Solutions:

As a collaborative studio between the disciplines of urban design and inclusive design, the solutions proposed range from micro to macro level that would help make this streetscape barrier-free.

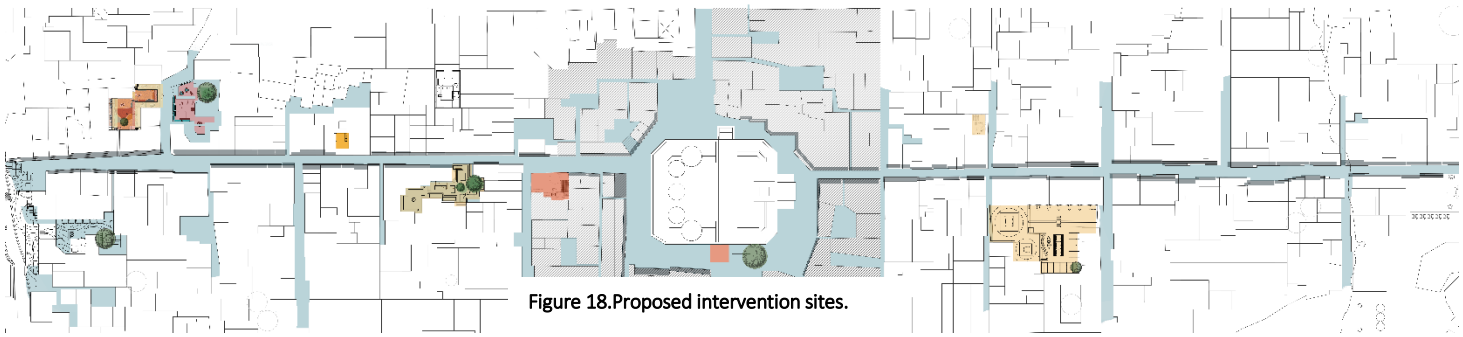


Figure 18.Proposed intervention sites.

1.Pause Points

a) **Sub streets to decentralize the spine:**

The inner courtyards are used as storage/dump thus, making them into a dead space which lacks any activity. To help de-

centralize the excessive informal vending occurring as overspills on the main spine, the inner open spaces connected by sub streets are opened up to host flea markets and informal vending. Re-introducing the concept of exploration and curiosity which would lead the people into finding these pockets of vibrancy. These spaces would act as 'Pause points' to this busy street that has the opportunity to host a plethora of activities.

b) **Multiple playing zones and recreational areas:**

Converting an abandoned plot into a playing area for the children of Chowk Bazaar. The entire playing area is designed to be barrier free. The buildings overlooking such playing zones act as 'Eyes on the Street'. Seating and open spaces are given for parental supervision. The same zones also act as recreational spaces that are grounds for socialization for the residents of Chowk Bazaar, even when the market is open.

c) **Chabutra:**

Culturally, Chabutras or bird feeders are the center of community life where the celebration of festivals takes place. Designing chabutras at pause points or cul-de-sacs will act as an information desk to people with visual impairment as a way finding guide. Each Chabutra would have a different artform on it with QR codes explaining them along with the same information written in Braille.

Figure 19.Abandoned plots converted into accessible play area for all

Figure 20.Chabutra or bird feeders with QR code and Braille for wayfinding and information

2. Urban insert and Shreejamandir seating - on the main spine

Re-imagining the front facade of the E-W cardinal axis of Chowk Bazaar, with a 'Pause point' created at multiple spots including the entrance of the Shriji temple to provide shade and comfort to all users in this chaotic street. An 'Urban insert' is proposed (Peer gate to Jama Masjid stretch) that would have some eateries in this heavy commercial and shopping market. Tactile tiles, handrails and information about the space will be given out through braille.

Figure 21.Urban insert

Figure 22 :Shreeji temple seating

3. Underground services

All services must be underground including electrical and telephone poles. All drainages must be covered. This will help in making the street more uniform and smoother for differently abled people.

4. Phase wise pedestrianization; Bollards; Tactile paving

A phase by pedestrianization is proposed in the precinct of Chowk Bazaar for the following reasons:

a) **To avoid further conflicts created by vehicular movement, pedestrian movement, informal vending, overspills and parking on the 3M wide E-W cardinal axis street**
b) **To make the precinct user-friendly, the road must be properly paved with tactile markers thus making it devoid of any uneven surface or potholes.**

To make the street more accessible, the vehicular movement will have to be re-routed with adequate parking spaces provided thus, achieving pedestrianization. Following the 'Grid-iron' pattern of

Chowk bazaar shall help in using the parallel roads to the cardinal axis for re-routing.

Bollards can also be placed at various strategic locations at a distance of 3-5 feet for allowing wheelchairs to pass by while restricting vehicular movement.

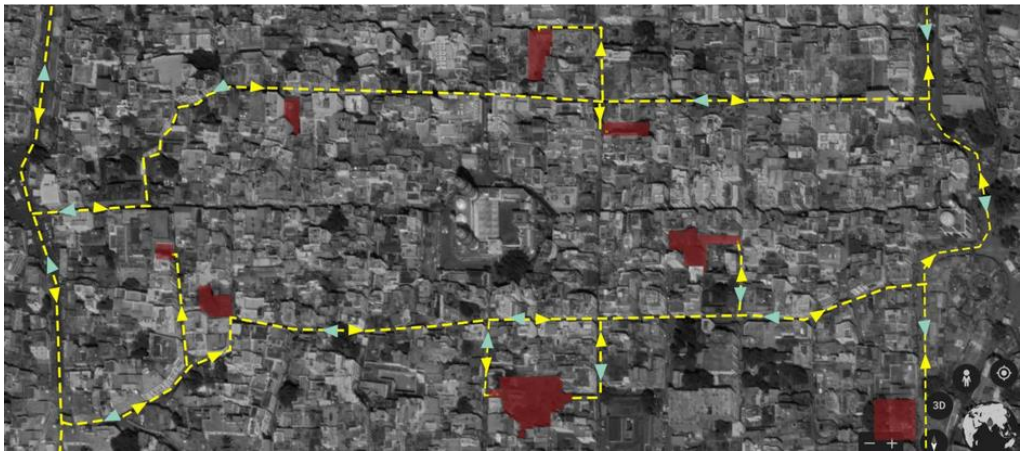


Figure 23.Re-routing of vehicular movement

5. Road widening by an offset of at least 0.5 M while redeveloping the structures

6. Widening of the square around Jama Masjid

To decongest the excessive parking happening around Jama Masjid and the haphazard parking along the main spine

7. Re-routing and MLCP

A MLCP is proposed for decongesting the parking around Jama Masjid thus, making the square clear, visible and accessible to all. It is located on an existing parking ground and abandoned nearby structures.

The ground floor shall host various informal activities and an urban green garden with some cafes is proposed on its roof. This MLCP is connected to one of the major grid- iron roads of the Chowk Bazaar precinct that would still be in use once pedestrianization of the main spine is done.

8. Ratio of tread and Riser are inappropriate, and stairs needs to be designed according to the Norms with the addition of ramps/lifts



Ramp with uneven slope and width.

Figure 24.Ramp and steps

The buildings along the streetscape have very high risers and a disproportionate ratio of riser to tread that makes using staircases extremely difficult. The few ramps present also do not follow the norms which are comfortable to use.

It is proposed to add ramps with usable slope and elevators wherever possible along with the ratio of riser to tread maintained.

9. Inclusive toilets

Presently, there are only 3 washrooms found on the entire stretch and are poorly maintained. Also, these washrooms are not accessible by all due to uneven thresholds, lack of ramps, handrails and signages.

The design proposes to add toilets at each recreational zone that caters it to all the genders.

10. Access to Jama Masjid

Jama Masjid, a cultural anchor attracts diverse user groups but with only large staircases as entry to it. This is a problem for elderly, people with mobility issues and many others. As a Grade 2 heritage structure, it is proposed to relocate an adjacent shop to make way for an elevator that would be usable by all.

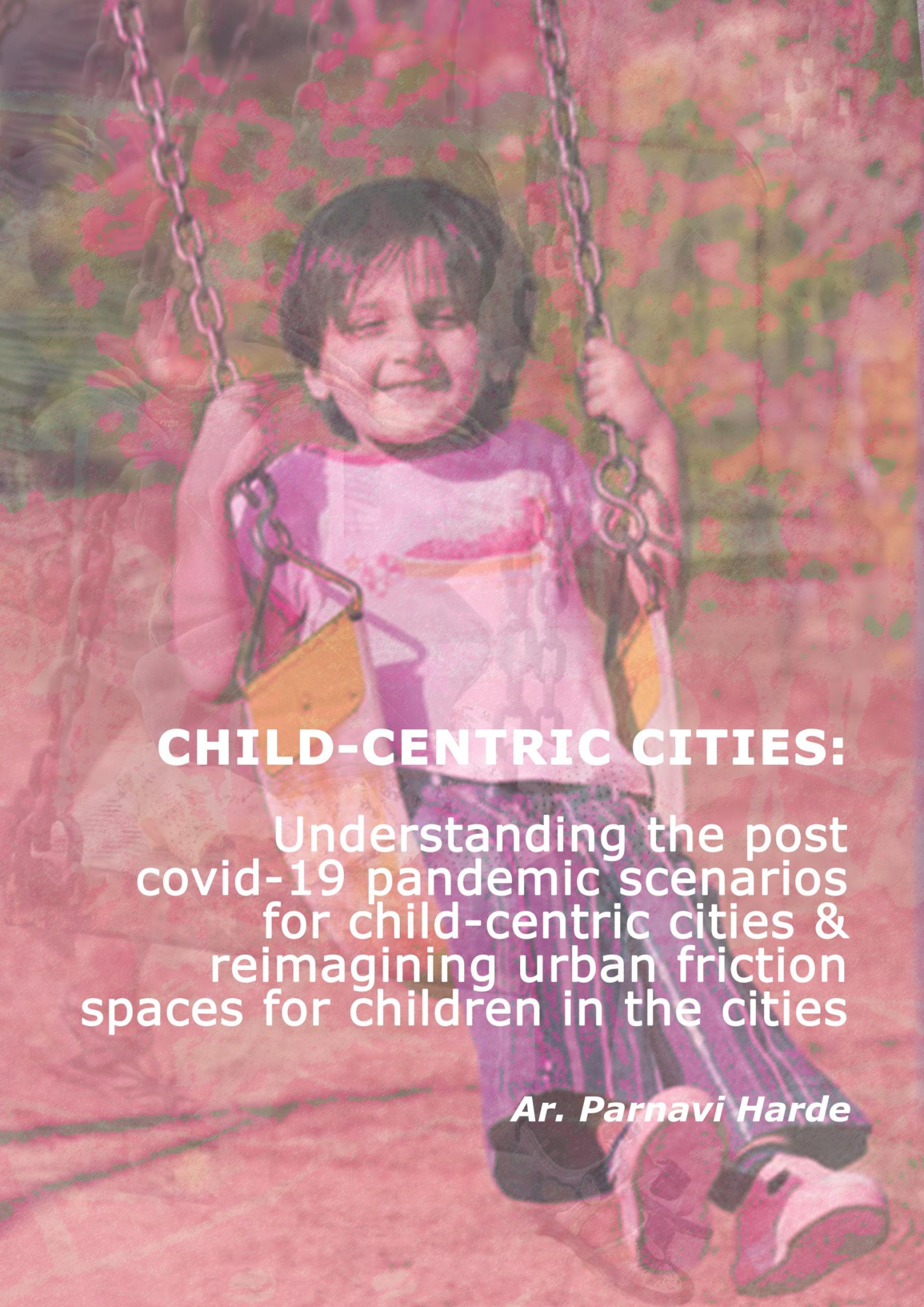
Figure 25.Proposal of elevator location to access the Jama Masjid

Conclusion

An Indian Street is a maximization of all sense. From touch, smell, sight to even taste, Chowk Bazaar is no exception in being an elevated and heightened sense of reality. In addition to these factors, the street also fulfils a functional purpose making it susceptible to various users. Thus steps have to be taken to enhance the functionality and ease of use for the street as well as making it inclusive for a diverse user groups. The steps and design interventions listed are only a step in the direction to making a street like Chowk Bazaar of such mammoth scale and history inclusive.

Acknowledgements

We would firstly like to thank the head of department of architecture Dr. Sandeep Sankat for his constant encouragement. A sincere thanks also goes to Prof. (Dr.) Rachna Khare for her expertise and knowledge which has been invaluable throughout the process. We also send our gratitude to our Urban Design faculty, Dr. Piyush Hajela, Ar. Vikram Kohli, Ar. Pooja Ninawe and Ar. Surekha KC for their guidance throughout the semester. Last but certainly not the least we also thank our teammates, Madhukar Gupta, Harshit Mor, Charan Anand, Sudipta Konhar for their continuous commitment and hard work is making sure we have a thorough research and contextual study.



CHILD-CENTRIC CITIES:

Understanding the post covid-19 pandemic scenarios for child-centric cities & reimagining urban friction spaces for children in the cities

Ar. Parnavi Harde

ISSN: 2582-8304

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Ar. Parnavi Harde

Abstract

Cities are the most complex but dynamic environments where people encounter the phenomenon of life. A child views the city and is a part of it through an entirely different perspective. Children absorb the city's surroundings using motor and intellectual skills, and the interaction with the city helps the child's mind grow and integrate. The covid-19 pandemic has significantly impacted children, who have suddenly changed their lifestyles, how they interact with the environment, and most importantly, how it has affected their physical and mental well-being. Eventually, the schools switched to an online education system. During the initial days of lockdown, the children are allowed to interact and spend more time with their parents. With time, peer interaction and outdoor activities decreased, which increased exposure to and dependence on electronic gadgets. Now, the post covid-19 scenarios have sparked concerns about children interacting with urban playgrounds and green spaces more by tackling contradicting values, social disconnection, and humanized disintegration to enrich and develop growth in the new normal.

This paper focuses on the significant shift in children's experience interacting with the city, which has transitioned during and after the pandemic. It deciphers the consequences of covid-19 pandemic on humanizing aspects of child-centric cities by adopting an investigative approach to develop a framework to understand and analyze the impact on children. This will provide a helpful toolkit for

re-establishing and shaping a child-friendly environment and reimagining urban friction spaces that grab the child's attention and offers interaction with the city.

Keywords***:*** ***child-centric cities, the impact of covid-19, interaction, urban friction***

Introduction

"Cities have the capability of providing something for everybody, only because, and only when, everybody creates them."**(jacobs, 1961)**

Cities reflect people, their aspirations, and desires over political, social, economic, and cultural factors and their attempt to accommodate all types of people regardless of age, sex, ethnicity, or religion. This unifies a city but neglects its youngest residents, who play a significant role in daily life and see the city from their own perspective.

The population of India in 2022 is estimated to be 1,417,170,000 with a growth rate of 1.15%. Despite the Covid-19 pandemic, the birth rate is 18.2 births/per 1000 population. The population of children from 0-14 years is 356,733,454, comprising 25.36% of the country's total population. *(United Nations, 2022)* The younger generation is India's future. Children and their interactions with the environment, the surrounding area, and the city level are disregarded while developing cities. Several new issues shed light on the accessibility of child-friendly environments, engagement, and liveability.

Children were less clinically affected than adults by the covid-19 pandemic. However, COVID-19 significantly impacts children's lives and changes how they engage with the city. Since digital tools provide a means to support the wealthier portions, the school closures caused by the pandemic widened the disparity. However,

underprivileged kids lag behind more. In addition to preventing ongoing education, COVID-19 also hindered children from learning from their daily interactions with urban environments. More youngsters are becoming introverted as a result of significant behavioral changes, including an inability or lack of need for social interaction. Since peer connection is essential for their development and because spending more time on digital displays is raising mental and physical illness, many toddlers and adolescents can suffer when they aren't exposed to social stimuli. Connecting to the outside world further develops a child's ability to make decisions and respond to stimuli. (After COVID-19, a future for the world's children? 2020)

However, the new everyday practices following the pandemic have made it difficult for people, particularly children, to engage in society. Depending on urbanism, parents develop strategies and habits to adopt and promote more external connections. (Living in the city). However, the contrast that the COVID-19 pandemic created has hindered both the quantitative and qualitative aspects of children's lives. As a result, popular play areas, playgrounds, and tot lots have abruptly disappeared from the neighborhood. Parents have begun to concern about their children's safety while neglecting the dangers of growth monitoring. They must be critically examined to enrich and enliven life within the cities.

The intention is to decipher how a framework can be generated that interprets the humanizing aspects of child-centric cities and, under the transition undergone by children in the COVID-19 pandemic and the post-pandemic experience, will create a toolkit that will help to re-establish and shape the void between the children and their interaction with the city, by generating a resultant of urban friction spaces.

Background

Children represent a segment of open space users who play outdoors, facilitating their skill development. Urban open spaces are more critical because they can positively affect the development of talent and creativity in children and develop their physical, social, emotional, and cognitive skills. (Goltz & Brown) (H, 2013).The brains of infants and young children stimulate the development of visual and motor skills. A single impression impacts the capacity to indulge and engage with the environment. Due to this, future learning and collaboration with others may be exceedingly challenging.

Factors affecting the growth of a child:

Children go through many developmental phases, including physical, cognitive, and socio emotional components.

Physical: It responds to growth and stimulation, quickening reaction time as children mature. It also controls motor abilities and body coordination.

Cognitive: Experiences and interactions with others and the environment help people grow and mature mentally. Language development and improved social skills are also a result.

Socio-emotional: Engagement in socializing activities

(freeman & Tranter, 2011)

How cities play an essential role in shaping children's lives:

Cities are viewed as the place where kids may play, explore, and interact. A child can develop their imagination by linking it to the city. Any adult's notion of a conventional fence operating as a barrier to separate two locations from one another. Conversely, children view the fence as a climbing, balancing engagement obstacle that also serves as a place to hide. The shift in view is clearly discernible

when children are given opportunities to imagine, express their thoughts, and explore the city's many levels areas.

Children consider cities as a medium for playing, exploring, and interacting. A child can enhance their imagination which associating with the city. Adults often design spaces without children in mind. Yet children constantly invade those spaces and use various elements of the environment to enhance their play. The most obvious example of a conflict is in adults' and children's understanding of the affordances of using trees. For adults, trees provide shade, food, privacy, or noise insulation. For children, trees can provide quiet and secluded places to play or opportunities for carving or for climbing and playing hide and seek. Considering an average fence acting as a boundary to separate two spaces from each other is a perception of any adult. Children see the fence as climbing, a balancing barrier of engagement, which can also be a space to hide. (freeman & Tranter, 2011) The change in the perception is seen as spaces in the city at various levels allowing a child to imagine and carve out their ideas and explore the rooms. Depending on usage and intensity, several city groups are targeted for children's spaces: areas in the neighbourhood, school, city center, and natural space levels. These areas are the most important ones since children interact most frequently on a daily basis and because what they encounter there might impact their minds.

Emerging Concerns- Changes in lifestyle adopted by children During the pandemic COVID-19 scenarios:

Many countries are cautiously endeavouring to return to the new everyday lifestyles while maintaining vital preventive measures. People are developing their methods of adoption, which has led to parents' growing concerns for a safe environment while also making their kids solely dependent on them. Since toddlers are more likely to investigate their surroundings and have greater freedom to move

independently and make modest decisions daily in challenging circumstances. However, with COVID-19, the scenarios take on a different look and have more adult-dependent mobility. Significant changes in activity and motor skill exploration and development exist because urban places no longer provide the same level of safety and instead turn into dead zones in neighbourhoods, public spaces, etc.

While the city's architectural design is crucial, more than a decent physical environment is required. A city's suitability for children is also influenced by its socio-cultural structure, spatial layout, and character.

Framework for re-establishing and shaping child-friendly cities:

The framework directs the development of urban resilience that benefits children, youths, girls, and boys. To ensure children's well-being, child-centered organizations must promote and strengthen resilience-building cities in response to the problems above. Working in cities can be done using the core ideas of urban systems thinking, a strength-based strategy, and a right-based approach. The objective of this framework is to enable designers and other public and private stakeholders to concentrate on the overarching ideas that will aid in identifying possibilities and chances to foster the development and coordination of future initiatives.

Key guiding concepts that have influenced the development of this framework:

Urban systems thinking: understanding the impact the city's physical and social urban systems have on the well-being of children and youth.

Strength-based approach: recognizing and leveraging the resilience already shown by children offers ways of building their strength and contributing to the stability of the cities.

Rights-based approach: urban stakeholders must ensure child and human rights are enshrined in resilience-building efforts. (United Nations, 2016)

In addition, four design-level strategies can be used to provide intervention that creates urban friction places for kids and can guide future action.

Promote integration

Make safe place

Mobilize the community

Sustain life

This study aims to promote integration that involves children's participation and integrates by creating friction spaces around cities that encourage children to spend more time outdoors.

Case study: Creating urban friction spaces under tactical urbanism: A case of Sambhaji garden and Sonawane maternity hospital, Pune

Urban 95 is a challenge. Pune is a fine example of creating urban friction spaces in various settings, including public gardens, maternity homes, schools, and residential neighborhoods. They have attempted to analyze the possibilities and range in the public realm by usefulness and a child's requirements.

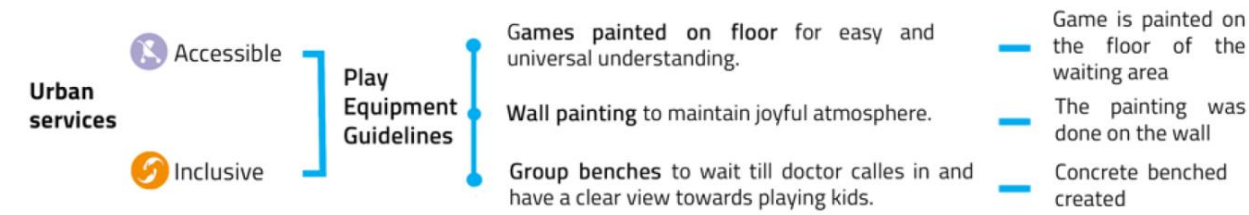
Considering the case of Sambhaji Garden, the intent was to generate friction spaces post-pandemic such that children are forced to interact with the environment, which will keep them engaged.Such play areas and green spaces will allow children to grow physically and emotionally, experience nature, and learn how to interact with their peers. With a focus on the physical, cognitive, and social development of babies, toddlers, and their caregivers, these

instances briefly explain a tactical intervention design that integrates sensory development aspects.

Design concept:

The aim was to make a safe and accessible environment for the movement of Infants and toddlers in the park and repurpose the open gym area within the park; through basic senses like touch, visuals, and feasible materials like tires and waste bottles. Also, I created wall art and painting to create a sustainable play space (by reusing material for setting and climbing activities and boundary walls).

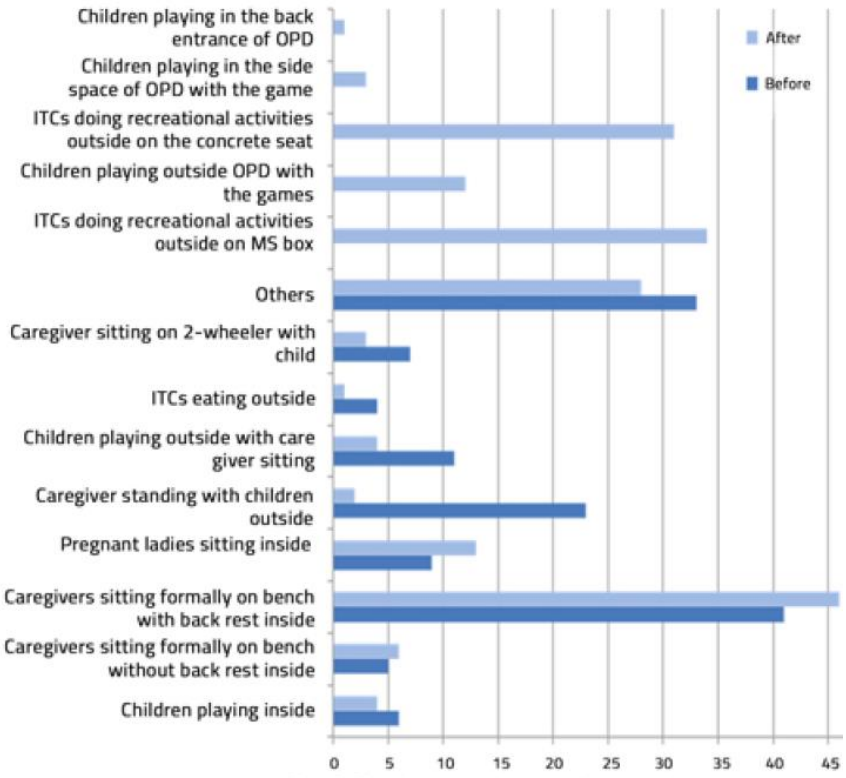
Also, the city-level Sonawane hospital has similar concerns and hospital slums on both sides. The aim was to create an outdoor waiting cum playing space with a safe, vibrant, and playful environment.



Reference of the ITCN Design Guidelines : https://bernardvanleer.org/app/uploads/2019/04/ITCN-Design-Guidelines_Revised.pdf

Interviews and surveys' conclusion:

From the interview conducted with the park caretaker, an understanding was developed that young children have intensivelyused it within the age group of 5-12 years and theircaregivers.

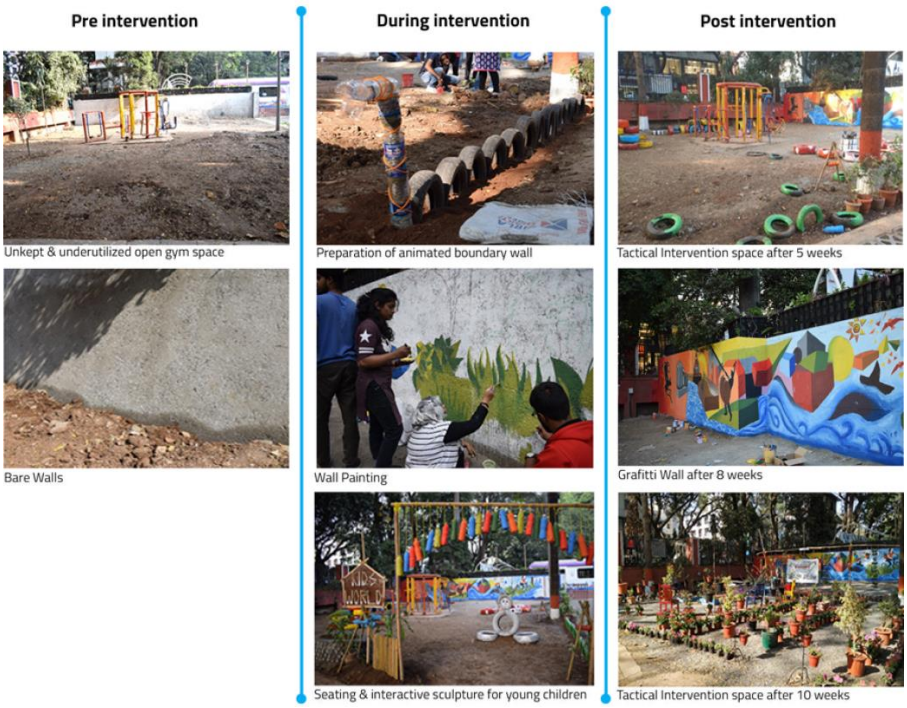


Graph: Post intervention activity mapping

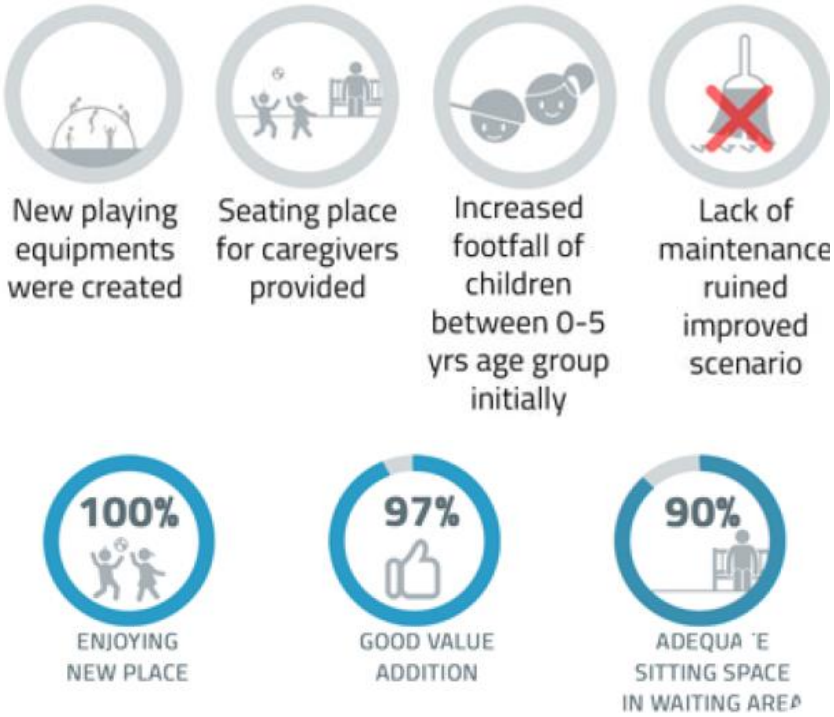
Outcomes:

For the hospital: playful and recreational activities of the children waiting near OPD have increased, and the activities happening before and after in the waiting area have improved.

Figure 1 shows stage wise progress of the Sonawane hospital intervention



Key learnings:



Graph: Post intervention - Impact on usage of play spaces

It has provided a familiar environment for young children to play actively and is comfortable for caregivers. Due to such interventions, design for behavioural change can be explored more.

(Urban 95 challenege)

Case study: "The Oasis Game" Santos, Sao Paulo, Brazil.

The second case of a city that emphasizes on children is Santos, a coastal city in Sao Paulo, where 100,000 people of the informal settlements of Nova Cintra struggle with issues including insecurity, poverty, hazardous living conditions, and a lack of infrastructure for families and kids.

The "oasis game" is a project that primarily focuses on gamified community intervention and involves 200–400 members of the community. It promotes community participation in the development of urban space specifically curated for young children, including daycare centres and playground areas, as well as some long-term strategies.The project used a seven-stage philosophy called "gaze, affection, dream, care, miracle, celebration, and re-evolution," which involved mobilising community members through meetings, workshops, and events to recognise and value the resources in the area, define shared aspirations, and collaborate to achieve them.

Outcome:

The initiative has now ended and accomplished considerably more than was anticipated. A community soccer field has been secured by fencing, a disused shipping container has been repurposed into a toy library and play area, and a pedestrianized street has been made more attractive by having trash picked up, vibrant murals painted, and a vegetable garden planted. (Barnard Van Leer foundation , n.d.)

Key learnings:

The initiative led to the participation of community people as well as designed a personalised space for the community children which , enabled them to study, develop, conceive their ideas, and interact with the outdoors. Additionally, it improved their motor and cognitive abilities. The children in the settlements don't have a lot of

resources, yet this programme helped them to understand their neighbourhood and serves as proof that children can learn a lot about their environment by playing in a decent urban friction area.

Conclusion:

Accessibility and inclusivity nowadays is a part of fundamental rights in the city where children are the most important part of the society. children's provision rights are usually considered in terms of food, shelter, health and education. Provision of playful spaces must be added in the provision of rights. At each different places children thrice to adapt multiple learnings from the surrounding, design of friction spaces generates a sprawl of activities that indulges a child's mind in playing, growing and learning. After pandemic, the scenario of playgrounds, schools as well as neighbourhoods and city centres felt like blank dead spaces, activation of such spaces has resulted multiple benefits. although urban designers may not consider children as an intentional component but a good urban design can benefit children. The improvement in the quality of life in a tangible way must be the primary focus. Multiple small and large level interventions to increase the learning and playful experience with comfortable participation needs to occur in a supporting physical space with encouraging mentors. Facilitating children to access such spaces can be challenging for parents but can try to maximise the participation.

New urban forms and initiative can be designed in consideration of which slowly will add to the mandatory layers of designing a city. While such spaces increase, multiple benefits are to the children as well as senior citizens and their indulgence shall be seen thriving in such spaces. A strong sense of belongingness can be generated which will contribute to the liveability of the city. The initiatives start from part to whole level. Designing or rethinking the neighbourhood play spaces and starting from small tactical

interventions slowly shall be developed from one level to another. Thus, a city level design is created which can be in more focused towards children and will slowly add up liveable and resilient cities.

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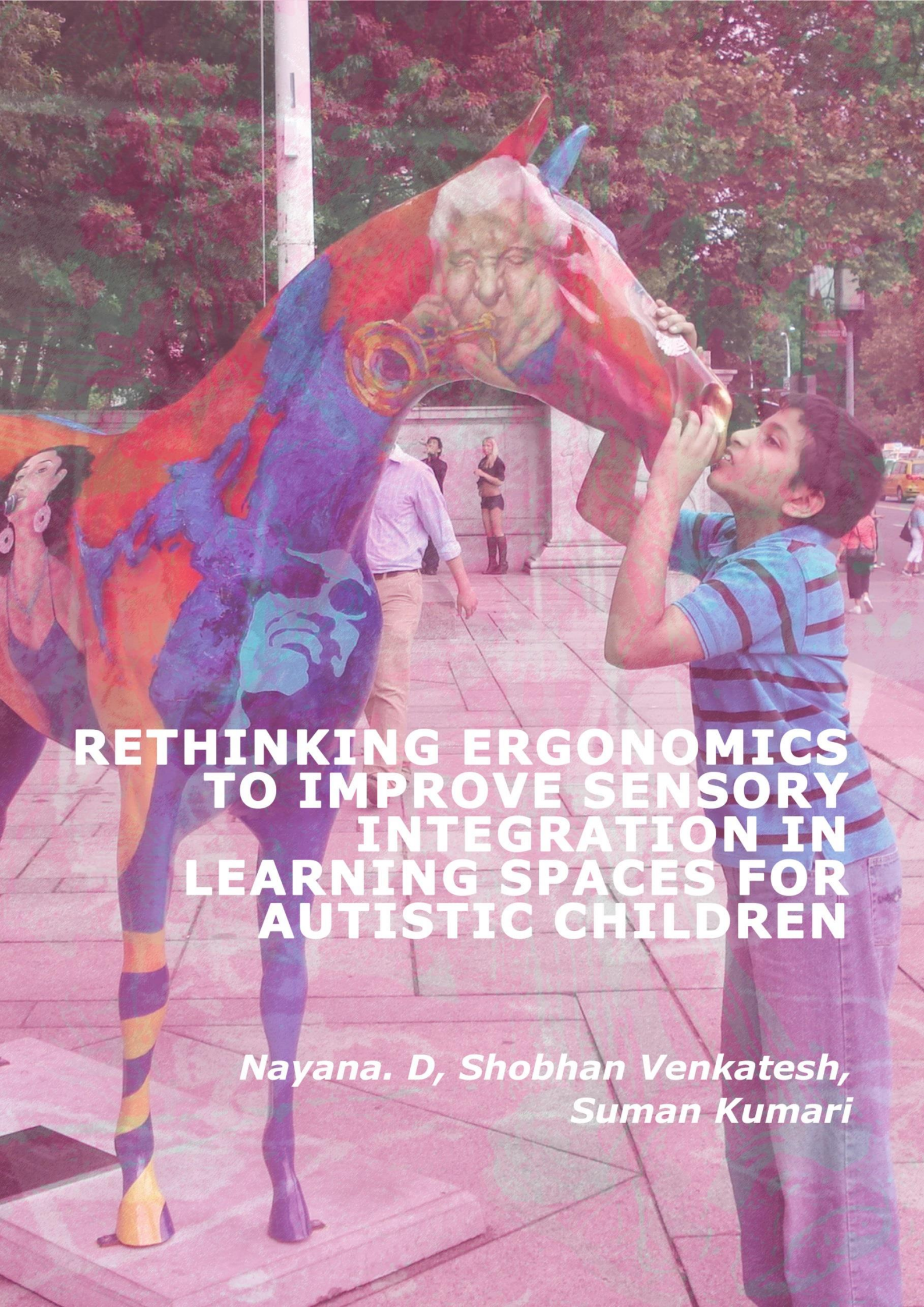

RETHINKING ERGONOMICS TO IMPROVE SENSORY INTEGRATION IN LEARNING SPACES FOR AUTISTIC CHILDREN

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ISSN: 2582-8304

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ISSN: 2582-8304

Rethinking Ergonomics to Improve Sensory Integration in Learning Spaces for Autistic Children

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ABSTRACT

Sensory integration is a natural phenomenon for human beings, and it is the prime reason for our proper functioning with respect to any given task or in a social construct. For people with ASD or autism spectrum disorder, it is an attribute that must be nurtured. There are a lot of ways by which one can nurture it through tangible and intangible entities that can be responsible in integrating one's senses. This paper discusses 'Furniture design' as one of the approaches and intends to find how reconsideration of ergonomics and design elements can affect and improve the sensory integration for Children with ASD. Children belonging to the age groups 4-14 years were considered as the target user group and their learning spaces were taken as the context. Parents and caretakers of children belonging to this age group were surveyed by the means of forms and interviews, to collect, analyze and synthesize data that clarified what triggers them and what affects them positively, to find a solution for better sensory integration.

KEYWORDS:

Autism Spectrum Disorder, Furniture Design, Learning Spaces, Sensory Integration, Cognition skills.

1.INTRODUCTION

Autism is a brain-functioning disorder that affects development. Despite being a significant part of society and contributing to the

world's expanding population, people with autism spectrum disorders are frequently overlooked in design processes. The physical and mental needs of this section of the society is barely acknowledged by the building codes and various design guidelines that concern objects that play an important role in our daily lives such as furniture. The environments that people with the condition of ASD are subjected to play a very important role in their well-being. Negative behavior frequently begins to develop when a person is unable to comprehend or adjust to their environment. Approximately 1 in 68 children have autism spectrum disorder (ASD), according to estimates from the CDC's Autism and Developmental Disabilities Monitoring (ADDM) Network (Gaines, Bourne, Peaarson, & Kleib, 2016). The childhood experiences of a person largely impact their way of thinking, acting, and feeling, that tends to be carried on into adulthood, which impacts their entire life. Obsessive behaviors are extremely common in children with ASD, and it is important to take into consideration the environment they are subjected to, and the ergonomics of the objects they handle daily.

Learning spaces and the objects used in these spaces, meant for children with ASD plays a vital role in helping the children overcome the difficulties caused by their condition. To positively influence these kids' behavior, interior space modifications can be used. By taking to consideration, the factors like texture, color, acoustics, sense of closure, proximity of objects, light and ventilation, brightness etc.

In this paper, we have recognized the problems faced by children with ASD with respect to their use of furniture in learning spaces. The children are constantly in contact with the furniture, through the entire learning process. Hence it is important to understand the necessity of personalized furniture for its user that does not cause irritation or hindrance to the learning process.

2. AIM AND OBJECTIVE

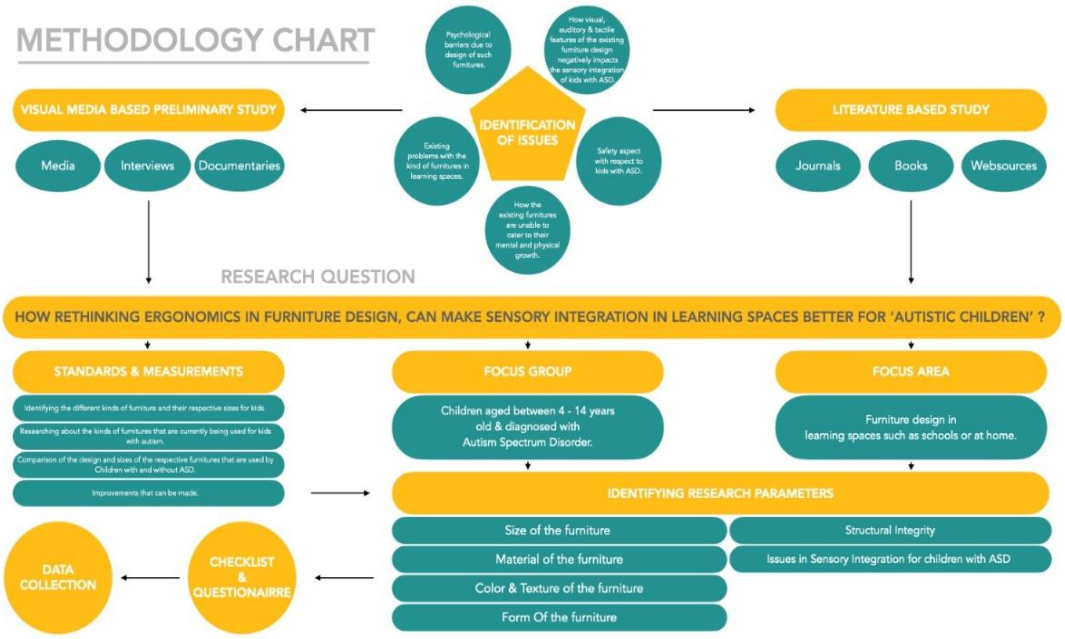
The data analyzed in the paper shows that rethinking the ergonomics of the furniture meant for learning's spaces of children with an ASD condition is important. The problems faced by these children with respect to furniture and ways to overcome them by modifying the ergonomics have been discussed. Although there are multiple papers, studies, debates, and discussions regarding the topic, we see that they are practically applied in very limited places. The aim of the research is to identify whether characteristics or elements of furniture design that trigger or improve the behavioral comfort of the user group and can bring about a better sensory integration and cognition in a learning atmosphere with themselves and their surroundings. An attempt is made to solve the issue of exclusion with an all-inclusive furniture design by evaluating the properties of existing furniture.

The objectives of the paper are as follows:

1. **To understand the user group and their requirements in the context of furniture design in their learning spaces.**
2. **To come up with a criterion of reconsidered factors and design aspects that would be referable for designing furniture for children with ASD in learning spaces.**

3. METHODOLOGY

This study employs quantitative as well as qualitative methods and a case study research design. In contrast to quantitative research, which primarily uses questionnaire results and pre-existing behavioral charts as its primary sources of data, qualitative research places more emphasis on words, or explanation, than on quantification.



The statistical data is retrieved by quantitative methods. The percentage or the chances of occurrence of ASD in a child was taken from ADDM Network 2000-Combining Data from All Sites. This data includes the surveillance year, birth year and the combined prevalence per 1000 children.

A case study is also included in the paper, which is based on an online survey which was targeted towards individuals that were in direct contact with children with ASD. We have compared and analyzed this data to that of the literature study. Previously conducted surveys by various organizations and individuals have also been taken into consideration.

4. ASD: A BROAD SPECTRUM

The fact is that no two cases of ASD can ever be the same, hence the requirements of any two individuals with ASD can never be the same. Each child has their own level of functioning, different symptoms, and different sensitivities. These symptoms range from mild to high.The sensory processing deficits in these individuals is what causes the sensitivity they have to their surrounding environment, be

it sensitive eyesight, or hearing (Gaines, Bourne, Peaarson, & Kleib, 2016). Repetitive rigid behavior is observed while trying to deal with overwhelming surroundings, which turns into a coping mechanism for many individuals on the spectrum. These behaviors might appear as irritating or might look like the person is throwing a tantrum to a third person while it is mostly due to an imbalance between an individual's capacity for adaptation and their environment. (Sánchez, Arnaiz, Vázquez, & Laureano, 2011). While in mild cases of ASD one might not even be able to tell the difference in between a person with ASD to the public, in severe cases the person might indulge in self injurious activities such as head banging or biting oneself.

Autism in children can be classified as either hypo or hypersensitive. Hypo sensitive kids can appear to be under responsive to stimuli while kids that are hypersensitive are very easily overwhelmed by the stimuli they are subjected to.

Sense	Hyposensitive	Hypersensitive
Auditory	Does not respond when called; Enjoys strange noises; makes excessive noises	Overly sensitive to noises; Likely to hear noises before the others in proximity; Cannot function with noise in the background
Tactile	Touches surfaces unnecessarily; Has abnormally high pain threshold; Isn't bothered by high temperatures	Avoids wearing certain fabric; Grooming is found to be distressing; Does not like being wet or going barefoot; Reacts negatively to being touched
Visual	Disregards people or objects in environment; Can see only outlines of certain objects; Likes bright colors and bright sunlight	Bothered by bright Lights (covers eyes or squints); Easily distracted by movement; Stares at certain people or objects
Vestibular	Disregards people or objects in environment; Can see only outlines of certain objects; Likes bright colors and bright sunlight	Bothered by bright Lights (covers eyes or squints); Easily distracted by movement; Stares at certain people or objects
Smell/ taste	Moves around unnecessarily; Enjoys spinning in circles; Becomes excited about tasks involving movement	Seems unbalanced when upside down or when feet leave the ground
Proprioception	Some reports of Pica or eating non-food substances; "Feels" objects with mouth; Seeks out strong smells; Oblivious to some scents	Picky eater; WiII only eat foods with certain textures, with smells, or at a certain temperature

Table 1.1 Behavioral chart curated by (Gaines, Bourne, Peaarson, & Kleib, 2016) depicting the differences in hypo and hyper-sensitive children.

Having remarkable talent and mastery in particular field, most often music, chess, or math, is a very fascinating common occurrence in children with ASD. Younger children are most likely to show more obsession in terms of hobbies or even simple daily objects. Social Interaction and difficulties in communication is not an uncommon trait in children with ASD. In most cases, they are unable to communicate their needs, and are unable to express their problems, which causes them to indulge in agitative behavior.

4.1 Relevance of Learning Spaces

Cognitive and social skills to overcome the problems faced by the kids, can only be taught step by step gradually, in the growth years, when they are most likely to learn effectively, catch up on routines with ease, which enables them to lead a normal life in their adulthood. Hence learning spaces and every object that is a part of these spaces plays a significant role in shaping a child's future since their wellbeing is highly influenced by their surroundings. The physical environment of these spaces should be all inclusive.

Autism is one of the most challenging developmental disorders, thriving in high numbers, even so is ignored by designers, and is not included in codes and standards.

Learning spaces are the best places to incorporate inclusive design, to enhance the learning experience of pupils, by subjecting them to appropriate physical environment and tools. (Khare & Mullick, 2009). Academic issues can be very well dealt with using suitable furniture and relevant articles in the learning spaces. Every object in these spaces should be designed with consideration for all aspects of sensory perception.

5. THE ROLE OF ERGONOMICS OF FURNITURE IN ASD

Ergonomics refers to the study of work, involving the interaction and the suitability between human capabilities and the requirements for

a task. (Tsneg & Cermak, 1993). The grip and pressure in terms of tactility of any object concerning children with autism should be studied evaluated and made suitable for their use. Furniture design highly influences the quality of not just learning spaces, but any space for better efficiency and usability. And considering the ergonomics in this field of design is crucial and can make a huge difference. Furniture is an important part of built spaces and is one of the important aspects that can affect architecture and sensory cognition in human beings, in terms of functioning of a space. The key to effectively modify these spaces, lies in the process of perception. Strategies to cater with individual needs of children with Autism in their growth years (4-14 years of age) can be incorporated in the modular furniture itself. The behavior can be favorably altered by changing the sensory aspects of furniture. (Brightness, texture, color, orientation, build, sense of closure etc.) The object that is being reconsidered must be divided into manageable pieces and arranged in a logical sequence that follows both sensory and temporal logic during the design process. Spatial quality, spatial organization, spatial orientation, spatial integration, and safety are the five main categories into which sensory design principles can be categorized. (Scott, 2009) Some relevant points that should be taken into consideration are as follows-

1. The building's layout should be uncomplicated, reflect calm, order, and clarity, and have clear signage and easy navigation.

2. Students may exhibit a variety of spatial sensitivities: some may be afraid of wide-open spaces and prefer smaller ones, while others may dislike enclosed spaces. When feeling anxious, having a variety of large and small spaces to retreat to can be helpful.

3. Low sensory-stimulus environments are designed to lessen anxiety, stress, and sensory overload.

4. The availability of a comfortable, well-proportioned space with neutral, gentle colors will enable teachers to gradually introduce stimuli (such as wall displays of student work or information).

5. Classrooms can be set up with areas for individual work or private workspaces so that teachers can use a variety of teaching techniques.

6. It is important to think about using indirect lighting and avoiding noise or other distractions (such as blind cords, exposed pipes, or imposing outside views).

7. Where there are students with severe disabilities, sturdy materials should be used, and safety measures for doors, windows, glass, plaster, and piped or wired services will be needed.

8. To avoid an institutional appearance while also reducing risks, it's important to strike a balance between security and independence as well as the right ratio of hard materials and specialized equipment to common, everyday items.

9. Modifications to the plan and simple or minimal detailing may lessen the potential for obsession. It is important for the users to be a part of the design process at every step.

The strategies and the brief should be developed by both, the designers and the users, which in our case are kids of age 4-14 years with an ASD condition. The furniture meant for these kids need to qualify three main criteria: Self-Regulation, Social Participation and Perceived Proficiency.

6. THE SIGNIFICANCE OF RECONSIDERATION

The flexibility of furniture, along with the stability and adjustability undoubtedly are an important aspect of furniture design. But when working with the case of autism in children, it important to ensure

that the flexibility does not mean constant change, instead it helps the furniture blend in any kind of learning setup. Lighting solutions withing furniture can play an important role as well. There should be scope for subdivision and rearrangement. Ideally, a single piece of furniture should enable the children to engage in various activities that help build their independence and self-confidence (Vogel, 2008). Just using open-ended materials, competency in physical abilities is enhanced. Features of furniture like rolling units, and other easily movable parts, sufficient well organized storage spaces, boards, and partitions and other multipurpose strategies are also proven to be beneficial. While being multipurpose, it is advisable to eliminate non-essential materials to form a clutter-free, aurally restorative space for learning.

Reconsidering the ergonomics in furniture design for kids with ASD, will not only benefit the students themselves, but it will also highly benefit the people who are closely associated to these children. It is very important for the layout to be perceived as welcoming, for the space to be non- threatening for the child, and to foster social relationships, and sensory skills.

The settings in which the furniture is placed also plays an important role in serving the cause by providing a sense of security and calmness. Playing with levels of elements of the furniture to enhance the visual skills while not being too overwhelming is also a great strategy that can be achieved. Visibly soft looking design elements in the furniture that can be achieved either by color, texture or hardness can also contribute to the sensory input. These can include unconventional furniture such as swings, bean bags, couches, and water or air beds. It is important to make sure the furniture is not very open and empty which can lead to a dead space, whereas ensuring that it is not cramped is also equally necessary. It is wise to avoid spaces than cannot be predicted easily, the entire study setup

should be easy to perceive and navigate. Safety is undoubtedly the most important aspect that needs to be taken care of. Creating a safe environment can be challenging when designing for children with autism. Both physical hazards (due to stimming and possible seizures) and, mental and emotional security need attention. While there is no perfect furniture design for autism, designers and everybody associated with the child need to educate themselves and identify attributes about the child to be supportive in order benefit the child as well as themselves by creating a safe, secure learning environment.

CASE STUDY: WHAT IS REQUIRED IN A FURNITURE

The survey was designed to retrieve data that provides us the opportunity to understand the user group in more detail to understand how various tangible and intangible aspects affect their sensory perception. Hence, the research demanded data from how intensity of light impacts their visual perception to how it triggers their emotions. Such data was required for all the other senses. It is known that children with ASD have more tactile sensitivity. Hence it was essential to see how their grip and comfort was to different surfaces.

Since the research was limited between an age group of 4–14-year-old, the above aspects had to be in relation with age as the controlling factor. The age factor also helped in getting an idea about the activities that are mainly concerned with the said age group, which in fact is more essential for the design of the furniture.

The furniture design aspect was one of the major perspectives of the survey along with user group and their age. The research demanded to document the furniture that are currently in use, problems faced by the user group, materiality, and ergonomics overall. The 3 major

aspects followed by a respective hierarchy of sub heads resulted in a checklist that helped in designing the survey form.

The above data is necessary and practical to come up with a framework of considerations in the design language and ergonomics for such children, in designing furniture for them in the future.

FINDINGS

Majority of the survey takers were teachers of the user group or siblings. Parents specially hesitated to be a part in fear of exposing their child's condition out though no names were asked. Though the target user group was from 4 to 14, majority of the survey takers have filled up the form recalling the behavior of now the grown-up user groups, i.e., above 14 years of age. Kids with ASD level 3, where they require very substantial support, were the ones talked about more in the survey. 14 out of the 23 survey takers have witnessed the child having a fidgeting behavior.

Table 2 Findings

Colors preferred.	**subtle neutral colors with no or very little contrast in the color scheme** **no vibrant or illuminating colors.** **blue color scheme is preferred but should not be monotonous**
Study table finishes.	**No strong or metal reflective surfaces, Glass should be avoided.** **Mild reflection** **Non reflective surfaces** **Glowing surface with tempered class on top, but not for studying**
Sound absorption	**Should absorb footsteps sound** **The furniture should not make noise which**

quality	**usually are or high pitch**
Furniture for one or more	**The furniture should have space for storage, groves, and slots for holding items for drawing etc., in hand reach zone, without them getting up or leaning in uncomfortable position to access the items.** **Place for holding water.** **Head support if the child requires one.** **Should have room for including minor group activities like playing with puzzle for two people.** **The furniture should be heavy and sturdy to avoid toppling or any accidents.**
Customization	**Height adjustment system with locking mechanism** **Detachable head and back support, with helps the furniture get transform into a multipurpose seat.** **Adjustable leaning back support which is study and angle can be adjusted.** **Height ratio of the table and chair can be adjusted to better suit the user**
Form of the table	**Rectangular table with round corners** **Circular table with study base and should not topple** **Sharp corners to be avoided** **Table with less than 4 supporting legs should be avoided** **Table should have enough height and leg room space**

Patterns on the table	**Organic monotonous pattern with neutral color scheme should be promoted.** **combination of strong colors, contrast and extreme geometrical pattern should be avoided at all costs.** **patterns containing too much of elements or colors should be avoided**
Others	**The material should be heating insulator.** **can include heating elements in colder climate.** **Material should be smooth and not slippery.** **Material should not develop crack or peel off easily which can lead to cuts.** **Furniture should be colorful but keeping the above aspects in check.**

CONCLUSION AND LIMITATION

The condition of autism and the needs of children with the condition can never be completely understood. As mentioned in the paper earlier, it is a very broad spectrum and no two people with ASD have the same requirements. But considering individuals and assessing their needs can surely improve the quality of their life. The strategies highlighted in the paper, are however broad and can be perceived as per the individual's need. The findings can benefit the children, irrespective of their position on the spectrum, to work on themselves in their learning spaces through the suitable furniture. Their symptoms should be accepted and catered to, instead of being challenged.

A pragmatic approach to furniture design in learning spaces, can contribute to the fostering of sensory skills, help with the management of the environment, and enhance organizational effectiveness. While catering to the needs and personalizing spaces for their growth, it is also important for these children to be subjected and should be prepared for challenges to remain immune to other environments. Subjecting them to overly ideal unrealistic environments can add to their processing deficit, and make other environments, distracting and even scary at times.

The insufficient availability of statistical data regarding the number of children proves to be a major setback. Only the data regarding the setup of furniture and the ergonomics of furniture is covered in the paper. Further studies on the learning environment and its impact can be conducted in the future, to understand the subject better.

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ISSN: 2582-8304

Letter from the Chairman's Desk By Sunil Bhatia PhD

I have come across a photo in newspaper of USA where a woman was defecting open in the street and caption was 'poor people are compel to defect in public out of financial compulsion'. It was shocking. My desired destination came and I alighted from metro. While walking for exit I thought woman was sitting as her body was feeling comfort while defecting. It was the clear example of biological interface with the other system. In this case earth that can not be alter so man has to invent ways he can execute with little pain. Squatting is the best body shape where large intestine is in the proper vertical position for stools to come out. Sometime size of the tool is big and touches the buttock portion so man thought to increase the height or sit at the edge where stool should have free fall due to gravity. later design of commode has same idea of functioning in defecting in open and compact design for washing the body part is included for more hygiene in mind.

We have other biological parts like eyes, ears nose etc. needs a proper interface with other systems. We have hands and it has specific way of functioning. We design other products keeping in mind what our hands or fingers can do without experiencing any taxed.

The last evolution in human was he stand on his feet from crawling on four legs (two hands and two legs). Our total design concepts of interface changed with such evolution. Legs are helping in movement. Both role of legs and hands can be used separately. A person can work manually while standing on his feet. Or while driving the vehicle he can use ear, nose or hands and legs for proper coordination for driving.

Origin to reaching a destination needs leg movement and for proper interface reach without facing any difficulties our ancestor designed pathways. The idea of joining both end by pathways and later improved version was that any person can join for any point of origin and leave the pathways as find his destination has come. Later design roads for better interface for eliminating disturbed to smooth movement by layering the road. They ultimately designed highways for interface for high speed vehicles. Wherever rivers are blocking the interface man thought of designing bridges for connecting the destination to origin.

I am thankful to Prof Rachna Khare School pf Planning and Architecture, Bhopal for accepting our invitation and contributed fruitful articles for our readers.

Lambert Academic publication for celebration of 150th special issue by publishing a book by compiling editorials "Design For All, Drivers of Design" was translated into eight different languages from ENGLISH to French, German, Italian, Russian, Dutch, and Portuguese. Kindly click the following link for the book. "Morebooks", one of the largest online bookstores. Here's the link to it:

https://www.morebooks.de/store/gb/book/design-forall/isbn/978-613-9-83306-1

Enjoy reading, be happy, and work for the betterment of society.

With Regards
Dr. Sunil Bhatia
Design For All Institute of India
www.designforall.in
dr_subha@yahoo.com
Tel 91-11-27853470®

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Forthcoming Issues

May2023 Vol-18 No-5

Ercan Tutal, ***completed the Bachelor of Social Sciences in the University of Tubingen- Germany in 1996.***

An accomplished Executive Manager, with expertise in leading the social change to close the gap between where people with disabilities are and where they should have been. Proven ability to innovate social responsibility projects with local and multinational companies in Turkey. Solid experience in creating strategies and processes that enhance the integrity of socially disadvantage population into the community. Strong management and leadership skills, with ability to motivate volunteers and promote volunteerism and develop smart solutions on disability.

Excellent communicator, with emphasis on building strong relationships with local and multinational non-governmental organizations. Deep understanding of how to lead organizational changes.

He is an expert on accessibility solutions.

Worl ambassador of Design for All Foundation.

Founder of: AYDER–Alternative Life Association, Dreams Academy,
Alternative Camp, Social Inclusion Band, Dreams Kitchen, D-Film, Best Buddies Turkey and SortyApp.

Among his social accomplishments include being Olympic Torch Bearer in 2004 Athens & 2012 London.

Throughout his career he has received various awards such as:

June 2023 Vol-18 No-6

Debra Ruh CEO Global Impact

| Executive Chair, Billion Strong | Host of Human Potential at Work

AXS Chat Co-Host
Talks about #inclusion, #tech4good, #accessibility, #digitalinclusion, and #disabilityinclusionTalks about hashtag inclusion, hashtag

tech4good, hashtag accessibility, hashtag digitalinclusion, and hashtag disabilityinclusion

Rockville, Virginia, United States

July 2023 Vol-18 No-7

***Manisha** is a thought leader in the power of thinking from the edge and has appeared on Big Ideas on Radio National, Sydney Writers festival and fronted the Disability Royal Commission. She has over 20 year's experience in strategic marketing, communication, transforming cultures and creativity and now leads the Centre for Inclusive Design as the organisation's CEO. She has a unique ability to bring together industry experts and global partners to identify areas ripe for disruption where we can make the greatest impact. Manisha has worked in government, community, and technology sectors. She is passionate about social justice and business growth and believes that when we combine the two, we get gold.*

August 2023 Vol-18 No-8

Divya Chaurasia ***is an award-winning industrial designer, with a background in engineering and user experience. An expert in user centered research, sustainable practices and design for manufacturing, she has a Masters in Industrial Design from Pratt Institute, New York and Bachelor's in Technology from Indian Institute of Technology Bombay, India.***

Currently, Divya works as a senior industrial designer and user experience lead at Spitfire Industry, a design consultancy based in Brooklyn, New York. She designs products and experiences for brands like Clorox, All Clad, Tefal, Bausch & Lomb, Cook's Direct, Hunter Douglas, GoTrax, and Nectar. Divya's work is inspired by the everyday pursuits of people. She is fascinated by the connection between humans, objects and environments, and captures this relationship in delightfully functional products. Her work has been exhibited at NYCxDesign (New York Design Week) and NYC Media Lab Annual Summit and received recognition by Chicago Athenaeum Good Design Award in 2021 and International Design Awards 2023. Being a strong advocate for sustainable practices in design, Divya has given guest talks at the Industrial Design Society of America Technical Deep Dive and North Carolina State University on the topic. Divya also volunteers her time for

supporting young designers. She serves as a mentor for Masters students at Virginia Tech University and the Offsite program, and as a Creative Liaisons Coach for the London International Awards.

October 2023 Vol-18 No-10

Dr Dolly Daou ***has 23 years of academic and industry experience leading global academic programs and non-profit associations and initiating practice-based research projects for medium-large organisations in Australasia, Europe and the Middle East. Dr Daou's professional background is in interior architecture and urban design research, her career path led her to France where she became the Director of Food Design Lab at l'École de design, Nantes Atlantique. During her leadership to the lab Dr Daou developed and implemented system-based and food entrepreneurship education strategies. Combining her multidisciplinary and my international industry and academic experience Dr Daou developed workshops that transform theoretical research into impactful commercial outcomes and strategies with ecological benefits particularly in the food sector. Dr Daou is currently the co-founder and co-chair of Food Think Tank Research Working Group at Cumulus Association. Dr Daou established the Interior Architecture Program at Swinburne University of***

Technology and implemented its transition and rebranding, was the Director of the non-profit Association of Professional Interior designers/Architecture (MENA) in the Middle

East and North Africa, where Dr Daou was awarded the title AlSafeer Congress Ambassador by Dubai Business Events, a Community Manager for a team of start-ups at the European Innovation Council (EIC), European Commission and invited Quality Assurance reviewer for TEQSA and for international quality assurance agencies for higher education in Australia and in Bahrain.

November 2023 Vol-18 No-11

Dr. Soumyajit Bhar is currently an Assistant professor of environmental studies at Krea University, India, where he offers and coordinates a course on Design Thinking. Soumyajit straddles action and academic research with more than 14 years of experience (both volunteering and full-time) working with various environmental and sustainability issues. He holds a Ph.D. in Sustainability Studies (with a specialization in ecological economics) from Ashoka Trust for Research in Ecology and the Environment (ATREE) as part of a unique interdisciplinary Ph.D. program. His dissertation attempts to understand socio-psychological drivers and local and regional scale environmental impacts of conspicuous/luxury consumption basket in India. Soumyajit is furthering postdoctoral research at the

intersection of rising consumerism, sustainability concerns, and inequality levels in the context of the Global South. He is also keen to explore how design education can broaden students' perspectives and help them delineate pathways to a better world. He has published in international journals and popular media. He is also interested in larger questions of philosophy and ethics, particularly pertaining to environmental issues.

ISSN: 2582-8304

New Books

it is available on www.morebooks.de one of the largest online bookstores. Here's the link to it: https://www.morebooks.de/store/gb/book/design-for-all/isbn/978-613-9-83306-1

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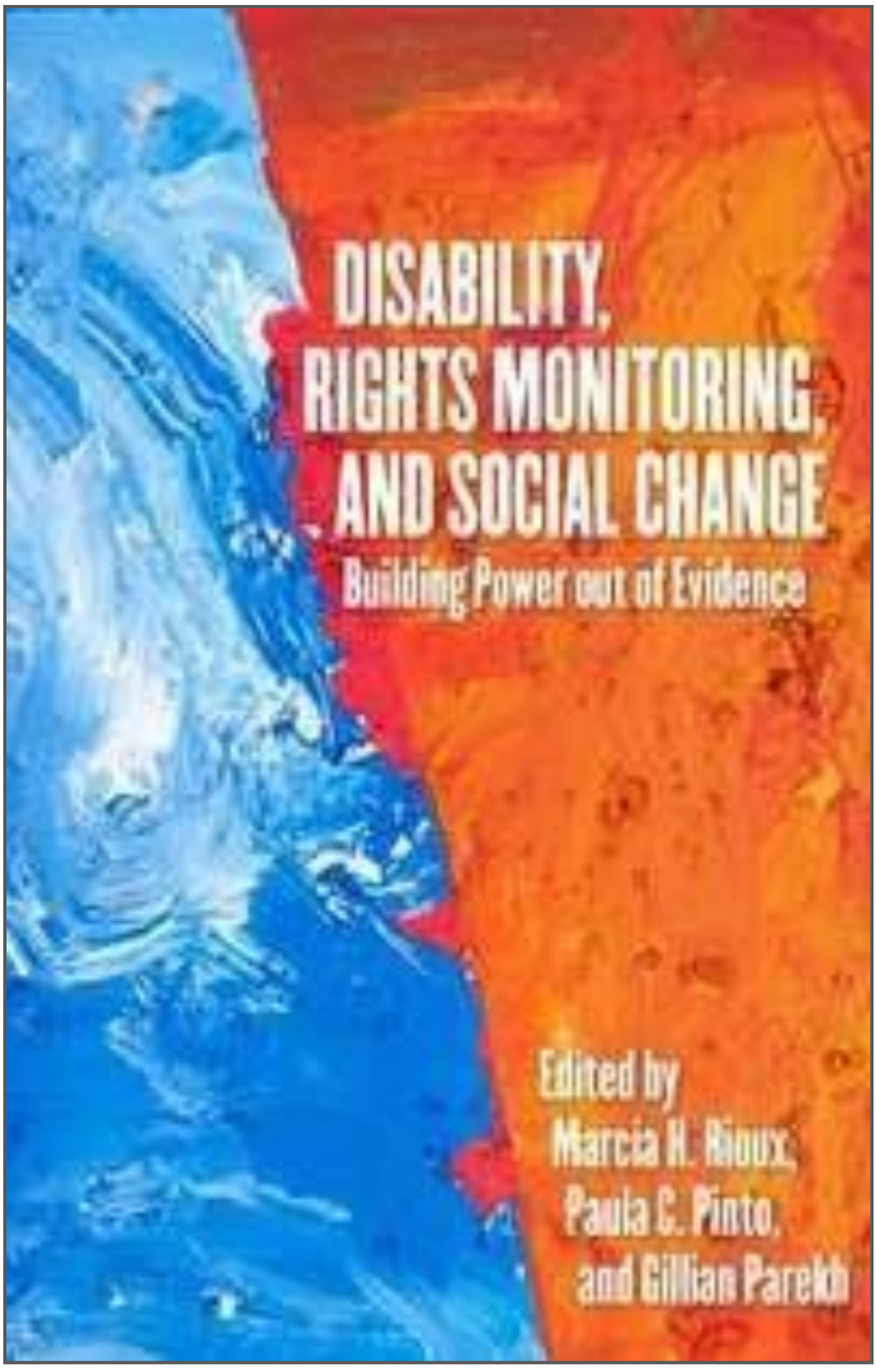

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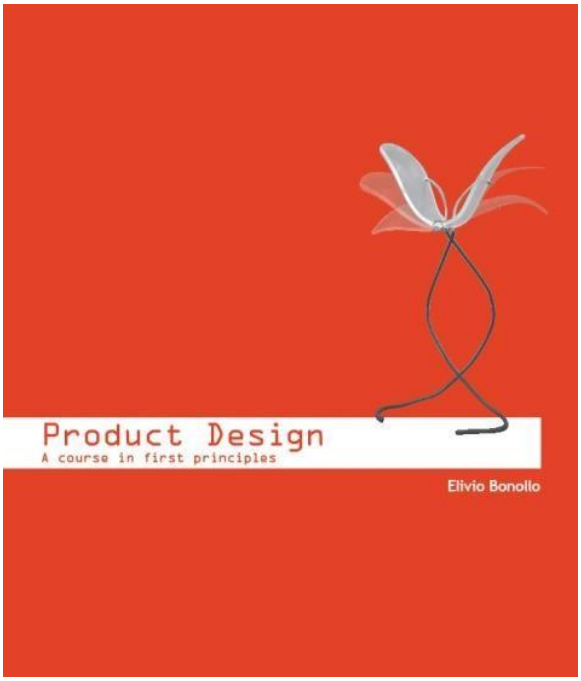

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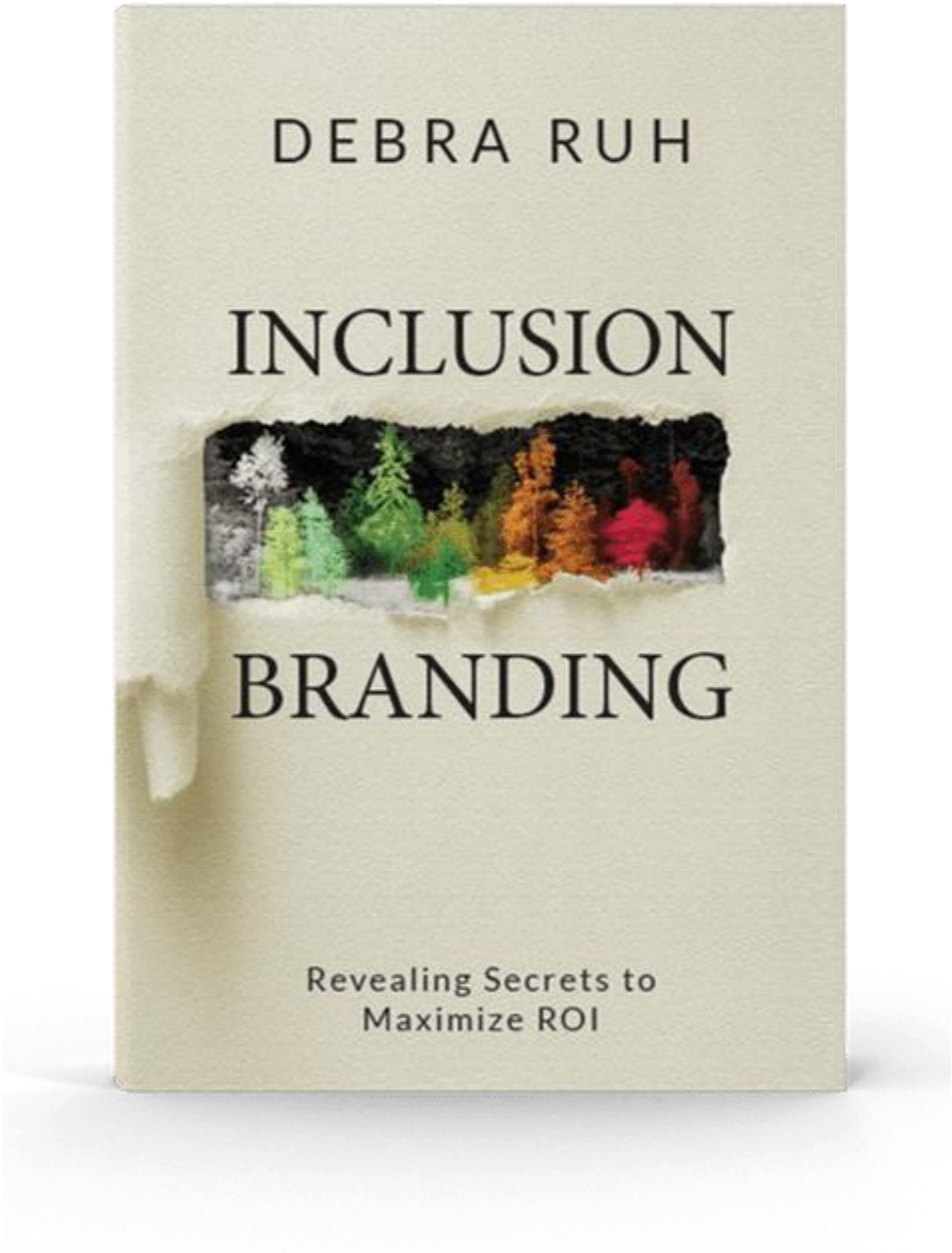
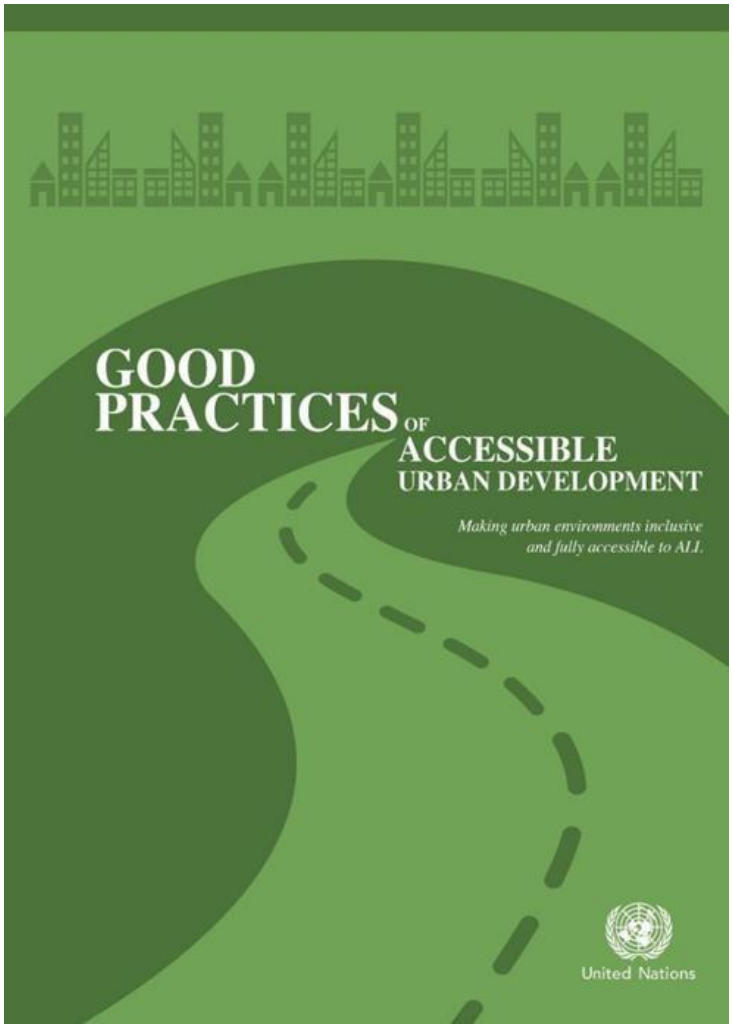
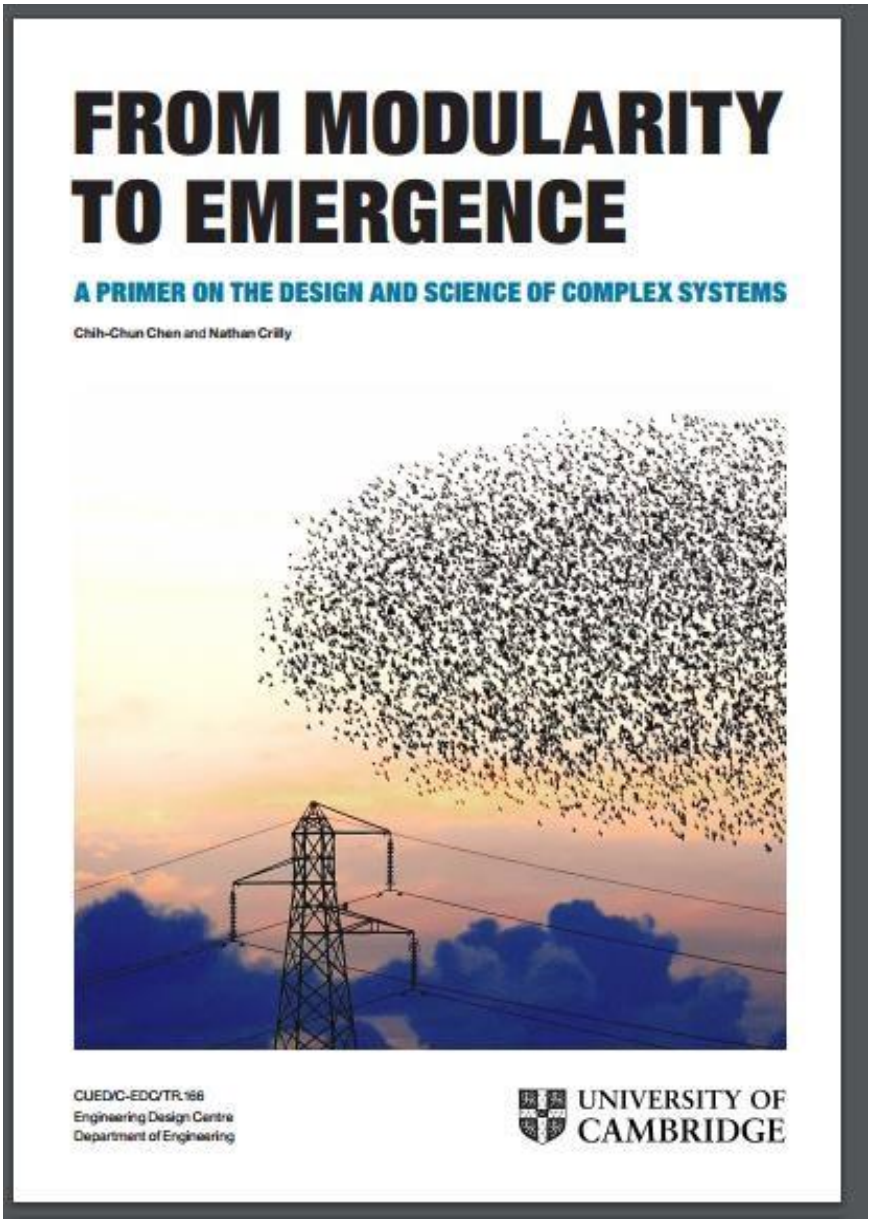




In light of the forthcoming United Nations Conference on Housing and Sustainable Urban Development (HABITAT III) and the imminent launch of the New Urban Agenda, DESA in collaboration with the Essl Foundation (Zero Project) and others have prepared a new publication entitled: "Good practices of accessible urban development".

The publication provides case studies of innovative practices and policies in housing and built environments, as well as transportation, public spaces and public services, including information and communication technology (ICT) based services. The publication concludes with strategies and innovations for promoting accessible urban development. The advance unedited text is available

at:http://www.un.org/disabilities/documents/desa/good_practices_urban_dev.pdf



Dr Chih-Chun Chen and Dr Nathan Crilly of the Cambridge University Engineering Design Centre Design Practice Group have released a free, downloadable book, _A Primer on the Design and Science of Complex Systems_.

This project is funded by the UK Engineering and Physical Sciences Research Council (EP/K008196/1).

The book is available at URL: http://complexityprimer.eng.cam.ac.uk

Changing Paradigms: Designing for a Sustainable Future

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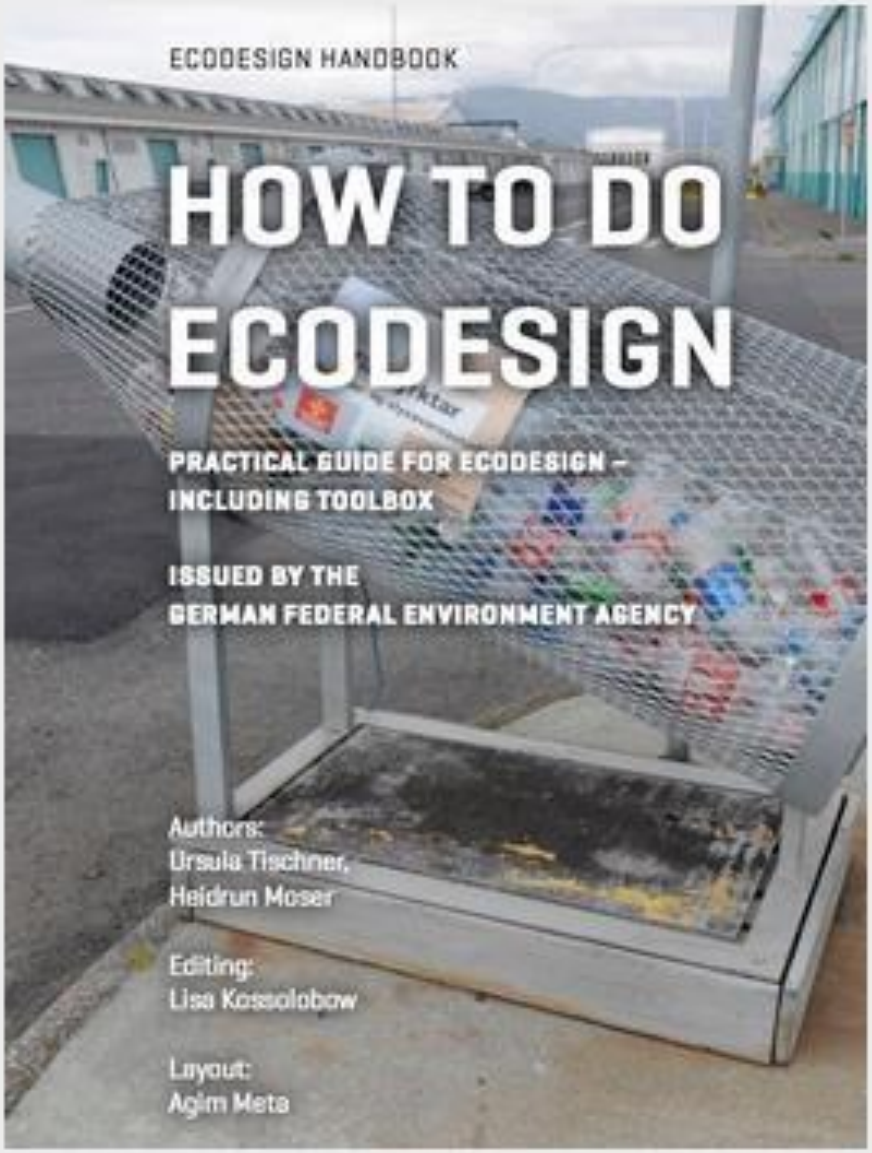

Practical Guide for Ecodesign – Including a Toolbox
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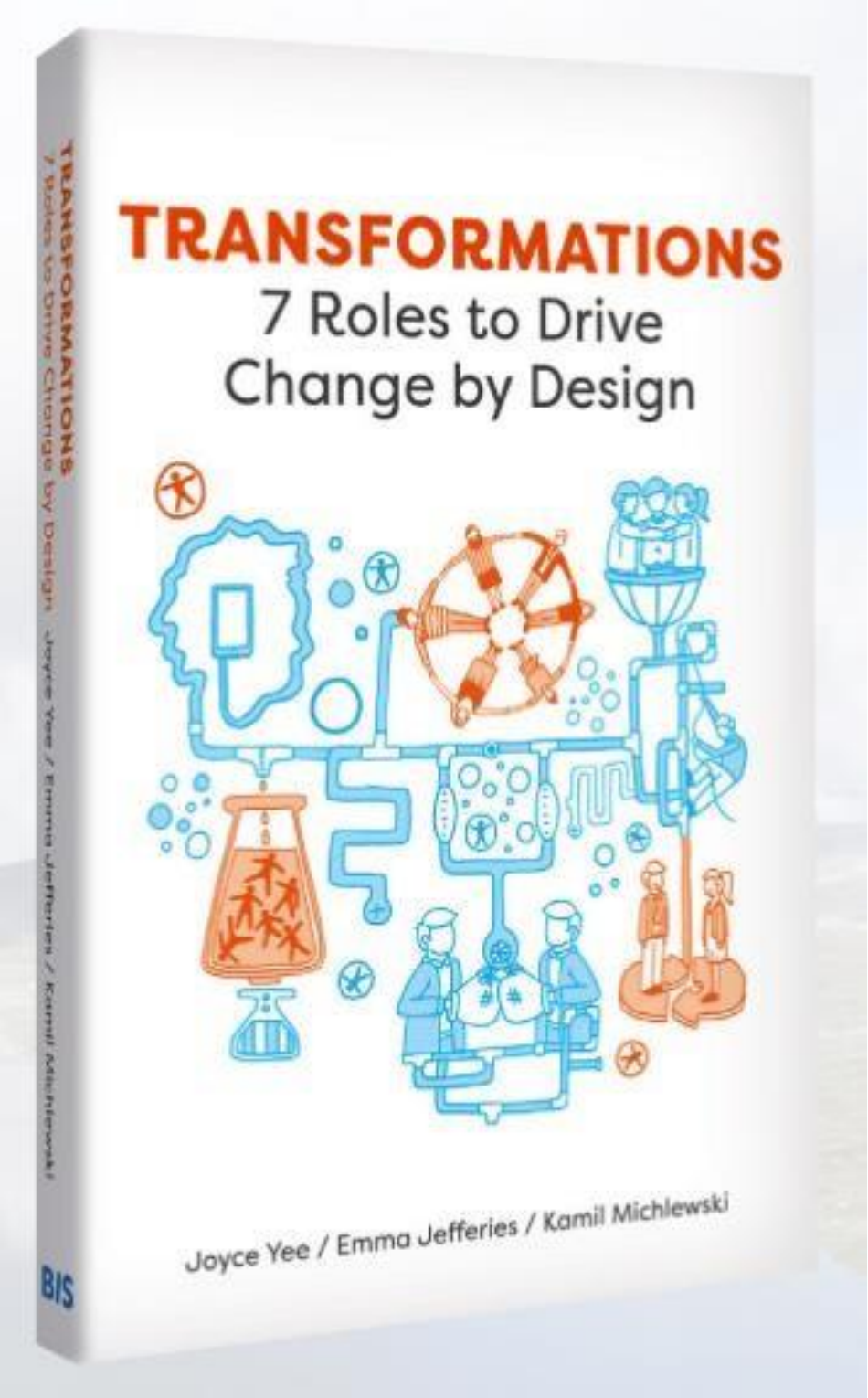

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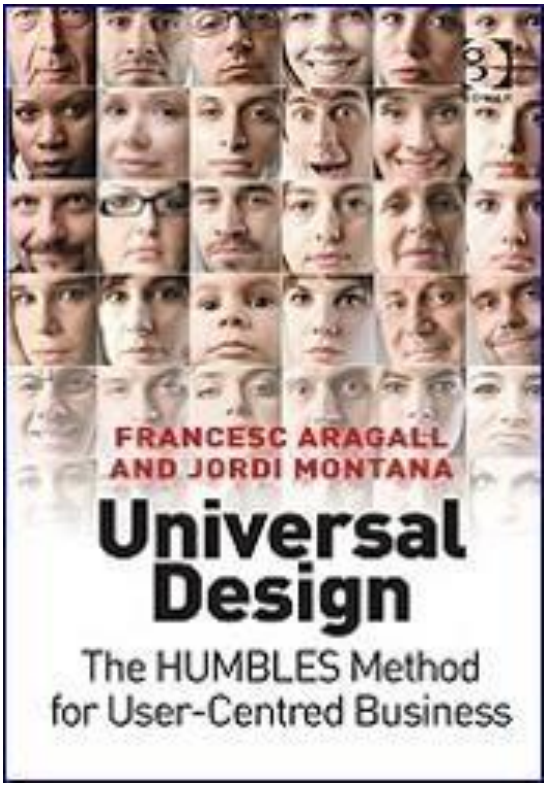
Universal Design: The HUMBLES Method for User-Centred Business



"Universal Design: The HUMBLES Method for User-Centred Business", written by Francesc Aragall and Jordi Montaña and published by Gower, provides an innovative method to support businesses wishing to increase the number of satisfied users and clients and enhance their reputation by adapting their products and services to the diversity of their actual and potential customers, taking into account their needs, wishes and expectations.

The HUMBLES method (© Aragall) consists of a progressive, seven-phase approach for implementing Design for All within a business. By incorporating the user's point of view, it enables companies to evaluate their business strategies in order to improve provide an improved, more customer-oriented experience, and there by gain a competitive advantage in the marketplace. As well as a comprehensive guide to the method, the book provides case studies of multinational business which have successfully incorporated Design for All into their working practices. According to Sandro Rossell, President of FC Barcelona, who in company with other leading business professionals endorsed the publication, it is "required reading for those who wish to understand how universal design is the only way to connect a brand to the widest possible public, increasing client loyalty and enhancing company prestige". To purchase the book, visit either the Design for All Foundation website

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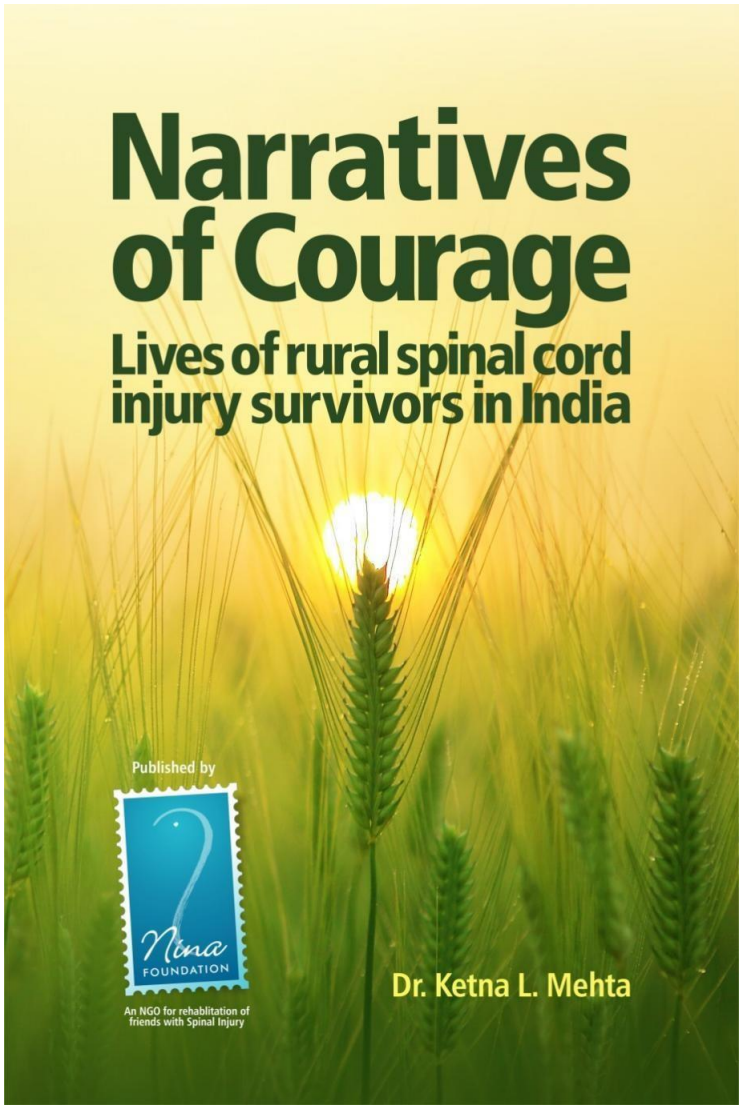


NOW AVAILABLE
Case Studies in Applied Behavior Analysis for Individuals with Disabilities (Second Edition)
Keith Storey, Ph.D., BCBA-D
Linda Haymes, Ph.D., BCBA-D
This book responds to a critical need for highly qualified personnel who will become exemplary professionals because of their advanced knowledge, skills, and experiences in working with students and adults that have varying disabilities, including Autism Spectrum Disorders (ASD). Since Board Certification for behavior analysts was introduced, there has been an expansion of training programs in Applied Behavior Analysis to meet the demands from school districts, health insurers, and families. In spite of these developments, a case studies book has not been available that uses the Behavior Analyst Certification Board Task List, Fifth Edition (BACB) guidelines for educating individuals receiving their BCBA, or for those in the field such as teachers, and service providers. The goal of this book is to fill that need. In this newly revised second edition, eighteen case studies are provided—case studies with complete analysis, case studies with partial analysis, and case studies without analysis. The format, readability, and detailed description of instructional methodology makes this text a valued resource for instructors and behavior analysts responsible for improving the skills of people with disabilities.
Charles C Thomas, Publishing is proud to announce the release of this second edition.
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Case Studies in Applied

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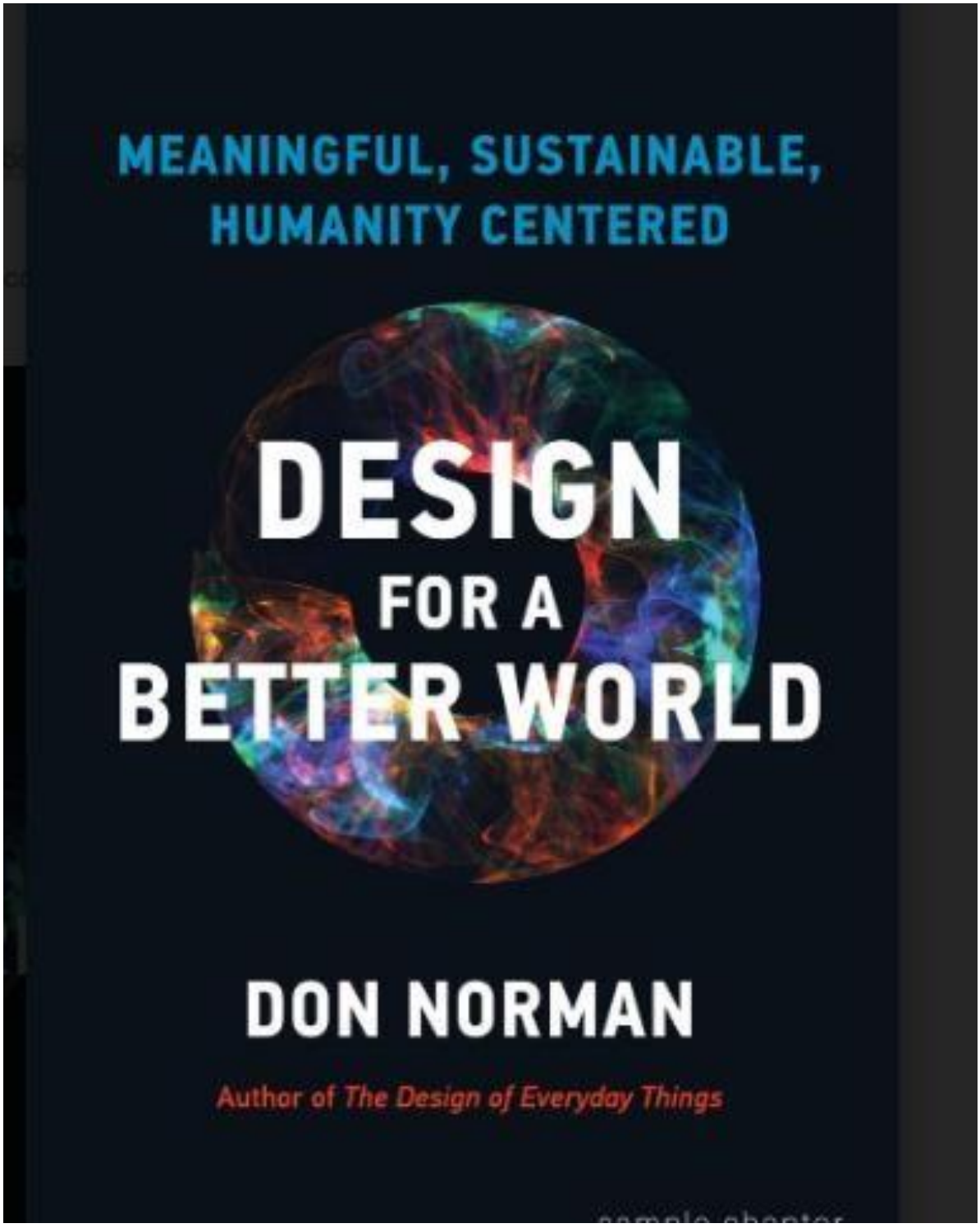


ISSN: 2582-8304

Obituary: By Debra Ruh

Edward Ruh 05-24-52 to 03-03-22. Beloved husband, father, son, brother, uncle, and friend. He is missed by his wife, Debra Ruh, daughter Sara Ruh, and son, Kevin Ruh

ISSN: 2582-8304

News

1.

SF State starts construction for first-year residence hall to provide more affordable student housing

Photo Credit: Courtesy of EHDD

The West Campus Green project will add 750 affordable beds by fall 2024

Today, San Francisco State University held a ceremony to celebrate the start of construction for the West Campus Green (WCG) project. The project includes a first-year residence hall that will add 750 affordable beds, a dining facility and a student health center. San Francisco State hired design-build team McCarthy Building Companies, Inc. and EHDD to deliver the project.

"With this project, more students will have access to affordable housing, which is critical here in the Bay Area," SF State Vice President of Student Affairs & Enrollment Management Jamillah Moore said. "That's because when students have safe, stable and affordable housing, they are more likely to enroll, excel and graduate."

The WCG project includes two all-electric buildings adjacent to each other. The first is a 120,000 square-foot, six-story first-year residence hall slated for occupancy by fall 2024. The second is a three-story, 50,000 square-foot building, to open in winter 2024, that will include a dining common area and the Gator Health Center. Other project highlights:

- **The residence hall will support all aspects of universal design to ensure equity and access to all students. It will be developed using a "pod" concept approach, averaging 12 rooms each, with three students in each room. Each pod will have shared bathroom facilities and study lounges, which will provide students with space to socialize, sleep, study and dine within the scope of intimate community grouping.**
- **The Gator Health Center will house different units on campus including Student Health Services; Counseling and Psychological Services; and Health Promotion and Wellness. Collectively, these units provide a wide range of services such as triaging and health assessments, examination and treatment rooms, mental health support and spaces for administrative and medical staff to provide care.**
- **The dining facility will frame a courtyard, which will host more intimate pockets for socializing, relaxation and reconnection to nature.**

WCG will cost a total of $179 million. It is supported by $116 million in funds from the State of California's Higher Education Student Housing Grant Program, which was established to increase affordable student housing across the state's three public higher education systems.

"During my visits to almost 30 universities across California, I have met with countless students who shared experiences with housing

insecurity," said California Lieutenant Governor Eleni Kounalakis, who attended the ceremony. "Thanks to projects like West Campus Green, more California students will be able to focus on their education and not worry about where they are going to sleep at night. I'm deeply proud of our state's historic commitment to supporting the total cost of college attendance for students and ensuring every Californian has a shot at achieving the California dream."

Designed by global design firm headquartered in San Francisco EHDD Architecture, the WCG project will be delivered under a progressive design-build model led by the national construction company McCarthy Building Companies, Inc.'s San Francisco office. Both companies play an integral part in shaping the Bay Area local economy and housing market.

"We are thrilled to collaborate with San Francisco State University to create a new center of gravity for their campus," says Jack Carter, Vice President at McCarthy Building Companies, Inc. "The new project will be an integral anchor to the Western neighborhood and will act as a connection point for existing and future housing in the area.

"As we developed this project our biggest goal was to foster a vibrant community," says Lynne Riesselman, project design lead and Principal at EHDD, "making sure incoming students have every chance to build connections and that in their first home away from home they find a place of belonging."

Learn more about the WCG project by visiting the SF State website.

About San Francisco State University

San Francisco State University is a public university serving students from the San Francisco Bay Area, across California and around the world, with nationally acclaimed programs that span a broad range

of disciplines. More than 25,000 students enroll at the University each year, and its nearly 287,000 graduates have contributed to the economic, cultural and civic fabric of San Francisco and beyond. Through them — and more than 1,900 world-class faculty members — SF State proudly embraces its legacy of academic excellence, community engagement and commitment to social justice. For more information, visit sfsu.edu.

About McCarthy Building Companies, Inc.

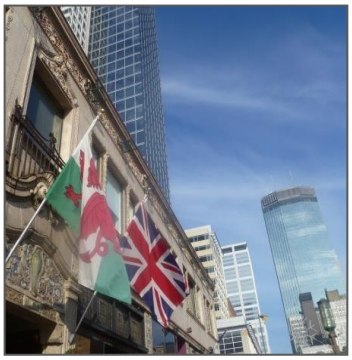
The oldest privately held national construction company in the country – with nearly 160 years spent collaborating with partners to solve complex building challenges on behalf of its clients. With an unrelenting focus on safety and a comprehensive quality program that span all phases of every project, McCarthy utilizes industry-leading design phase and construction techniques combined with value-add technology to maximize outcomes. For more information, visit www.mccarthy.com.

About EHDD

EHDD Architecture is a design firm committed to creating transformative places of belonging and impact. With a staff of 85 across two west coast offices, their expertise spans a wide range of project types and scales. Honored with more than 200 awards for design and environmental stewardship, EHDD has committed to Climate Positive Plans for 100% of its upcoming projects. The firm has delivered 39 LEED-certified buildings including 17 LEED Platinum projects, and has been awarded seven Center for the Built Environment Living Building Awards, seven AIA Committee on the Environment (COTE) Top Ten Green Building awards, and recently a Metropolis Planet Positive award for their in-house EPIC tool. Learn more about the firm at www.ehdd.com.

(Courtesy: SF State University News)

ISSN: 2582-8304



Programme and Events


Design Research Society
DRS
BOSTON,
NORTHEASTERN
UNIVERSITY
JUNE 2024
DRS 2024


CELEBRATING 65 YEARS OF GOOD DESIGN
GOOD DESIGN AWARDS
ARCHITECTURAL DESIGN
COMMUNICATION DESIGN
DESIGN RESEARCH
DESIGN STRATEGY
DIGITAL DESIGN
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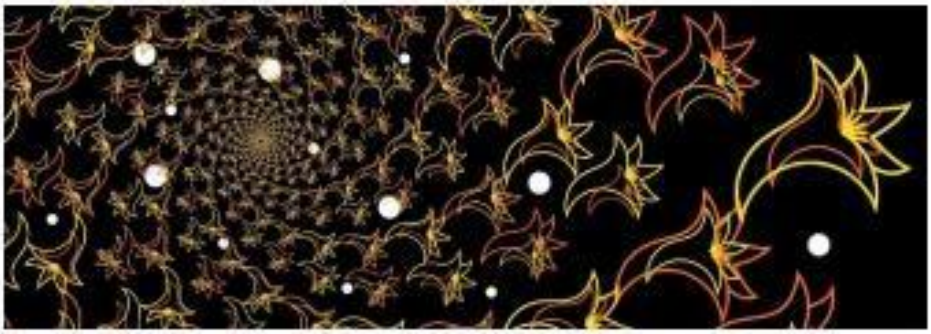

International Call:

D'source DIC-BHU SDGs Design Challenge

https://dsourcechallenge.org/

The Sustainable Development Goals (SDGs), also known as the Global Goals, were adopted by the United Nations in 2015 as a universal call to action to end poverty, protect the planet, and ensure that by 2030 all people enjoy peace and prosperity.
Against this broad, reflective context we need you to brainstorm and look for opportunities where design can now make a difference.

We, therefore, welcome you to this international **D'source DIC-BHU Sustainability Development Goals (SDGs) Design Challenge** in seeking creative, innovative, out-of-the-box, resourceful, appropriate solutions. We request you to use your creative energies and come out with solution(s) that might become a contribution of immense benefit in a real world situation that is today crying for problem-solving.

The chosen entries will be generously felicitated with accolades. Our intention is to make these solutions available on an open design platform for the maximum benefit of people.

This International call is open to students, fresh graduates, and young designers from around the world. You may work as individuals or work as collaborative groups.
You are also encouraged to seek guidance from faculty members and professionals, because we recognise that it takes collective endeavor to come out with something meaningful.

For the international **D'source DIC-BHU Sustainability Development Goals (SDGs) Design Challenge**, ten design problem areas have been identified. You may choose to work on one or more than one area.
Additionally, you have a choice of identifying your own design problem area outside of the listed areas to work with.

Accordingly, we request the following groups to work as stakeholders with your community of young students, fresh graduates, and young designers, by extending your help in whatever way possible:
To **faculty members/teachers,** we request that you take the initiative to inform, motivate and guide your students to work on finding solutions by addressing the problem areas listed.
To all **working professionals,** we request that you volunteer some of your time to mentor students or young designers who may be working with you as interns or colleagues.

We also urge faculty members and professionals to go ahead and register so that we can keep you in the loop and acknowledge your help. Further, this will help us build connections and form networks for future references.
Link to Registration:

Submission and Dates:

The first cut-off date for submission: 30th April, 2023
The first announcement of results: 31st May, 2023

Contact Details:

D'source Corona Design Challenge
Contact email for any queries: DsourceChallenge@gmail.com

Best regards,

D'source Challenge Team

ISSN: 2582-8304

THIS YEAR'S TOPIC:

ARCHITECTURE DESIGNED FOR AGING

The First Berkeley Prize 1998-99

ARCHITECTURE IS A SOCIAL ART

The BERKELEY PRIZE supports the study and teaching of the social art of architecture. The online, two-stage Essay Competition (in English) is open to undergraduate architecture majors in accredited schools of architecture throughout the world. The Travel Fellowship Competition is open to the Essay Competition semifinalists.

PURSE

Essay Competition: **35,000 USD; 8,000 USD first prize; Multiple prizes**

Travel Fellowship Competition: **Stipend and airfare; Multiple prizes**

2023 JURORS

The Berkeley Prize Committee

In honor of the 25th Anniversary, this year the members of the Berkeley Prize Committee will select the semifinalists, the finalists and the overall winners.

SCHEDULE

Competition opens: **September 15, 2022**; Stage One entries due: **November 1, 2022**.

For more information go to www.berkeleyprize.org

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• EXPLORE ONLINE: WWW.BERKELEYPRIZE.ORG

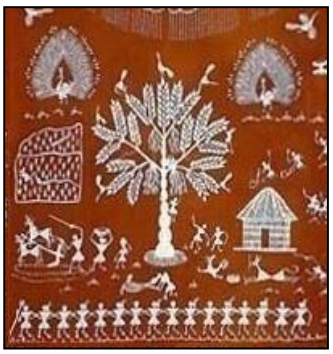
Please forward this message to undergraduate student message boards, newsletters, any and all electronic platforms, and to those who might be interested. Download PDF for full size image to post.

DEAWARDS CALLS FOR 2023 ENTRIES

Competition 'Design Educates Awards' (DEAwards) goes a step further as it combines architecture and design with an educational impact. The aim is to push aesthetics to reach and obtain a lasting, informative influence on society. Visual arts have always been perceived and used as means of expression socially and politically, but the competition seeks to change this through original concepts and ideas revolving buildings or products that can be implemented for their function and effectiveness. Renowned Architects like Toyo Ito and Anna Heringer make part of the jury panel that is set to select the outstanding projects based on implementation, aesthetics, feasibility, and quality of the informative layer.

To join the Awards and register click the link here before it's too late! **Deadline for submissions is February 2, 2023.**

ISSN: 2582-8304



Job Openings

ISSN: 2582-8304

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This journal is published monthly for free for benefits for readers, by Design for All Institute of India,/ 70 Sector-18 Rohini, Delhi110089 (INDIA) and publisher name Dr. Sunil Kumar Bhatia, address A/2/70 Sector-18 Rohini, Delhi-110089 Tel: +91-11-27853470 ,E-Mail: dr_subha@yahoo.com

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ISSN : ***2582-8304***