# Design for All

universal
design

the **Indian** Way

सबदा भला

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# Mobility for All

# Content

## Guest Editorial

Moving ahead is usual in context of time. What determines where we reach is dependent on directions we take. This finally gets determined by what we think in time and now. Designs of the future are quite significantly governed by what we are doing now? Extending the dialogue to design, its emerging transformations have brought the subject towards a broad spectrum of ideas ranging from technology driven productions to cater global masses to context driven conceptualizations with limited reach and showcasing. The subject of Universal Design in one way brings a universal perspective of human needs and on the other allows contextualization in the environment where the individual or the problem are posed. At the very outset, I would like to thank Dr. Sunil Bhatia, Chairman to request me to edit the June issue of Design for All.

The cover photo titling in Hindi *'Sabda Bhala'*, meaning *'Good for All'* is a carefully chosen image from my photo archives reminding me of the age old adage from Indian context as a populist wisdom moving across Indian streets. Sociology of human values remains critical to the journey of design evolution, acceptance and its transformations in future. India on its streets projects many such imagery on a daily basis. It requires deep introspection to be able to touch upon some of them as one moves ahead. Sense, Sensibility and Sensitivity emerge as the only keywords on the foundations of which sense of design, creation and inclusive existence prevails.

This issue presents in small and humble way a journey of moving ahead in the domain of Universal Design under the umbrella of Indian Institute of Technology at Roorkee. The seeds of the journey started possibly by the presence of a small school for children with hearing impairments, today well known as Anushruti on this serene campus. Dedicated to the education of children coming from as far as 75 kms every day to receive education and from diverse economic grounds, this school and the little angels in it formed an indelible mark several years back to initiate my first steps in the domain of seeking knowledge on Barrier Free Environment.

From there to today with independent courses at IIT Roorkee on Universal Design & Accessibility Planning, Barrier Free Transportation and setting up of a Laboratory of

Universal Design and Accessibility Planning at IIT Roorkee, etc. has been a continuous journey with seemingly a no end. UD education now fuses into design curriculums of architecture and infrastructure planning at IIT Roorkee and moves ahead with a social perspective to design.

This edition of Design for All features chosen articles on the theme of 'Measurement and Mobility related issues of accessibility. They are presented in this issue towards a perspective of accessibility research in diverse mobility contexts

1. Changing Paradigms of Universal Design Education
2. Assessing accessibility for urban mobility systems
3. Inclusive Railway Station Environments for Persons with Visual Impairments
4. Understanding mobility for Persons with Visual Impairments
5. Inclusive pilgrimage experience in India: A case of Haridwar

I dedicate this issue to my own students who today take stride in carrying forward the ideas of universal design in their respective professional domains and have practically become ambassadors of inclusion. Also, wish to thank my student contributors Ms. Megha Tyagi, Mr. Lakshya Pandit, Ms. Trisha Sinha and Ms. Pranati Awasthi for their contributions to this compilation for a broader audience.

We look forward to interact, collaborate and join hands with our readers and hear from them at

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Gaurav Raheja

## Guest Editor

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Dr. Gaurav Raheja is an Associate Professor in the Department of Architecture & Planning and a joint faculty at the Centre for Excellence in Transportation Systems at IIT Roorkee. Driven by sensitivity to human perspectives in our living environments, his research interests include human centered approaches to sustainability and universal design focusing on social inclusion of Invisible Populations like persons with disabilities, children and elderly in diverse urban and rural contexts.

He is a **DAAD (German Academic Exchange Service) Fellow** and a recipient of several German scholarships under the Smart City initiatives. He was a visiting professor in T U Darmstadt, T U Berlin and University of Duisburg, Germany during 2016 wherein he has initiated research collaborations on urban transformation studies in domains of urban mobility and health paradigms.

He has served as an Expert Member in various national committees in Ministry of Urban Development and Ministry of Social Justice and Empowerment, Govt. of India. He has been a key consultant to the Ministry of Social Justice and Empowerment, Govt. of India under the

**Accessible India Campaign** for conducting access audits of some of the prestigious projects including *Prime Minister's Office, New Delhi Airport, New Delhi Railway Station, etc.*

Dr. Raheja is a recipient of Mphasis **Universal Design Award 2010,** conferred upon him by the National Centre for Promotion and Employment of Disabled Persons (NCPEDP), India. He is one of the co-authors of **Universal Design India Principles** (UDIP) copyrighted and released in 2011, principally led by the Head, Jamsetji Tata Chair for Universal Design at NID, Ahmedabad.

He has delivered several invited talks on accessibility, inclusion and universal design at Institute for Transportation Research, DLR (German Aerospace Agency), Berlin , Germany, WHO South East Asia Regional Office, New Delhi, Confederation of Indian Industries, New Delhi, IIM Ahmedabad,  Tata Institute of Social Sciences, Mumbai and several others.

He has recently authored a book titled '**Enabling Environments for the Mobility Impaired in Rural Areas**' published by Lambert and foreword by Prof. Edward Steinfeld, Director, IDeA Centre, State University of New York, USA. Dr. Raheja is a well-known national expert and an invited speaker on accessibility planning and perspectives of urban inclusion.

Besides his diverse interests, he passionately pursues photo narratives, visual communication and storytelling as mediums of expression.

# Universal Design Education

# IIT Roorkee



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.........since 1847

## Universal Design Education at IIT Roorkee: Paradigms of Change

**Introduction**

In an institution of historic legacy of more than 170 years, the journey of evolving a universal design (UD) educational paradigm became not only a socially responsive outcome but also a guiding philosophy with on ground implementations. UD education at IIT Roorkee dates its actual beginning more than a decade back with its initial focus on responding to needs of students with disabilities on IIT Roorkee campus. This led to initiatives by the author to develop contextual design of accessible restrooms driven by a research based understanding. Further it took to a major retrofitting programme to make the academic, administrative, common campus facilities etc. accessible and barrier free.

**Development of UD curriculum**

This journey of accessibility transformations led to initiatives on outreach programmes like conducting sensitization workshops, week long courses for training the trainers/faculties of other national institutions. After having evolved with dissemination programmes UD was launched formally as an academic insertion (Table 1) in Center for Excellence in Transportation Systems (C-Trans) and Department of Architecture and Planning. Different learning models have been employed to introduce theoretical constructs and build upon them both an Indian and a global perspective towards UD. This includes development of a modular curriculum with segments like UD theory, disability/ accessibility policy, best practices of accessible built environment and transportation systems. This is followed by students engaging in full term masters and doctoral dissertations on UD and related domains under this umbrella. A laboratory for Universal Design and Accessible Transportation (L-UDAT) was also created at C-Trans, IIT Roorkee to facilitate an experimental and research approach to strengthen UD initiatives towards academic, research and professionally applied dimensions at national and international levels. Independent research collaborations have also been steered with Technical University of Darmstadt, Technical University of Berlin,

University of Duisburg etc. facilitating student exchange and collaborative initiatives for joint research.

**Table 1**: UD curriculum at IIT Roorkee

| S. No. | Contents |
|---|---|
| 1. | **Universal Design Theory** |
| | Concept of Accessibility, Inclusive Design versus Non inclusive Approach, Principles of Universal Design and its areas of application. |
| 2. | **Design Standards for Barrier Free Public Transport** |
| | Access paths, ramps, surface texture, signage, symbols, road marking, traffic control, street furniture, toll plaza, public address system, web based information. |
| 3. | **Barrier Free Public Transportation** |
| | Terminal Design, Information Systems, Vehicle Loading, Safety issues at Platforms, Vehicle Design, Ticketing & Security, Trip Planning, Ticketing, Access, On board communication, Emergency, Advanced Technology. |
| 4. | **Access Audit** |
| | Road System, Railway System, Aviation System, Water Transport. |
| 5. | **Case Studies** |
| | Delhi Metro Rail Corporation, Bus Rapid Transit System (Delhi), Bus Shelters, Foot over Bridges, under passes, Modernization of Indira Gandhi International Airport, Nizamuddin Railway Station, INA Street, Circulation networks around tourist places, Public Spaces (Dilli Haat, Garden of Five Senses). |
| 6. | **Disability Models and Public Policies** |
| | Medical Model, Social Model and Biosocial model approach to disability, Disability Acts of India, Singapore USA (ADA), UK, Australia, UNCRPD, Biwako Millennium Framework. |
| 7. | **Research Methodology** |
| | Data Collection Techniques, Survey Design and Implementation, Reliability and Validity, Linear & nonlinear Regression analysis, Probabilistic distributions, t-test, chi square test, scaling and rating techniques, Usability Rating Scale (URS), Functional Independence Measure (FIM), Functional Performance Measure (FPM) Analysis, Scaled Modelling. |

**Pedagogic approaches to UD**

The broad pedagogic keystone being *learning by experience* supported by *learning through state of the art knowledge and critical thinking*, it becomes vital for us at IIT Roorkee to engage students through a range of learning activities. A demonstrative set of exercises with their brief outcomes has been shared in fig no. 1-7. They reflect a series of mobility mapping experiences using assistive devices and simulating diverse disabilities in the regional context of transportation. The learning outcomes were shared through a series of presentations and visual drawings to identify the critical issues and formulate different approaches to recommend design interventions and strategies as possible solutions. The students shared meaningful learning feedbacks from field and on site driven pedagogies.

Besides active academic exchanges, open workshops and diverse pedagogic experiments, we at IIT Roorkee have emerged as national light house on UD. Through our varied initiatives, IIT Roorkee has been contributing to the recently launched "Accessible India Campaign" with a few flagship projects to its credit. This includes access audits of the Prime Minister's Office at New Delhi, Indira Gandhi international airport, New Delhi railway station, etc. among several others. Some brief images about the projects are highlighted in the forthcoming pages.


## Conclusions

Universal Design holds a huge promise and responsibility in shaping future professionals of architecture with sense and sensibility. From an identity of *design with a difference* to reshaping an idea of *design including all differences* requires huge contextual efforts both from thought and practice driven illustrations. We at IIT Roorkee are taking a research driven and critical thinking driven efforts to keep taking the idea of inclusion forward and keep building a knowledge base towards an Indian identity of UD education.

**Fig 1** Disability simulation activity performed by Master's students using wheelchair as an assistive device
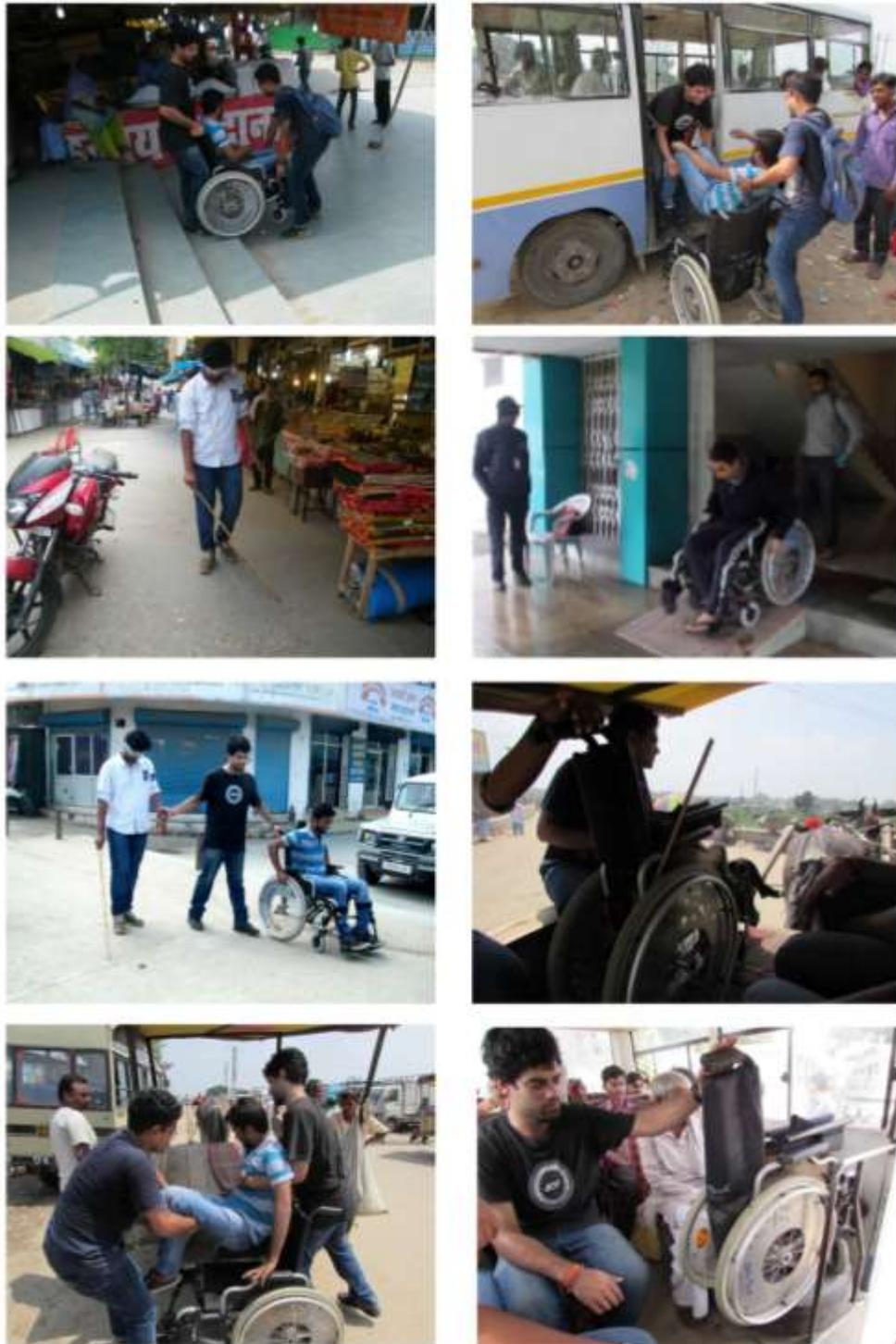
Fig 2 Disability simulation activities performed by Master's students in Roorkee
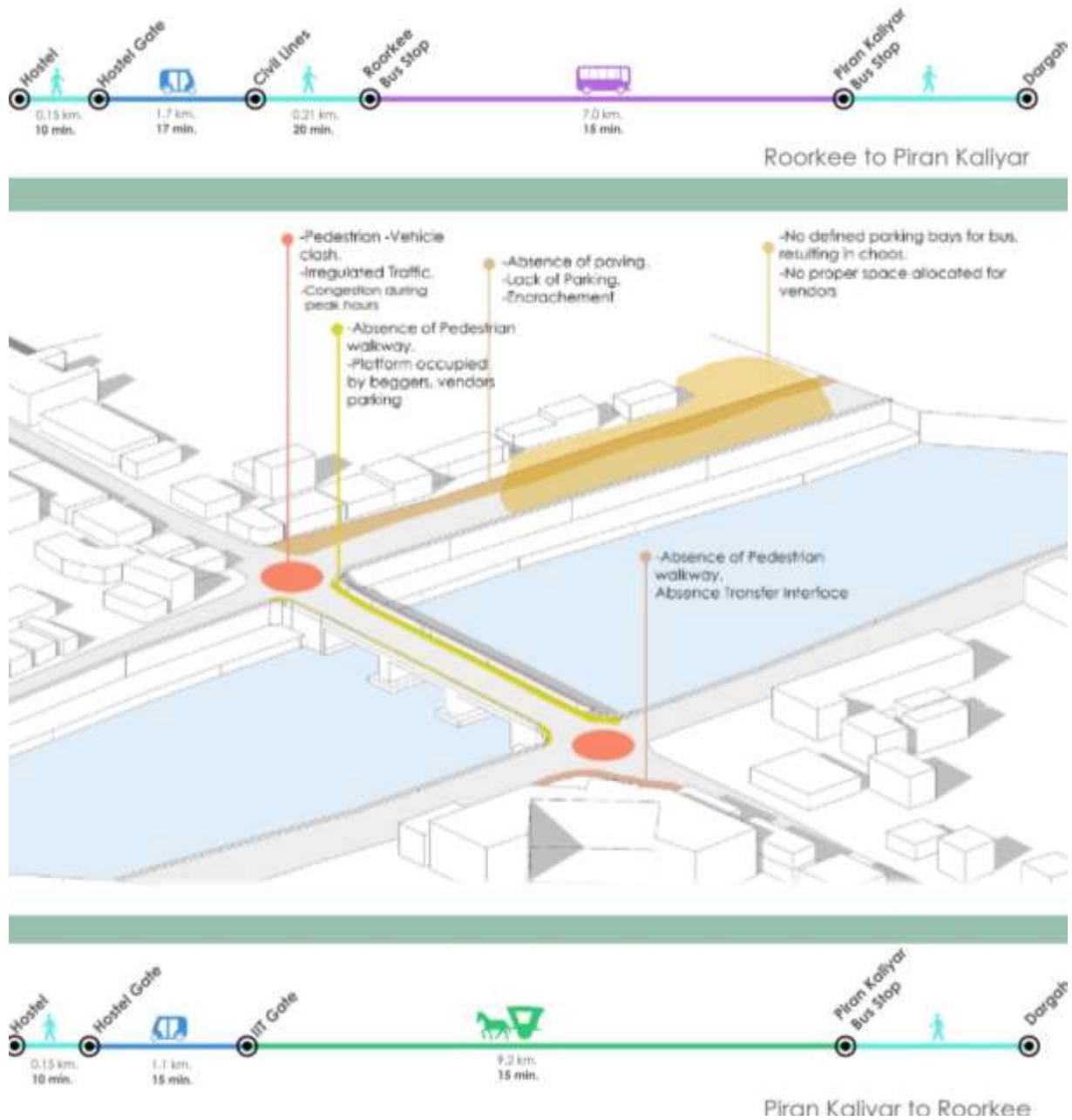
Fig 3 Issues identified for a Person with mobility impairment on a journey from Roorkee to Piran Kaliyar and back

## Access Audit conducted in Haridwar as a course project
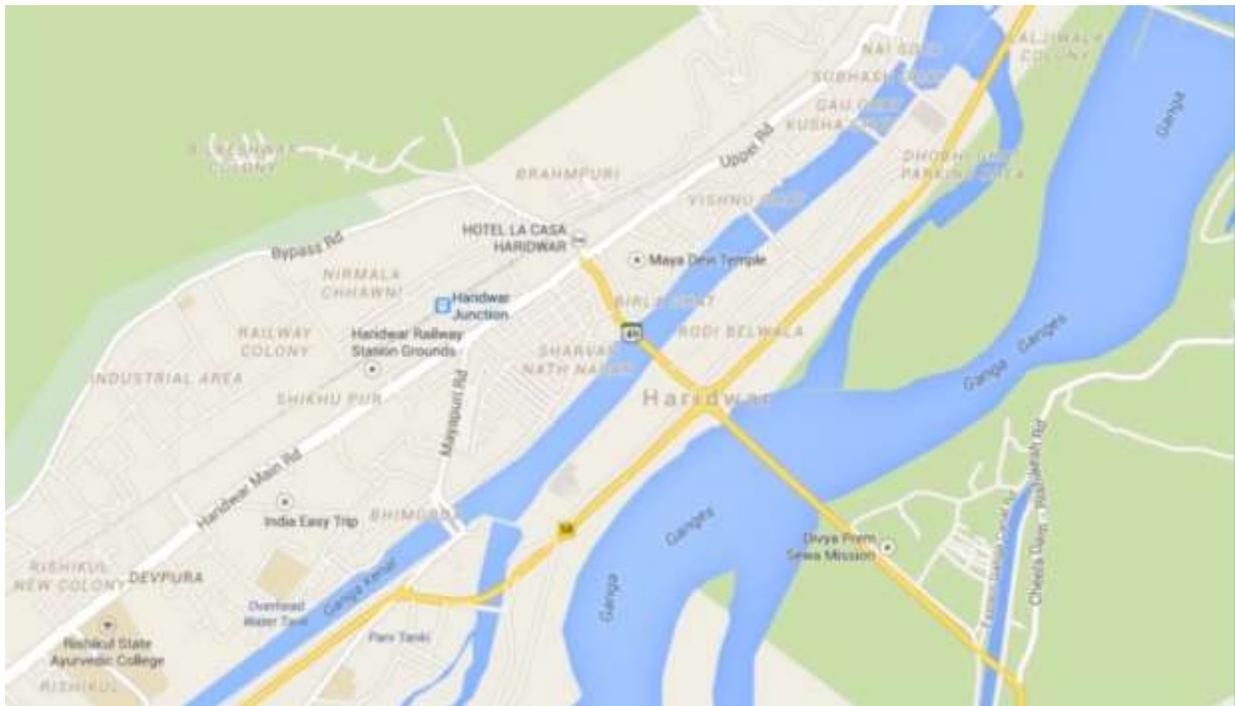


**Fig 4** Google map showing the Ghat area of Haridwar selected for an access audit



**Fig 5** Base map of the Haridwar Ghat area selected for an access audit

**Fig 6** Existing Base plan of the Haridwar Ghat area showing section lines



Section GG'

Section HH'
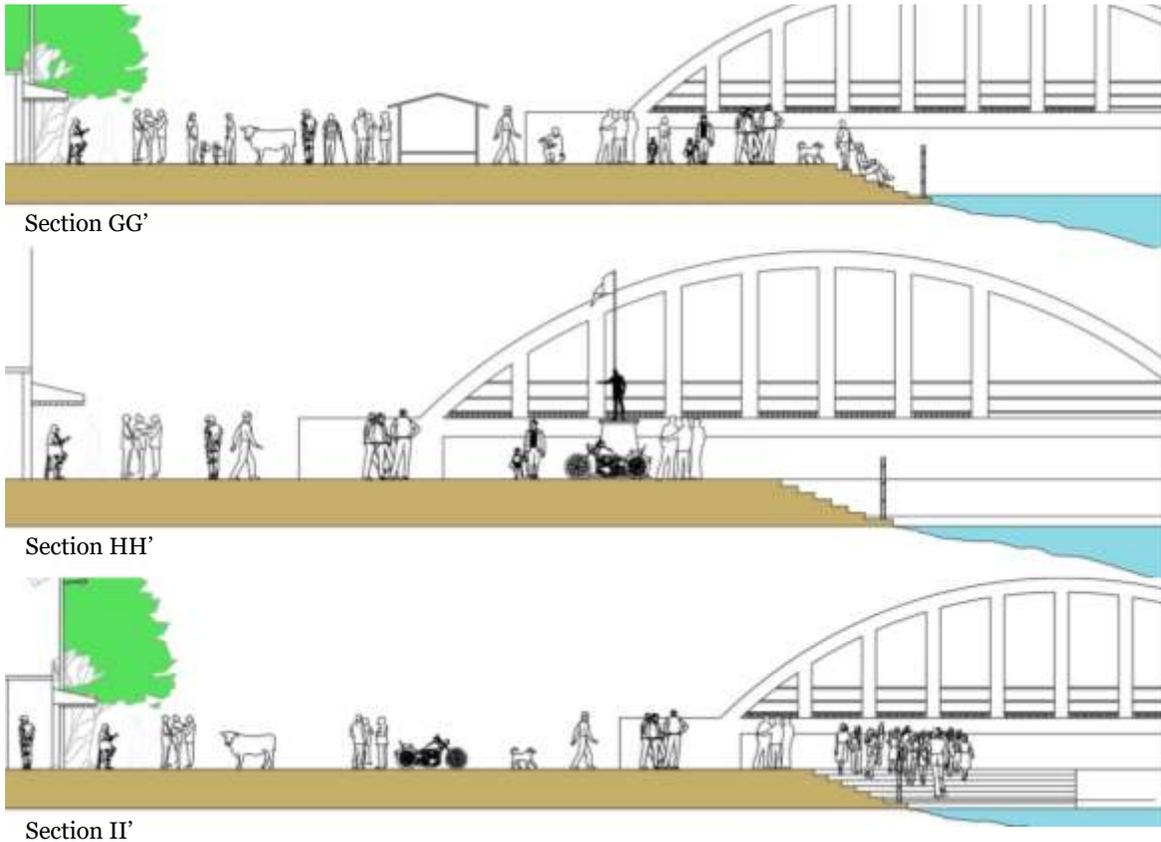
Section II'

**Fig 7** Existing sections of the Ghat area of Haridwar
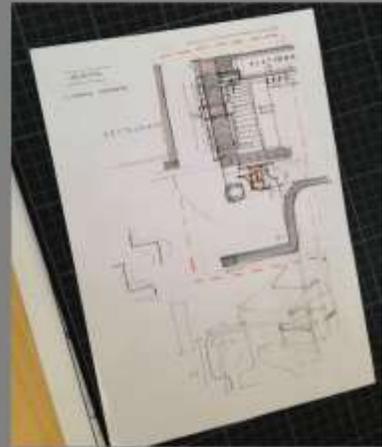
Fig 8 Full scale model lab experience at Lund University, Sweden

## Research and Consulting Projects

## Access Audit Projects

As a series of examples, we at IIT Roorkee were commissioned by the Government of India to undertake accessibility audit and design projects under the "Accessible India campaign" launched by the honorable Prime Minister of India in 2015. These in-house projects provided unique opportunities to study and practice UD driven approaches in different building and urban environments. They varied from a scale of a heritage structures of national importance to complex transportation hubs in the capital city of New Delhi. The illustrated projects have further contributed towards case development approaches in teaching UD at IIT Roorkee.

### 1. New Delhi Railway Station



ACCESS AUDIT REPORT FOR
NEW DELHI RAILWAY STATION
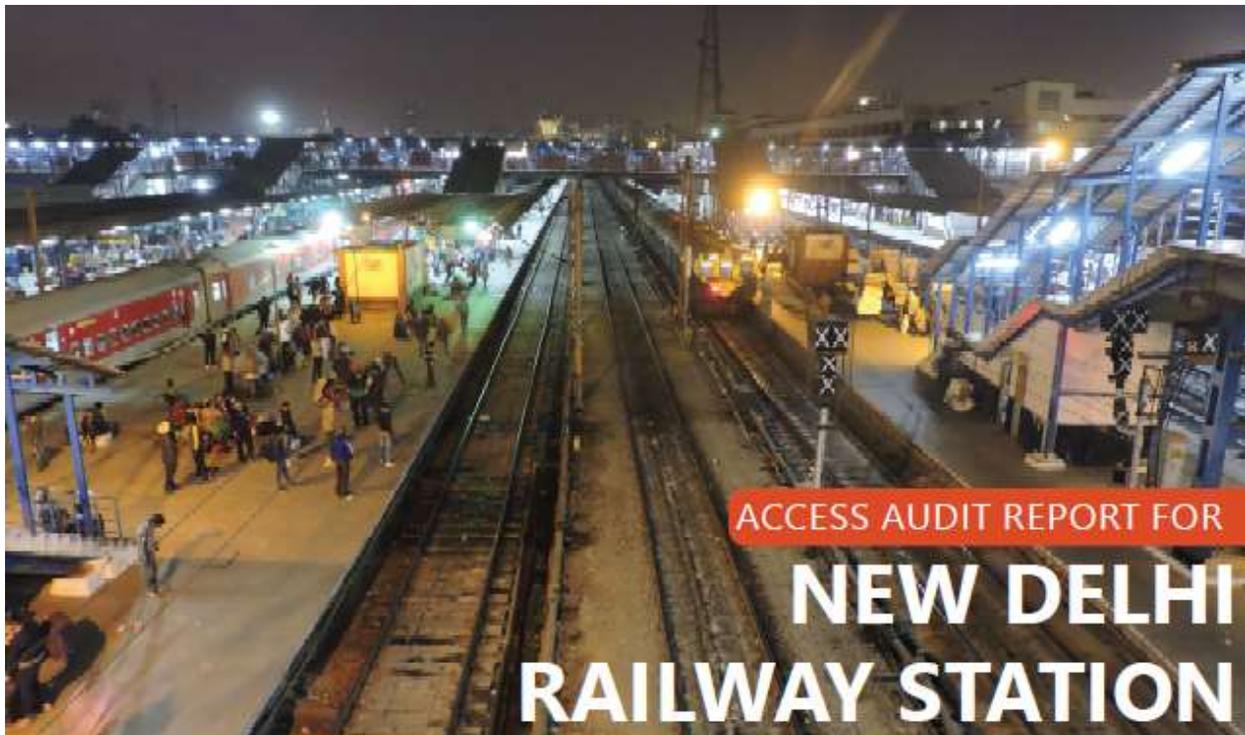
PREPARED BY
DR. GAURAV RAHEJA
Associate Professor , Department of Architecture & Planning | Center for Excellence in Transportation Sytems
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

## 2. Indira Gandhi International Airport, New Delhi



ACCESS AUDIT
TERMINAL 1-D | TERMINAL 1-C | TERMINAL 3
INDIRA GANDHI INTERNATIONAL AIRPORT, NEW DELHI

PREPARED BY
**DR. GAURAV RAHEJA**
Associate Professor
Department of Architecture and Planning | Centre for Excellence in Transportation Systems
**INDIAN INSTITUTE OF TECHNOLOGY, ROORKEE**

## 3. Central Secretariat, New Delhi – North & South Block

ACCESS AUDIT REPORT FOR
**NORTH BLOCK**
RAISINA HILL, NEW DELHI

Accessible
India
Campaign

PREPARED BY
DR. GAURAV RAHEJA, ASSOCIATE PROFESSOR
DEPARTMENT OF ARCHITECTURE AND PLANNING
&
CENTRE FOR TRANSPORTATION SYSTEMS
**INDIAN INSTITUTE OF TECHNOLOGY ROORKEE**
DECEMBER 2015

ACCESS AUDIT REPORT FOR

# SOUTH BLOCK
## RAISINA HILL, NEW DELHI

Accessible India Campaign

PREPARED BY
DR. GAURAV RAHEJA, ASSOCIATE PROFESSOR
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CENTRE FOR TRANSPORTATION SYSTEMS
**INDIAN INSTITUTE OF TECHNOLOGY ROORKEE**
DECEMBER 2015

IIT Roorkee team conducting Access Audit in South Block, Central Secretariat, New Delhi

## Prime Minister's Office

IIT Roorkee Access Audit team at South Block, Central Secretariat, New Delhi

'The problem is not how to wipe out all differences, but how to unite with all differences intact."

-Rabindranath Tagore
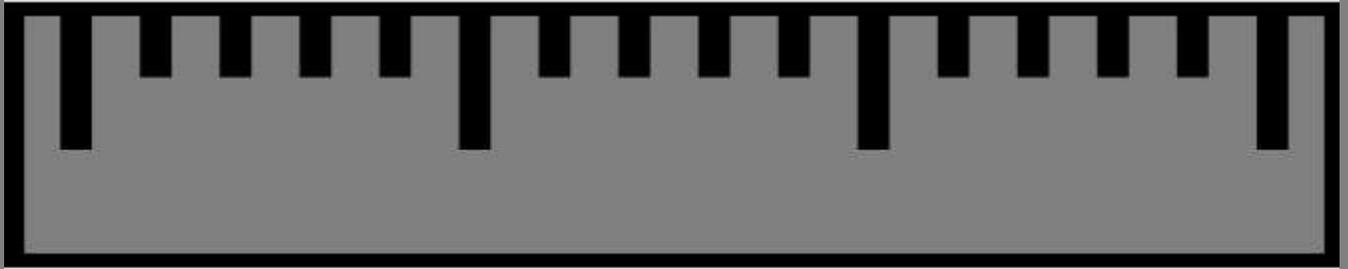
# Measuring
# Accessibility

2

## Lakshya Pandit

The author is a post graduate student from Indian Institute of Technology Roorkee in 2017.  He is currently working on his M. Tech dissertation in Infrastructure systems. He has worked in diverse areas of accessibility, audits, urban mobility, slum upgradation, urban health games and related fields. He has represented the Indian Institute of Technology, Roorkee under the nation-wide flagship campaign for achieving universal accessibility for Persons with Disabilities through the Accessible India Campaign (Sugamya Bharat Abhiyan) during the 2015-2016 session. Access Audits of New Delhi Airport, New Delhi Railway Station, North Block and South Block were carried out during the campaign under the Ministry of Social Justice and Empowerment, Government of India. Lakshya was awarded the DAAD Fellowship 2016-17. The German Academic Exchange Service or DAAD (German: Deutscher Akademischer Austauschdienst) is the largest German support organization in the field of international academic co-operation. The fellowship was under the IIT Masters Research Sandwich Fellowship, where as a Post Graduate Student he spent a period of 7 months in TU Darmstadt, Germany to carry his research during his master's degree. He has also worked with COSTFORD, Surbana Jurong and other companies under diverse projects ranging from RAY (Rajiv Awas Yojana) slum free city planning to master plan options for sustainable community.

# Assessing accessibility for urban mobility systems

Lakshya Pandit[1], Dr. Gaurav Raheja[2]

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## Introduction

The global urban population had surpassed the rural population, in 2008, for the first time and it is projected that 66% of the world population will be living in the urban areas by 2050 (UN DESA, 2012)[1]. The growth pattern of the urban complexities reflects and intends the need for addressing issues of urban movement. Mobility is a key element for urbanization, and the associated infrastructure shapes the urban form the spatial imprint defined by roads, transport systems, spaces, and buildings of cities.

Conventional mobility-based planning places automobiles at the center of the transport system. The new accessibility based paradigm places people at the center. An accessible urban mobility system includes high degree of freedom of choices, to access an urban space, and therefore generates and conserves the idea of accessibility.

'Accessibility is most difficult to measure, because it requires taking into account land use, mobility and mobility substitute, and allows widest range of problems and solutions to be considered' (Litman, 2016)[2]. A method of assessment and benchmarking is required to be able to assess and measure how accessible a particular street or an urban space is. There is a need to identify gaps in the structure, which is gained through the review of the benchmarking tools and assessment of best practices of accessibility measure. Benchmarking accessibility of an urban space would lead to identifying, understanding and evaluating various performance measures which affect the urban space mobility, therefore leading to the prognosis stage of enhancing the degree of accessibility. The study takes into consideration the accessibility assessment of the selected urban spaces in India and Germany, in order to test various benchmarking tools to proceed through a universal approach.

The article mainly deals with the diverse understanding of the term 'accessibility', along with the identification of diverse parameters which affect accessibility of an urban space and at the same time prioritize within the identified parameters. The aim is to integrate and translate a mobility perspective into an inclusive and universal value of accessibility, through identification and evaluation of the accessibility parameters of an urban mobility system.

## Objectives of the study

The objectives concentrate on the identified fields of the study, in order to assess accessibility as follows:

The first objective of the study is to provide an understanding of what accessibility means in an urban context. This deals with the relation of the accessibility and urban mobility of the diverse urban spaces and the varied perspectives taken into consideration. The second objective is the demonstration of a methodology for assessing accessibility, which mainly includes the identification of various parameters which involve and affect the access to the selected urban spaces taken into consideration.

1. Department of Economic and Social Affairs (2014), 'World Urbanization Prospects', United Nations, New York, pp 2-10
2. Litman, T. (2016), 'Evaluating Accessibility for Transportation Planning: Measuring People's Ability to Reach desired Goods and Activities', Victoria Transport Policy Institute, pp 3-9.

The culmination of the study would mainly lead to understand the factors which assess accessibility and provide a universal approach in order to enhance the degree of access to the urban space.

## Research Methodology

The research methodology is a desk based approach, which has been divided into three phases in continuum with respect to the desired output in each phase. The first phase takes into consideration the review of various benchmarking tools which exist in the field of research, and understanding the core area and the parameter the tool relates to with respect to other identified tools.

The second phase initiates with the selected parametric tools and identification of an urban space for which the identified tools would be examined. This mainly leads to the attribute selection under the selected parameters for the urban space, which is assessed with two perspectives. The first perspective takes into consideration the broad eye perspective, which studies the large urban space as a single entity, whereas the second perspective deals with the human plinth (or eye) level perspective that takes into account the urban street and direct human interaction with the space. These two perspective include parameters like

a. Network Connectivity,

b. Pedestrian Footway Comfort,

c. Public Transport Accessibility Level,

d. Intelligibility, which utilizes Space Syntax as a theoretical tool, and

e. Space Element Index.

Each parameter has its respective sets of attributes, which are to be studied based on the selection of the urban spaces. In this context, accessibility for people is a key priority, and two diverse case studies are taken into consideration which include Luisenplatz located in Darmstadt, Germany and Connaught Place in New Delhi, India.

CONNAUGHT PLACE, NEW DELHI | INDIA

Inner Circle
Middle Circle
Outer Circle
Radial Roads

Central Park

Palika Bazar

Landmark:

N
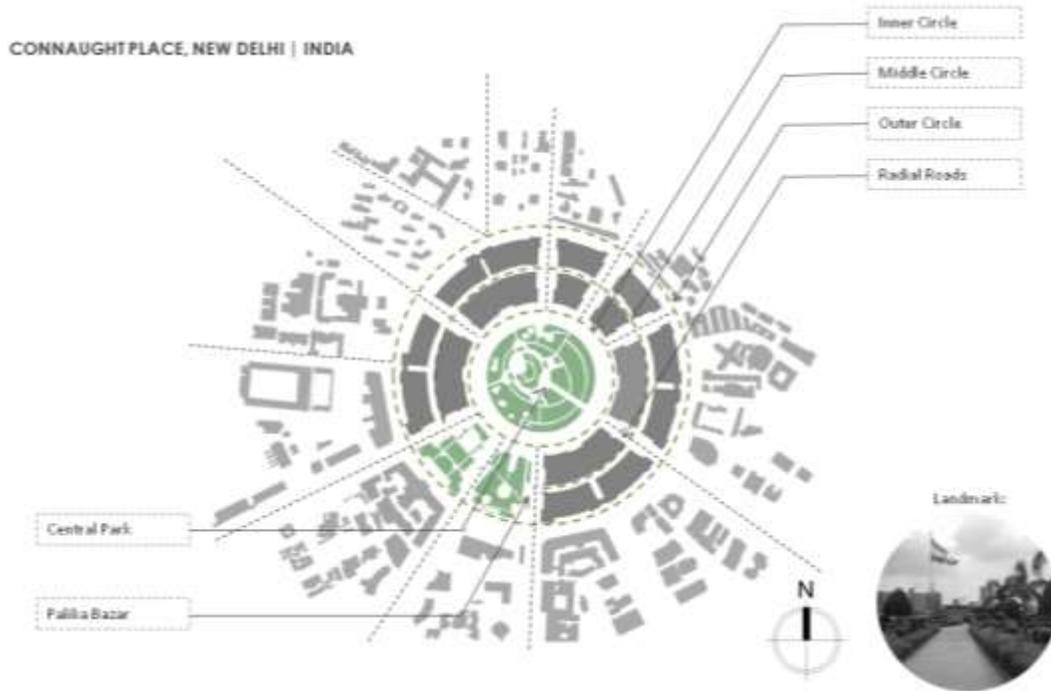
Figure 1 Figure Ground Map of Connaught Place within 650m radii (not to scale)



LUISENPLATZ, DARMSTADT | GERMANY

Herrengarten
Tram line
Schloss Castle

Luisenplatz

Marktplatz

Landmark:

N
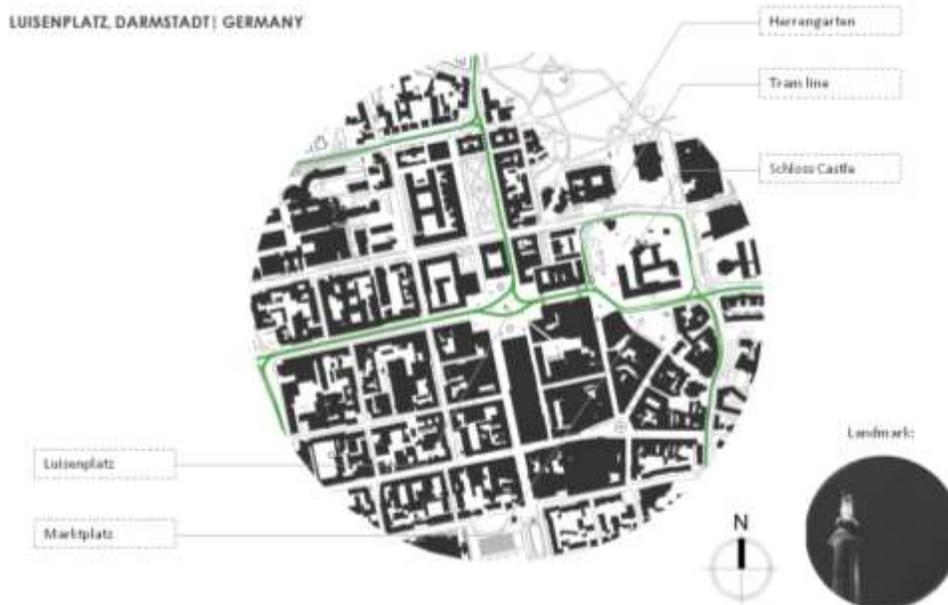
Figure 2 Figure Ground Map of Luisenplatz within 650m radii (not to scale)

Definitions

Accessibility as a term has varied and diverse definitions and understandings, and links itself to varied fields of study. It is important to understand as to what the term 'accessibility' means and how it is perceived with respect to the urban mobility context.

Universal design increases the mobility and communication of people, which helps to integrate people of different abilities into the mainstream daily life. It enables everyone to enjoy the built environment and live a quality life.[3] The statement identifies the importance of universal design in order to provide access to diverse human forms through the ease of mobility. 'Accessibility refers to the ease to arrive to facilities, activities or goals, which could be appointed in general as opportunities. In addition, accessibility could be defined as the intensity of the possibility of 'interaction' (Hansen, 1959) and 'exchange' (Engwicht, 1993)[4]. With respect to the perspective of Hansen, accessibility deals as a function of service towards an individual's 'opportunities', which in turn lead to generation of needs, and associated activities towards it. Interaction within the system, leads to an enhanced accessible environment. Further exchange of services, acts as an interim part of the opportunities and services, which also play an integral role in order to access the same.

'Various disciplines analyze accessibility, but their perspective is often limited. Transport planners generally focus on mobility, particularly vehicle travel. Land use planners generally focus on geographic accessibility (distances between activities). Communications experts focus on telecommunication quality (such as the portion of households with access to telephone, cable and Internet services). Social service planners focus on accessibility options for specific groups to specific services (such as disabled people's ability to reach medical clinics and recreation centers).' (Litman, 2016)[5]. In order to analyze accessibility, Litman defines the term through diverse perspectives of the individuals based on their profession and their respective focal points, which in other terms can be regarded as the 'activities or goals' based on the definition by Hansen and Engwicht.

3. Building and Construction Authority (2006), 'Universal Design Guidelines', Singapore, pp 3-16

4. Engwicht, D. (1993), 'Reclaiming our cities and Towns: Better Living with Less Traffic, New Society Publishers, at (www.newsociety.com)

5. Litman, T. (2016), 'Evaluating Accessibility for Transportation Planning: Measuring People's Ability to Reach desired Goods and Activities', Victoria Transport Policy Institute, pp 3-9.

'An accessible public space is one to where many different people can come, but also one where many different people can do many different things: it is an accessible node, but also an accessible place' (Bertolini and Djist, 2003)[6]. With the adjacent perspective, Bertolini and Djist place public space as their central node and define the access to the space. Access deals with the ability of diverse people who can access the space, and at the same time are able to interact with their immediate environment and the surrounding elements don't act as barriers. The statement also defines that the focal point acts as a node, in other words there are other nodes which act as spaces which are not necessarily public spaces but other elements like pedestrian junctions, public transportation service stops, etc.

## 1.4 Context with urban mobility

Mobility is a key dynamic of urbanization, and the associated infrastructure invariably shapes the urban form the spatial imprint defined by roads, transport systems, spaces, and buildings of cities.

The pedestrians play an important role in the urban mobility scenario. There are pedestrian zones in various parts of the urban cities in the world. The zoning of such urban spaces is not a new phenomenon. There are many examples of city centers, such as Venice and the medieval city of Mdina, in Malta, that have never allowed motorized vehicles. Mdina is even known as the "Silent City" because of the absence of motor-traffic noise inside the city walls. Pedestrian zones in Japan are called *hokōsha tengoku*, which translates as "pedestrian heaven." Parts of the Calle Florida in Buenos Aires have been restricted to pedestrians since 1913 and the whole street since 1971.

More recently, many cities have moved to pedestrianize parts of their city centers. Examples include London, New York, Paris, and Singapore. (Bouton, S. 2015)[7]

By 2005, approximately 7.5 billion trips were made in urban cities worldwide each day. In the developing world, where walking can account up to 70 per cent of all trips, this low-density horizontal urban development causes further exclusion of the urban poor (UN-Habitat 2012)[8].

6. Bertolini, L.; Djist, M. (2003), 'Mobility environments and network cities, Journal of Urban Design', 8 (1), pp. 27–43

7. Bouton, S; Knupfer, S.; Mihov, I; and Swartz, S, (2015), 'Urban mobility at a tipping point', Department of Sustainability and Resource Productivity, Mckinsey and Company, at (http://www.mckinsey.com/business functions/sustainability-and-resource-productivity/our-insights/urban-mobility-at-a-tipping-point)

Due to transport poverty, many residents cannot afford to travel to the city centres or to areas where businesses and institutions are located, depriving them of the full benefits offered by urbanization.

In mega cities (of India) with more than 10 million populations, average travel distances have increased up to 9-12 km. Cities with 2-5 million population such as Pune, Surat, Kanpur, etc. have an average trip distance of around six kilometres with a high non-motorized travel share of 40 to 50 per cent. This share further increases to 60 to 70 per cent in cities with population between one and two million.[9]

Access to the urban environment initiates equity and inclusion, and accessibility is a quality of system which allows, includes and integrates diverse human forms and users within the system. An accessible urban mobility system includes high degree of freedom of choices to access an urban space, and therefore generates and conserves the idea of accessibility.

In terms of urban infrastructure, accessibility as property of an urban space, is most difficult to measure, because it requires taking into account land use, mobility and mobility substitutes, but most accurately reflects the ultimate goal of transportation, and allows widest range of transport problems and solutions to be considered.

8. United Nations Habitat (2012), 'For a better urban future', Urban Themes, Mobility, at (https://unhabitat.org/urban-themes/mobility/)
9. Baindur,D., (2015), 'Urban Transport in India: Challenges and Recommendations', IIHS, at (http://iihs.co.in/knowledge-gateway/urban-transport-in-india/)

**Figure 3** A covered pedestrian mall at Clis Road in Sendai, Japan
(Source: http://en.re-tohoku.jp/cmt/wp-content/uploads/20130316-04.jpg)



**Figure 4** A pedestrian zone at Luisenplatz in Darmstadt, Germany
(Source: Master Thesis-'Benchmarking accessibility for urban mobility systems' (2017), CTRANS, IIT Roorkee)

There is a need to understand various parameters which affect accessibility of an urban space and at the same time prioritize within the identified parameters.

## Identified parameters for assessing accessibility

The evaluation of the indefinite form of an accessibility index can be defined through the study of the various linked parameters which define the urban fabric and assist in the evaluation. The following parameters have been identified based on the literature studies and their synopsis:



Network Connectivity          Pedestrian Footway Comfort          Public Transport Accessibility Level

Space element index          Intelligibility

**Figure 5** Identified parameters for assessing accessibility

The definitions of the parameters are listed as follows:

<u>Network Connectivity:</u> It is the measure to acknowledge choice of more pedestrian roads and junctions around a place, offering more degree of freedom of choices for the pedestrians. With respect to Connectivity index, (Ewing, 1996)[10] it is computed by dividing the number of roadway links by the number of roadway nodes. A measure of 1.4 is devised as a good measure for planning purpose.

10. Ewing, R. (1996), 'Best Development Practices: Doing the Right Thing and Making Money at the Same Time', American Planning Association, Chicago, IL, pp 12-22
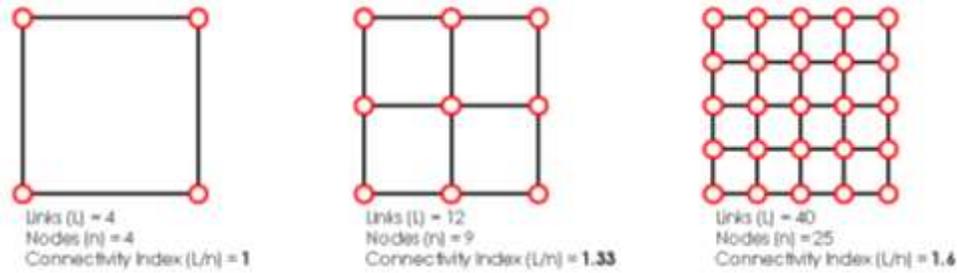
**Figure 6** Demonstration of calculation of connectivity index for an urban network
(Source: Master Thesis-'Benchmarking accessibility for urban mobility systems' (2017), CTRANS, IIT Roorkee)

Pedestrian Footway Comfort: It refers to the ability to move through the adjoining streets with comfortable width (space) of street available to move through, along with the density of pedestrians using the streets (Finch, E., 2010)[11]. The aim of a pedestrian comfort assessment is to understand the pedestrian experience as people walk along the street. The assessment does not look at the quality of the footway or associated issues such as maintenance that may affect the use of an area.

11. Finch, E. (2010), 'Pedestrian Level Comfort Guidance', Transport for London, London, pp 7-12
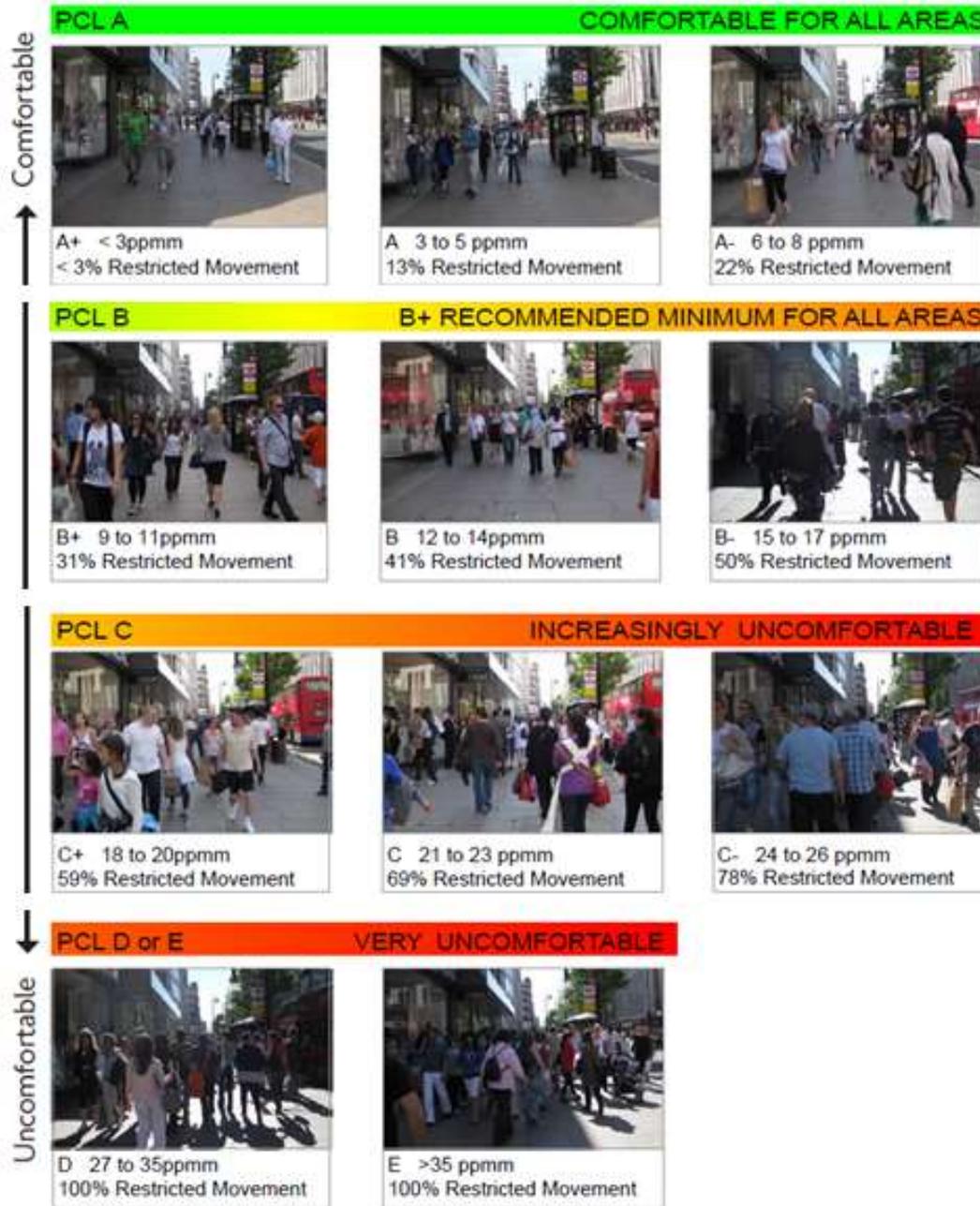
Figure 7 Comfort levels based on pedestrians per meter per minute measure
(Source: Flinch, E. (2010), Pedestrian Comfort Levels on Footways, Transport for London)

Public Transport Accessibility Level (PTAL): It is the ease of accessing a public transport service through its service frequency in a day and how far the service stations are located from a point in a place, where service station includes tram stations, bus stations etc.[12]PTALs take into consideration the walk access times and the service availability of the transportation modes within a pre-defined zone. Based on the index, the resultant

levels are categorized into six levels where 1 is the least level of accessibility and 6 is the excellent level.

Space Element Index: It is the ease of utilizing and accessing the street elements like benches, understanding the information systems, signage, ground surface etc. with respect to the place. The index is developed based on the standards, of the respective countries, for the accessibility with respect to Persons with Disabilities (PwDs) in a barrier free environment. The parameters are rated on three levels of safety and standards. If it follows the standard and is safe for utility, then it is rated as '1', if it does not follow the standard but is still safe then it is rated as '0.5' and the least is '0', where it is rated as unsafe. These ratings are carried out for all elements in a selected urban space where resultant cumulative mean of the ratings of all elements (i.e. SEI ~ Space element index) lead to identification of factors which need to be upgraded as per standards.

Intelligibility: The ability of a person to understand and navigate within the surroundings in a broad urban space i.e. the ease of how a person can pinpoint his/her location in an urban space. It is based on the Space syntax theory, developed by B. Hillier[13], where a space is mapped based on the axial lines (lines with maximum line of sight in a selected space) and the overall network of these lines are analysed with respect to how well integrated each link (or axial line) is with respect to the overall system of axial lines.

12. Rajendran, P.; Kumar, V. (2013), 'Public Transport Accessibility Index for Thiruvananthapuram Urban Area', IOSR Journal of Mechanical and Civil Engineering, pp 61-66
13. Hillier, B. and Hanson, J. (1984), 'The Social Logic of Space', Cambridge University Press: Cambridge, pp 99-123

Table1 Identified accessibility parameters and their respective measures

| Parameter | What to measure? | How to measure ? |
|---|---|---|
| Network Connectivity (Ewing, 1996) | Degree of freedom of choice for pedestrians to move around. | Connectivity Index through mapping of links and nodes in a selected urban space per sq. km. and the ratio of links with respect to nodes. |
| Pedestrian Footway Comfort (Finch, 2010) | Ease of movement for pedestrians with respect to movement restrictions | On-site data collection based on the street length of 6 metres, considering movement buffers as per standard (in ppmm) |
| PTAL (Tfl, 2010) | Access of different modes of public transport within selected radii of space. | Walk access time and the service frequency of the public transport modes, leading to an index based on the standard. |
| Space Element Index | Access of elements in the immediate environment with respect to PwDs. | Sub-parameters of elements to be indexed within a selected space based on the national standards regarding accessibility for PwDs. |
| Intelligibility (Hillier, 1984) | Ease of navigation around a network of visible spaces | Based on mapping of axial links in DepthmapX software, with respect to the Space Syntax theory. |

## Parametric perspective

With respect to overall perspective of the parameters identified, the measures can be categorized into two basic perspectives. The bird's eye view perspective and the human plinth eye perspective. The bird's eye view perspective takes urban space into a macro level study whereas the human plinth eye perspective takes the immediate environment, which is a part of an urban space into a micro perspective.

The Network Connectivity and Intelligibility fall under the macro perspective, the footway comfort and space element fall under the micro perspective category whereas the sub-parameters under Public transport accessibility level fall under both micro and macro level perspectives. The selected parameters have been studied in the two selected urban spaces, i.e. Luisenplatz in Darmstadt, Germany and Connaught Place in New Delhi, India.

Parametric review

- With respect to the Network connectivity, which includes link (i.e. road or pedestrian pathways) node (i.e. intersections) ratio, connected node ratio and intersection density, the links are not measured based on the distance and is difficult to compare with respect to the varied scales of the links. This affects the review of two cases taken into consideration, if both vary in scale and the ratio considered does not include the same unit of length.

- The PTAL, assesses the services of public transportations system with respect to the factor of access time, and does not consider the ease of interchange. It also takes an average speed of 4.8 kmph, as the nominal speed, to calculate access times based on travel length, which may differ with respect to persons with mobility impairment, elderly persons and other diverse human forms. The indexing system, also does not take into consideration the non-public transportation modes such a rickshaw which also help in enhancing access to a nodal point as compared to other public transportation modes.

- The space syntax theory is mainly utilized to relate the intelligibility factor in the research. The spatial arrangement of links utilized as an axial map, does not consider the topography for the assessment of the intelligibility factor. Therefore, the physical factors such as slope of the urban space does not affect the overall intelligibility of two diverse cases, if taken into consideration, i.e. if a space situated on a hilly region is compared to the one on plains or plateau, the horizontal links are only taken into consideration and not the sloping distance.

- With respect to the footway comfort assessment, the physical length and width of the urban space i.e. street system is taken into consideration as compared to the other parameters, except space elements. The density and the space availability address the movement restrictions around the peripheral streets of a selected urban space.

- The space element parameter considers the objects with which the individual interacts with, which may also act as a barrier during their movement. The measure takes the most micro level perspective for the assessment as compared to the other parameters. The parameter mostly focuses the Persons with Disabilities (PwDs) among the diverse pedestrian groups for the assessment of the space infrastructure.

Conclusions

- Planning of the urban space plays an important role for the basis of intelligibility. The monotonous planning of urban leads to the decrease in the ability of the user to pin point his/her location on the site, as compared to non-uniform pattern planning and the immediate area surrounding the public place. On the basis of intelligibility, the not so integrated pedestrian links can be correlated to the physical environment and observed if the information system is well in place or whether people find in easy to navigate in those areas.

- Pedestrian Footway Comfort is the factor of high priority in urban spaces. The comfort levels and movement restrictions should fall within the comfortable range. With respect to pedestrian footway comfort, the major barriers which reduce the overall footway of the pedestrians, leading to increase in the movement restrictions of the pedestrians. should be given a major priority in order to reduce the discomfort.

- 'Space Element' parameter deals with the immediate environment of a person, and takes into consideration the sub-parameters of the objects with which a Person with Disability interacts with. These sub-parameters obtained from the standards prescribed by the responsible authorities of the two countries, assist in rating the condition of the elements on-site. With respect to the standards, the index can be used to pin point the hazard the element deals with and can be prioritized to upgrade the safety of the persons utilizing the services.

- Considering the access to public transport, access to the stops should be made with respect to PwDs, with respect to stations which have lower level of accessibility with respect to the ease of boarding. The length of the journey to the service stations plays an important role is assessing the overall access level, the closer the service stations are with respect to the point of interest, more accessible the space is.

- The identified parameters can be further studied with respect to varied typology of urban spaces or land use and may not be restricted to the public spaces, which were taken for the research. The prognosis of the research would lie in identifying relative parameters which act as variables in defining the accessibility of an urban space and further correlation in order to benchmark the factors which assist in acquiring access to varied services by the person utilizing it.

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# Inclusive
# Railway Stations

3

Ajmeri gate side entrance to New Delhi Railway Station (Source: Author)

## Megha Tyagi

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## Inclusive Railway Station Environments for Persons with Visual Impairments in India

Megha Tyagi, *PhD Scholar at IIT Roorkee*

Railways, a national lifeline forms one of the most critical transportation systems in making an inclusive impact on mobility for diverse population groups. The diversity presents opportunities and challenges in terms of age, abilities, socio economic and cultural backgrounds. These railway station environments thus need to integrate and support the movements and usability experiences of these diverse population groups including Persons with Disabilities. India is a home to about twenty million Persons with diverse Disabilities out of which the highest is Persons with Visual Impairments (PVI) accounting to about five million in total. This figure supported by the fact that many elderly persons above the age of 60 years also face many types of visual impairments adds to the total effected population with a similar kind of issues. Mobility in Indian Railway Stations for these PVIs therefore poses multidimensional challenges for access to an inclusive travel experience.

A study was conducted as a part of master level thesis to map the mobility pattern of PVIs in Alwar Junction as a pilot study and in New Delhi Railway Station (NDLS) as main study to identify the accessibility issues. NDLS was selected due to its national importance and the strategic location in the capital city of the country. It introduces a

passenger to the level of services offered by the Indian railway authorities. The on-field study facilitated in addressing the mobility needs of PVIs; thereby contributing in identifying key barriers to their access to the railway services at NDLS. This exercise leads to analyzing the issues from multipoint perspectives using Universal Design as the core foundation. This article discusses the research methodology adopted for the study, the overall findings and the scope for future in assessing the needs of PVIs with respect to Railway Station environments in India.

## Status of Mobility of Persons with Visual Impairments

Railway station environments in India are often associated with terms like "crowded" and "confusing" commonly for mega stations in urban areas. The main issue arises in spatial orientation, navigation and destination identification for PVIs. In order to achieve these tasks a PVI undergoes mobility and orientation training along with the training of assistive devices developed for them. Assistive devices such as the white cane and smart cane facilitate in mobility of a PVI whereas other devices such as portable tactile maps, remote infrared audible signage (RIAS) facilitates wayfinding inside a built environment. Indian railway authorities in their document 'Manual for Standards and Specifications for Railway Station' (2009) has also establish the need for special guidelines for Persons with Diverse Disabilities. However, there are limited specifications focusing on PVIs. Indian Railway stations require a deeper understanding of the socio-cultural dimension of its users before beginning with the implementation of any Universal Design principles.

## Best Practices for an Inclusive Railway Station Environment

The accessibility policies and standards are the first steps towards creating an inclusive environment for all. A number of countries worldwide have successfully implemented these guidelines proving beneficial to the society at large. One such example is the St. Pancras International Station in London. It provides facilities such as wide accessible ticket gates, identical help points at regular intervals on every platform, mobility assistance points and tactile warning – guiding paths making it universally acceptable

and easy to navigate by the majority of PVIs. Similar is the King Cross station in London which lies across the St. Pancras Station. Opened in 1852, it is a major London station terminus. The accessibility features include step free access to station, accessible self-help ticket vending machine, designated accessible parking, induction loops and step-free train boarding.



(a)                                    (b)

**Figure 1** (a)Platform area at King's Cross Station (Source: networkrail.co.uk/London-kings-cross-station); (b) Accessible ticket gates (Google street view)

Another example is the Kyoto Railway Station in Japan. A unique feature of Braille stickers on the handrails of a staircase facilitates in providing perceptible directional information without any assistance to the passengers with visual impairments. Contrasting tactile tiles and legible signage are some of its other accessible features which make this station inclusive especially with respect to mobility requirements of a PVI. These stations exhibit the state of the art solutions to the concerns of all the passengers irrespective of their physical abilities. The similar effort is made in the research to first understand and identify the fundamental concerns and fears of the passengers while using the railway station facility in order to address them successfully on the field.

## 'Getting around is about much more than accessible buses and trains. It is as important to have well-designed and well-managed streets that don't act as a barrier to movement.'

-Inclusion by Design-Equality, diversity & the built environment. CABE (2008)

(a)                                          (b)
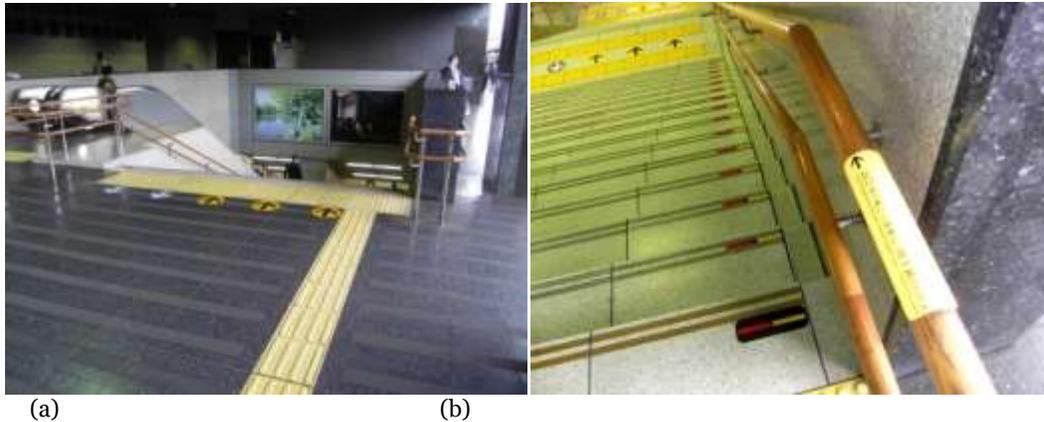
**Figure 2** (a) Contrasting tactile tiles at Kyoto station; (b) Braille stickers on staircase handrail at Kyoto Station

In India, the railway authorities attempted to provide barrier free mobility experience to PVIs but there remains a huge scope for improvement in this field. One such PVI inclusive Railway Station is established in Mysore city. This six platform railway station has undergone retrofitting to provide independent mobility experience to PVIs. Accessibility features of the station include tactile maps of the railway station and train schedules in Braille, tactile maps of railway station layout, metallic Braille signage and Braille menu cards in food joints within the station. This retrofitting was the part of first phase of the total design process.

The review of literature suggests that the challenges of PVIs in terms of their mobility, orientation and accessibility can only be met by providing a complete universally accepted model of railway station environment. The environment of a railway station comprises of physical elements, information features, polices, guidelines, staff training, online pre-assistance and crowd pattern. All these parameters can be used to evaluate the universal acceptance of a railway station environment especially with respect to PVIs.
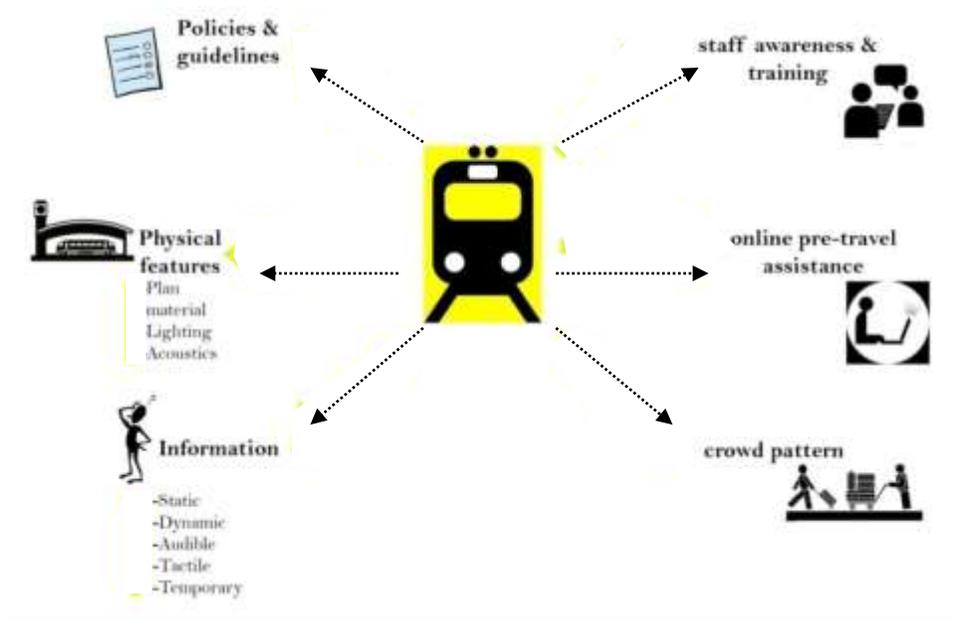
**Figure 3** Graphic showing parameters of an Accessible Railway Station (Source: Author)

## Research methodology

To understand the key barriers and the basic needs of Persons with Visual Impairments with respect to a railway station, the study adopted three research tools namely in-depth interviews, Access Audits and video based fieldwork. The overall sample size for in-depth interviews was 35. The Access Audit involved total four volunteers with different vision impairments. Snow ball sampling technique is used for selecting the interviewees or volunteers for the research. The pilot study involved 5 in-depth interviews and one access audit on field at Alwar Junction which was conducted in the month of September 2015. The main study conducted at NDLS involved four access audits and 30 in-depth interviews in the month of March 2016. Out of this 35 people, 22 had vision impairment of complete blindness and remaining 13 had vision impairment of partial blindness. A 60-40 male-female ratio was observed in the group. The age variation was between 25-65 years; thereby the study incorporated the issues of elderly passengers as well for a deeper understanding of the concerns in the context of a railway station environment. The selection criteria were based upon the following four points-

   a. A person should have a Visual Impairment

   b. Age of the person should be above 18 years

c. He/ She should have an independent travel experience via train

d. He/ She has travelled through New Delhi Railway Station

The study is conducted from the perspective of physical, sensory and social components of a railway station environment.   These components incorporate the access to infrastructure, information and services on a railway station.
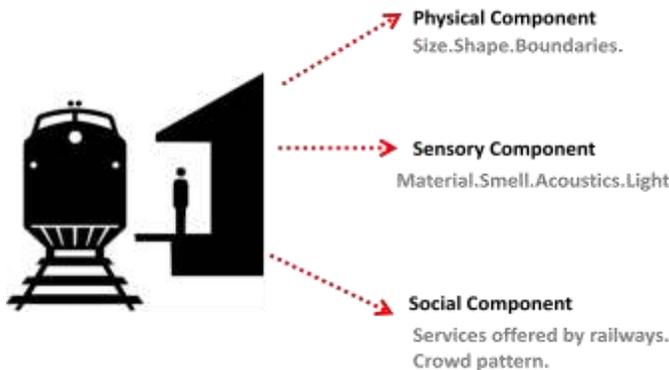
Figure 4 Graphic showing three main components of a Railway Station (Source: Author)

The focus of the research is on knowledge construction of the main issues faced by a PVI in Indian railway stations. In order to understand this complex paradigm, the study employed detail research framework. This human-centric research focuses on ethnographic approach in the given context of a railway station.

Pilot study

The pilot study is conducted to test the validity and feasibility of research model prepared for the main study. Two stations comparatively smaller in scale than of New Delhi Railway Station are selected. One is Roorkee Railway Station which has only 3 platforms and another one is Alwar Junction with 2 platforms located 160 km south of Delhi. With the help of a PVI volunteer access audit is conducted for these two stations. The outcome of the pilot study is the identification of certain parameters against each zone for evaluating the accessibility of a Railway Station. Refer table number 1 for the various parameters identified.

Table 1 Parameters identified for evaluating accessible railway station

| Sno. | Zone | Activities | Parameters identified |
|------|------|-----------|----------------------|
| 1 | Zone 1 External Environment | • Parking<br>• Pedestrian movement<br>• Vehicular drop off movement<br>• Boarding nearest transit mode | • Designated parking space<br>• Flooring material. Tactile path<br>• Accessible pedestrian path connected to station building from nearest transit hub |
| 2 | Zone 2 Station Ticketing Area | • Standing in queues<br>• Enquiry from counter<br>• Ticket purchase | • Tactile guiding path<br>• Braille signage<br>• Counter height |
| 3 | Zone 3 Platform | • Waiting<br>• Boarding / de-boarding the train<br>• Drinking water<br>• Use of Public toilet<br>• Purchase at food/book stall | • Seat design<br>• Identification of location of the coach<br>• Tactile guiding path for all passenger services<br>• Braille menu & other information<br>• Lighting level |
| 4 | Zone 4 Foot Over Bridge | • Way finding for exit<br>• Reaching the next platform | • Braille/ tactile information<br>• Tactile guiding & warning tiles<br>• Railing heights |

The parameters identified after the two pilot studies facilitated in conducting the main study at NDLS. It further highlighted the that there are always some facilitating elements in any built environment that should be enhanced and maintained which can act as guiding cues for PVIs supported with removal of any physical, sensory and social barriers thereby creating an inclusive environment on a broad perspective.

## The field study

After conducting the pilot study and analyzing the data collected from the study, the data collection method is refined for NDLS. The type of data collected is both qualitative and quantitative in nature. Total three research tools are employed for data collection i.e. In-depth interviews, Access Audit and Video-based fieldwork.

Since the expanse of New Delhi Railway Station ranges from Paharganj side to Ajmeri Gate side; for ease and understanding a zone wise approach was followed to map the accessibility issues while conducting the Audit. Each zone of NDLS is again divided into few sub-zones. For each sub-zone certain issues are identifying and recommendations are made in later stage after analysis. To begin the study, digital mapping of NDLS is done followed by preparation of an access audit checklist for each zone of the station. On-site checking against the Accessibility standards was also conducted. The data was recorded in the form of graphical sketches and photographs. A video based fieldwork is conducted with the help of three Visually Impaired volunteers. The volunteers were asked to perform certain activities in all the six zones and these were then recorded. The videos were later analyzed to identify the on ground issues by observing the person-environment relationship. This tool is used to collect naturally occurring data using video recording cameras. Table 2 provides an example of list of activities given to each volunteer in different zone of the station complex

Table 2 List of activities for Zone 1 of New Delhi Railwat Station

| | ACTIVITY NUMBER | | ACTIVITIES |
|---|---|---|---|
| E N T R Y | 1 | | **Entering the station premises & reaching assistance counter no. 58** |
| | Sub tasks | 1.1. | Enter the station premises |
| | | 1.2 | Identify the direction of assistance / enquiry service |
| | | 1.3 | Cross the Passenger loading and unloading area |
| | | 1.4 | Reach the assistance counter no. 58 |
| | | 1.5 | Ask for the information about the train arrival time |
| | **2** | | **Using the unreserved ticket service** |
| | Sub tasks | 2.1 | Identifying the direction of unreserved ticket service from parking lot |
| | | 2.2 | Crossing the main station building |

| | | 2.3 | Identifying the location of senior citizen/ PwDs window counter |
|---|---|---|---|
| | | 2.4 | Reaching the unreserved ticket service counter & purchasing a ticket |
| | **3** | | **Using the prepaid Taxi booth service** |
| E | Sub tasks | 3.1 | Identify the direction of prepaid taxi booth service from unreserved ticket booking counter |
| X | | 3.2 | Cross the road towards exit gate 2 |
| I | | 3.3 | Identify the location of pre-paid taxi booth |
| T | | 3.4 | Book a taxi for a certain destination and reach the taxi stand |

The mobility pattern of the volunteer while completing the activities was mapped accordingly.
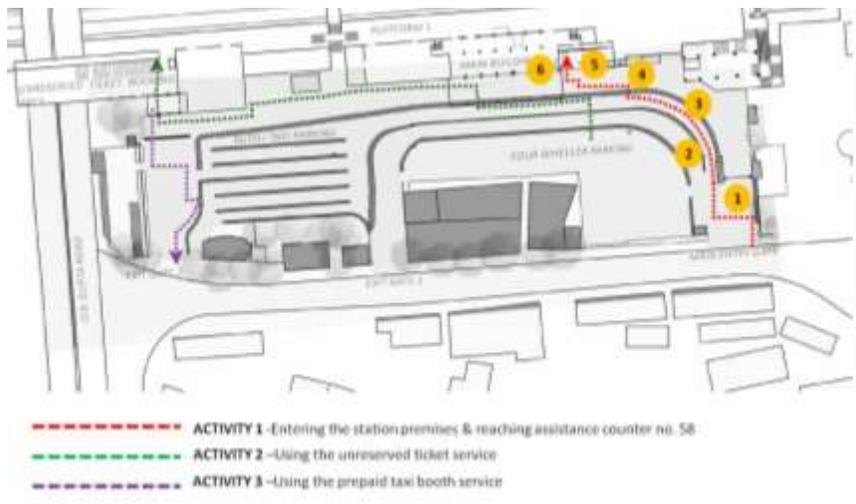


Figure 5 Mapping of activity number 1 of entering the station premises from Paharganj side of NDLS and reaching assistance counter no. 58 (Source: Author)

Figure 6 Screen shots of Activity 1 video at New Delhi Railway Station Zone 1 (Source: Author)

The same activity was performed by a non-PVI volunteer and some comparative observations are made as described in table number 3.

Table 3 A comparative observations between the movement of a PVI and a non-PVI in Zone no.1 of New Delhi Railway Station

|  | **Spatial Orientation** | **Ease of Navigation** | **Destination Identification** |
|---|---|---|---|
| Movement of Volunteer A | Not able to identify the safe lane for pedestrian entry- seeks support of fellow passengers | Collision with vehicles, curb division & fellow passengers | Verbally confirms with fellow passengers |
| Movement of a Non-PVI | Identifies the lane with restricted vehicular entry | Avoids vehicular collision easily | Signage |

## Findings

The data collected from the study provide with some useful insights into the needs, concerns and barriers in the movement of a PVI in a Railway Station Environment. A number of issues were found out to be overlapping with respect to each zone of the New Delhi Railway Station.The issues were therefore prioritized on the basis of their repetitive occurrence and are enlisted in table number 5and 6.

Table 4 Issues identified in the External Environment (zone A) of New Delhi Railway Station

| Component of a Railway Station Environment | Issues Identified | | |
|---|---|---|---|
| | **In-Depth Interviews** | **Access Audit** | **Video-Based field work** |
| Physical | • Passenger services like ATM, toilet cubicle, food plaza etc. are not accessible to Persons with Disabilities | • Absence of any accessible parking space<br>• The counter heights for all the services are 1230 mm which is inaccessible. | • Absence of pedestrian crossing |
| Sensory | • Location of passenger services not known to many Persons with Disabilities | • Directional & information signage about the services available like airport metro gate, provision for escalators is missing for passengers using pedestrian pathway | • Absence of sensory guiding system for passenger services |
| Social | • Lack of awareness about other entrance gate options<br>• Lack of awareness about 'assistance counter' | • Auto-rickshaws parked in between passenger drop off lane block the entire path. | • Passengers sitting on the entrance steps with luggage of the current reservation ticket counter area |

Table 5 Issues identified in the internal environment (zone B) of New Delhi Railway Station

| Component of a Railway Station Environment | Issues Identified | | |
|---|---|---|---|
| | **In-Depth interviews** | **Access Audit** | **Video-based field work** |
| **Physical** | • Unable to identify the layout of the foot over bridges without assistance<br>• Absence of any accessible toilet or drinking water facility on the platforms | • Lack of seating space for all the passengers<br>• Absence of designated seating space for Persons with Disabilities<br>• Absence of any accessible passenger service on the platform | • Absence of handrail for support at the entrance of station building |
| **Sensory** | • Majority of times the platform edge is unidentifiable<br>• Not able to identify the location of the coach | • Signage for platform numbers are not legible and clear on the foot over bridges | • Unable to identify the arrival of nearest staircase or escalator on the platform leading to the foot over bridge. |

| Social | • Lack of awareness about the location of cloak room , 'May I Help You' counter and Jan Ahaar facility on platform number 16 | • Passengers standing or sitting against the railing of the foot over Bridges | • Luggage placed on the edge of the platform end blocking the path for passengers and way towards the toilet block |
|---|---|---|---|

The other findings through in-depth interviews highlighted some common issues at the railway station for PVIs. It was observed that female travelers mostly opt for online reserved ticket as compared to male passengers for safety and security reasons.

Ajmeri gate side entrance is preferred due to direct metro connectivity and bus connectivity. On the other hand, Paharganj side entrance do not have any such direct connectivity and even the auto rickshaw drivers try to stop at the entrance gate only and do not prefer to reach near the station building drop off zone. Female and elderly travelers avoid any personal assistance and try to carry light luggage which they can carry by themselves. This was due to the fear of luggage theft and trust issues. Others who require assistance mostly receives from fellow passengers. Majority of PVIs depend upon the announcements or information from fellow passengers for confirmation about the platform number. Very few were aware about the location of the enquiry counter and others due to long queues preferred not to use this facility for getting information about any other services.

Discussions

The mobility issues of a PVI in many respect overlaps with the generic concerns of almost all other diverse population groups. Universal design as a strategy and a guiding philosophy can become a panacea to resolve the complex perspectives of handling such diversity in the given railway station context. The seven Principles of Universal Design offer a strong foundation base to address the convoluted dynamics of this issue. On the other hand, Universal Design India Principles (UDIP) further complements the UD principles adding a unique Indian perspective to it. The UDIP respects the socio-cultural diversity of India thereby contextualizing the solutions.

The first principle termed as 'Equitable' refers to the design solution to be fair and non-discriminating to the diverse users in an Indian context. In terms of a Railway Station Environment; provision of accessible parking, approach and passenger amenities such as accessible drinking water facilities, toilet facilities and food/ books stall facilities to all irrespective of their physical abilities can lead to achieving equity. A prior announcement about the location of disable coach of the arriving train is another solution which will bring all the passengers at the equal level since the location of other reserved and unreserved coaches are generally already displayed on digital screens.

The second principle termed as 'usable' suggests that the design should be operable by all users in an Indian context. Successful integration of design elements like an accessible ramp with handrails on both sides, table top crossings at passenger drop-off areas, lower counter heights, Braille stickers, menus and signage implies a meaningful achievement of usability factor of the design.

The third principle termed as 'economy' address an important aspect of Universal Design in Indian context i.e. affordability. An economically feasible design solution is more likely accepted and appreciated universally. In the context of a Railway Station sensitizing the railway staff and training them in handling diverse population groups equally is a very efficient and economically strong solution. Similarly, availability of accessible maps of railway stations and use of low-cost assistive devices also represents an affordable dimension of design solutions.

The fourth principle of 'aesthetics' suggests promoting social integration among the users. The aesthetic dimension in a Railway Station can be addressed by the application of an adequate color contrast of the built environment maintaining the light reflective values for PVIs. The wayfinding signage should be well integrated into the visual fabric of the Railway Station Environment thereby fostering the culture of maintaining the functional aspect of the aesthetics.

The fifth principle of 'Cultural' encourages the design solution to be respectable towards the cultural past and the changing present assisting all the users. Respecting the cultural diversity of India signage should be available in multilingual options and staff should be trained with multilingual skills catering to larger population groups. Provision of

priority seating options for elderly passengers and Persons with Disabilities in waiting halls, restaurants and platforms are practical solutions appreciating the socio-cultural past of the country.

## Conclusions

Mobility experience of a Person with Visual Impairment (PVI) with respect to a railway station depends on the access to infrastructure, access to information and access to services. The research suggests that nationally there has been a lot of improvements and efforts done for removing the structural barriers in built environments especially for those encountered by Persons with mobility impairments. However, a little progress is made in removing functional barriers for all other types of disabilities, especially for PVIs.The study conducted thereby supports that it is the fabric of accessible built environment, sensory guiding and warning cues along with assistive technologies is what can deliver a universally acceptable railway station for majority of population groups. A major transit hub like a railway station with the help of a Universal Design approach in Indian context can achieve complete accessibility in all respects touching the lives of millions of PVIs in a positive manner.

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# Mobility needs for Persons with Visual Impairments

4

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# Understanding mobility needs for Persons with Visual Impairments in Indian context

Trisha Sinha, *Assistant Professor*

## Introduction

Accessibility refers to the design of an environment and its elements for the users in such a way that their "inclusion" can be scaled on various parameters like comfort, convenience, safety, etc. The concept focuses on enabling access for people with disabilities (PWDs), or special needs making the environment completely barrier free for one and for all. As a society consists of diverse nature of section differentiated on the basis of age, gender, economy, social and political status, abilities etc every individual demands equal rights for using the provided facilities in the given environment. Every system or entity provided in a surrounding is considered to be a success on the basis of extent of its serviceability. If any section of the society is neglected, the capacity of the system remains unutilized thus hampering the growth of overall country. Thus mobility system plays a vital role in connecting the varied communities of a city and modelling them into a network layout.

This article debates on a specific concern for People with Vision Impairments (PVIs), in an Indian context. It starts with the basic working principles of Universal Design globally and its relation in an Indian context. The relevance and prevalence of PVIs in India along with statistical data moves our focus towards this vulnerable segment of the society. The later sections of this article highlight the existence of mobility aids necessary for PVIs in India while dealing with the different challenges met on everyday basis.

## Universal Design

The term, 'Universal design' was first used and promoted in the United States by Mace in 1985 to communicate a design approach that could be utilized by a wider range of users.

"Universal design means the design of products, environments, programmes and services to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design" (Mace, 1985).

From the perspective of consumers, universal design is expected to increase the overall prevalence of accessibility and usability in the built environment and to enhance opportunities for routine participation and social integration of people with disabilities in everyday life (Mace, et al., 1990).

Thus, the design approach was aimed at all types of users irrespective of their age, gender or abilities. The idea behind the concept was not only to make the given environment accessible but also to make it aesthetically pleasing for one and all. To substantiate the implementation of concept by designers, planners and architects, Seven Principles of Universal Design were developed by the Center for Universal Design in 1997.

1. Equitable Use: The design does not disadvantage or stigmatize any group of users.

2. Flexibility in Use: The design accommodates a wide range of individual preferences and abilities.

3. Simple, Intuitive Use: Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.

4. Perceptible Information: The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.

5. Tolerance for Error: The design minimizes hazards and the adverse consequences of accidental or unintended actions.

6. Low Physical Effort: The design can be used efficiently and comfortably, and with a minimum of fatigue.

7. Size and Space for Approach & Use: Appropriate size and space is provided for approach, reach, manipulation, and use, regardless of the user's body size, posture, or mobility (Connell, et al., 2008).

**Universal Design in India**

Working towards the concept of 'Universal Design' in India, currently several organisations are involved in making the country accessible for all.

Recently, the Prime Minister of India, launched "Sugamya Bharat Abhiyan" (Accessible India Campaign), on 3rd, December 2015. It is a nationwide flagship campaign for achieving universal accessibility for "Persons with Disabilities".

But one of the greatest challenges faced while implementing the concept of 'Universal Design' in Indian context, when compared to the western world lies in the fact that Indian user group comprises of extreme range of diversity classified on the basis of socio-economic, age and other cultural factors.

Addressing the above perspectives, UD India Principles provide a background philosophy to accommodate the ethos of inclusion. They are :

1. Equitable/ Saman: The design is fair and non-discriminating to diverse user in Indian context.

2. Usable / Sahaj: The design is operable by all users in the Indian context.

3. Cultural / Sanskritik: The design respects the cultural past and the changing present assist all users in the Indian context.

4. Economic / Sasta: the design respects affordability and cost considerations for the diverse users in the Indian context.

5. Aesthetic / Sundar: The design employs aesthetic to promote social integration among users in Indian context. (Mullick, et al., 2011)

These principles can directly relate to an Indian scenario encasing a wide range of users. Designers, planners, architects or other allied professionals along with policy makers can refer the above listed five UD India principles to transform Indian socio-cultural and built landscapes into inclusive environments.

**The Indian User Group- Relevance & Prevalence of PVIs**

To answer as to why we need to focus towards 'Universal Design' in India, lies in the statistical figures given by WHO, Census of India & NSSO reports.

A total number of 26.8 million people have one or more multiple forms of disability in 2011. Proportion of disabled population by the type of disability in India in the year 2011 is shown in Fig. 1. (Source: C-Series, Table C-20, Census of India 2011)
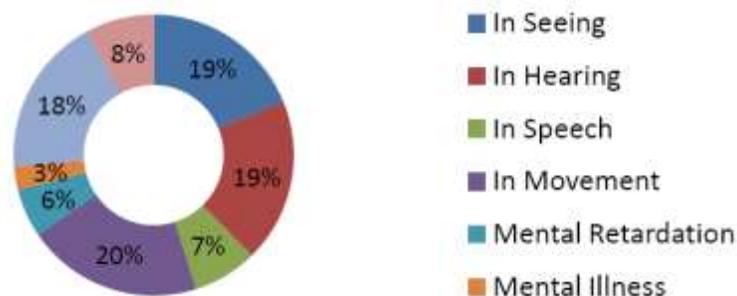
**Figure 1** Proportion of Disabled Population by Type of Disability, (Source: Census of India: 2011)

From the above pie chart, it is evident that a significant proportion of population falls under the category of disability in seeing and movement. Comparing the two sections, one can easily identify People with Vision Impairments (PVIs) as the most vulnerable section of the society, exposed to minor injuries or the major accidents on a daily basis. PVIs in India constitute up to 17.5 percent of global percentage (WHO, 2010).

Table 6 Visual Impairment in India- Global percentage (Source: WHO, Region- India and country, 2010)

| WHO Region | Total population (millions) | Blindness No. in millions (percentage ) | Low vision No. in millions (percentage) | Visual Impairment No. in millions (percentage) |
|---|---|---|---|---|
| India (Global percentage) | 1181.4 (17.5%) | 8.075 (20.5%) | 54.544 (22.2%) | 62.619 (21.9%) |

Vision impairment is prevalent in many forms and degrees and covers a very wide range from total blindness to moderate visual difficulties. For the purpose of studying vision related problems in India, a sample of common visual impairments were identified with the list of visual problems under the individual impairments. Visual Impairments included in the list were: *Refractive Errors, Ocular Diseases and Anomalies and General and Systemic Diseases. Ocular Diseases listed causes like Albinism, Trachoma, Glaucoma, Cataract and many others. General and Systemic Diseases included visual impairment due to Hypertension, Vitamin A Deficiency, Multiple sclerosis and Chronic Diarrhea.*

Visual disorders that are commonly prevalent among these impairments may occur in diverse forms such as blindness, halo formation around point images in low light, blurred vision, night blindness, decreased visual acuity, double vision, visual field loss, limited vision due to involuntary movement of the eye, general fatigue after prolonged use of the eye, eyes may not move or focus in the same direction, loss of accommodation, cloudy vision, appearance of flashing lights, intolerance to visual perception of light, peripheral loss of vision/tunnel vision and loss of colour vision.



Figure 2 Visual Disorders- (a) Halo formation around point images in low light, (b) Blurred vision, (c) Tunnel vision/Peripheral loss of vision (Source: http://en.wikipedia.org/wiki/Halo_(optical_phenomenon, http://www.redbarn-studios.com/blurry-eyes, https://www.guidedogsvictoria.com.au/about-vision-loss/type-of-vision-impairment/)

Some of the other rare visual disorders are

- Distortion of vision to some degree at all distances
- Vision with blue/red tint
- Distinct colored edges around objects, especially in high-contrast situations
- Unable to perceive depth
- Sudden appearance of many floaters
- Fluctuating vision



**Figure 3** Rare Visual Disorders- **(a)** Distortion of vision to some degree at all distances, **(b)** Tinted vision, **(c)** Sudden appearance of many floaters (Source: https://quizlet.com/25572650/atsu-heent-flash-cards/, http://web1.cs.brynmawr.edu/CS110:Lab05, http://www.aboutfloaters.com/images.htm)

People with distinct vision related problems face different levels of difficulty in the same situational context. An individual suffering from a moderate acuity loss may find it adequate and efficient to access positioned signs in large prints, while a person with tunnel vision may have a little difficulty reading signs, but may not easily locate them. These differences may be dealt with at the different levels of functional description of the vision loss. Thus, within the category of PVIs, sub-sections can be considered to simplify the designing principles and to suit the widest possible range of visual problems in the given environment.

**The Environment- Role of PVIs**

The most challenging role of PVIs in the given environment is related to its 'Wayfinding'. People want to move or travel as per their wish or as per their needs. While when we relate it with the most vulnerable section of the society, PVIs, wayfinding becomes an intricate challenge at each and every step.

In urban theories, the word 'Wayfinding' got an early mention by Kevin Lynch, a celebrated author of the book- 'The Image of the City' published by MIT. He mentioned how a person moves through the given space using different environmental cues such as paths, edges, landmarks and nodes etc. He was specially recognized for his unique concept of perception of elements related to an urban environment and mental mapping. According to him, during the perception of surrounding environment, nearly every sense is in function and all together collaborates to form the final image. Many kinds of cues are used: the visual sensations of color, shape, motion, or polarization of light, as well as other senses such as smell, sound, touch, kinesthesia, sense of gravity, and perhaps of electric or magnetic fields (Lynch, 1960).

The main difference between wayfinding systems specially designed for PVIs and for sighted user's points to the level of detailing of spatial description. For persons with normal vision, wayfinding is not a big task. They can visualize and explore the surrounding environment which may have a complex design. But PVIs are devoid of these options and often make use of different wayfinding. To become completely lost is perhaps a rather rare experience for most people in a modern space and it is also

surprising to notice how the sense of anxiety and even terror accompanies the traveler to stress on the link that exists between wayfinding, sense of balance and wellbeing (Lynch, 1960). Thus the tools & techniques of way-finding play a vital role in an environment, promoting independent mobility for one and all.

**Mobility Aids- Assistive devices & Environmental Technologies**

The current Indian scenario necessitates examining and analyzing the various ways to help the PVIs by means of mobility aids which include assistive devices on the personal front as well as environmental tools & technologies. Thus for an efficient functioning of an environment, user is equally responsible.

(A) Assistive Devices - Human wayfinding relates to both sensing the immediate environment for obstacles/ barriers and hazards, and reaching complex destination points beyond the immediately noticeable environment. Assistive devices help PVIs in orientation, object identification, positioning, detection of obstacle and route planning. Examples are foldable walking canes, voice wearing video glasses, GPS cane, GPS mobile phones, electronic compass, remote infrared auditory signage-hand receiver etc.

Figure 4 Assistive Devices (a) Foldable walking canes (b) Voice wearing video glasses (c) GPS cane (d) Electronic compass (Source- http://www.irishwalkingsticks.com/folding-walking-sticks.aspx, http://www.dhgate.com/store/product/80-inch-big-screen-3d-video-glasses-digital/244736008.html, http://www.alibaba.com/product-detail/GPS-SOS-MP3-Smart-Handy-Stick_60319156869.html, http://www.westmarine.com/buy/kvh-industries--azimuth-1000-electronic-compass--493262)

(B) Environmental Tools & Technologies - Different forms of visual impairment might impact on technological development in their distinct ways. Several research works have demonstrated how orientation involves gathering and interpreting available sensory information which may be visual, auditory, kinesthetic, tactile, thermal and/or olfactory. In the absence of vision, information from other sensory sources becomes crucial and

significantly reliable. The latest tools and technologies to help the PVIs in wayfinding are: Tactile tiles, handrails/grabrails, information in Braille or raised letters, guiding light strips, electronic or tactile maps etc.



**Figure 5** Guide paths: **(a)** Tactile tiles **(b)** Handrails with Braille **(c)** Guiding light strips (Source: http://en.wikipedia.org/wiki/Tactile_paving, http://www.dev.ihcdstore.org/?q=node/130, https://www.pinterest.com/geochevez/hallway/)

## Challenges in Indian Scenario

Mobility plays a very important role in a self-determined life. Every individual has the right to move independently in any environment. But in India, unfortunately, there are other constraints that limit the independency of an individual and in particular for PVIs. These can be discussed under the following subjects.

## 1. Language

India is a country which is famous for its cultural diversity and regional customs & traditions. It is a home to several hundred languages. One of the critical issue that can be seen here is that most of the recent technologies use English as their language for interaction. Thus it is a big challenge to promote the use of these developments among the non-English users and especially in India where the rate of illiteracy is high. Even the non-English speakers cannot be expected to be known to a common Indian language.

**Figure 6** Lack of social awareness among general public



**Figure 7** Adjustment with tactile tiles junction design

## 2. Social and Technological Awareness

The general user group should be made responsive to the technologies provided to help the PVIs so that they can co-operate at their individual levels to make the environment barrier free. For example, the general crowd can keep off the tactile tile layout for PVIs which otherwise may become a huge obstacle (Figure 6). On the other hand, the utility factor of the latest technologies, if provided on a large scale, directly depends on the awareness among PVIs. If the PVI is unaware of the existing facility or its method of use, he/she should be trained about the same through organized learning programs. This practice is not very common in Indian scenario.

## 3. Safety Issues

Demarcation of warning zones in the given environment for PVIs needs to be done with an extra focus, considering the factor of population in India. Another very critical issue that can be observed is the compromise in appropriate design with onsite adjustments which could lead to major accidents (Figure 7). This again can be related to social awareness among professionals and different user groups. Also, providing assistive devices like voice wearing glasses could always make it vulnerable for theft. So it is preferable to avoid use of costly and personal assistive aids for helping the PVIs.

## 4. Comfort & convenience

There are several technologies for PVIs which include the use of body worn devices in wayfinding systems. At the cost of comfort and convenience, no one would actually volunteer to make use of these technologies regardless of how successful results they provide.

## 5. Cost

Cost is an important factor to be considered while implementing the recent technologies in public use. Since cost effectiveness plays a very important role specially when related to large scale projects for PVIs, it is always preferable to go with reasonable and feasible methods. Considering the varied economic sections of Indian society, maximum involvement in public spaces that provide basic needs is from low to middle income group families. Eg. Metro System.

## 6. Lack of understanding among designers/planners/industries

Another very significant factor in Indian scenario for implementing these ideas is lack of understanding among the designers and planners to make the design of public systems accessible not only for PVIs but also for the diverse sections within the group suffering from different kinds of visual disorders as discussed in the earlier sections. Thus these professionals often tend to ignore the basic idea of 'Universal Design'.

**Primary Survey- National Association for Blind (NAB), Delhi, India**

To test the efficiency of built environment in Indian scenario, a sample of ten PVIs was interviewed at National Association for Blind, Delhi, India. The sample group comprised of PVIs suffering from minor vision impairments to complete loss of vision. The questions were related with one of the busiest and the most important public space in Delhi- Metro stations. Some of the major findings from the survey have been listed down:

- 60% of PVIs rated independent mobility inside Metro stations as difficult. Next 20% said it was impossible to navigate independently.
- 70% of PVIs have never used the tactile tiles in Metro stations while another 20% of PVIs think that they are misleading.

- 50% of PVIs have never used Public toilets while 40% PVIs think that the way to public amenities are confusing.
- Only 30% of the PVIs are updated with the latest navigation mobile apps/other technologies.

The survey results show that even though India is taking measures to implement the principles of Universal Design, its lagging in providing the basic services to the intended group of users.

**Conclusion**

India is developing a sense for Universal Design but at a much smaller pace than required. Recently there has been a significant transformation in the designing policies and regulations given by the Government of India. Underlining the concepts of 'Universal Design', India is trying to implement the related principles in terms of tools and technologies but looking at its efficiency factor, the country has a long way to go.

The demographic silhouette of our country under the category of PWDs, demands much awaited attention from the society. Several initiatives have been taken recently, both at National and State level, to attain the concept of barrier free environment but it has not been successful to meet the basic mobility needs of PVIs. These issues when simplified can lead to a better built environment in India with an increased efficiency and can help the PVIs to be an important part of our society with self-confidence. On the other hand, the designers, planners and the architects have a major role to play in molding the shape of overall country.

Providing simple or advanced tools and technologies in our environment is the basic step. To test the efficiency of these systems with respect to the intended user group, is what needs to be assessed and analyzed.

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"The main trouble with design schools seems to be that they teach too much design and not enough about the ecological, economic, and political environment in which design takes place"

-Victor Papanek

# Inclusive Pilgrimage Experience

5

## Pranati Awasthi

Pranati Awasthi is an enthusiastic Transport Planner at Directorate Urban Land Transport, Govt. of Karnataka, India. She completed her post graduation from Indian Institute of Technology, Roorkee, in 2015. She has worked in diverse area of projects ranging from multi-modal integration to promotion of non-motorized transport system through participatory planning approach and design. She did her thesis in the domain of barrier free tourism which aim at identification of various issues by identified typologies of tourists at a pilgrimage center and universal design based strategies to counter them. This paper is an output of the research work done by her as a part of endeavor for completion of her thesis.

# Inclusive pilgrimage experience in India: A case of Haridwar

Pranati Awasthi, *Transport Planner*

Tourism is not just about travel and leisure but sometimes it is phenomenon of life itself. India is a land of pilgrimage. Travel for religious purposes has been there from the most ancient times. In fact, to a majority of domestic tourists in India, pilgrimage has always been the main motivation of travel.

Inclusivity is the core essence of Indian ethos of pilgrimage as it includes diverse profile of tourists for the purpose. However, in reality inclusivity happens in fragments, the idea of barrier free mobility for pilgrimage center in India remains a matter of concern.

With the enactment of "The Rights of persons with Disability Act, 2016", on 27th December 2016, India, the enable environment has emerged as the indispensable right of an individual and therefore necessitates the study and provision of barrier free environment at all public places which embrace the pilgrimage sites as well.

This study highlights the key barriers faced by diverse pilgrims in a typical Hindu town of India considered to be a pilgrim center for tourism. Through profiling its diverse range of tourist pilgrims, it shall provide a comprehensive view of the critical issues to mobility and access to the major public space in the realm. This study also peeks on the

understanding the interrelationship of various barriers with the profiles of tourists as well which can also be termed as cross classification of barriers based on profile.

Introduction

India is the land of spirituality where religious devotees travel from several parts of the country and the world. Various tourists come here to experience the vivacious vibes of belief which are displayed as temples, shrines and holy destinations in India. For the comfort of tourists who are visiting these destinations and for the sake of inclusivity of tourism, it is of utter importance to provide barrier free mobility to these destinations. The UNWTO recommendations on "Accessible Tourism for All" (2013), have been approved and endorsed by the General Assembly, updated from the 2005 version, the recommendations outline a form of tourism that involves a collaborative process among stakeholders to enable people with access requirements to function independently through universally designed tourism products, services and environments. This resolution itself provides a very strong base for the provision of accessible tourism at any destination in India, as it is one of the member of executive council of UNWTO for the last 19 years. With the enactment of "The Rights of persons with Disability Act, 2016", on 27th December 2016 in India, to give effect to United Nations Convention on the Rights of Person with Disabilities, 2006, India has come a long way in empowering its citizens with an enable environment. This Act along with increasing of the type of disabilities from 7 to 21 also provide legal support to PM's accessible India campaign

A study by the Delhi based National Council for Applied Economic Research shows that of the 230 million domestic tourist trips undertaken in India in year 2002, 16% trips are made for religious purposes, which is second highest after the travels made for social purposes. Such journeys, which are undertaken by both rural and urban India, outnumbers the leisure holidays in hill stations, getaways to sea beaches and even trips to metropolitan cities. (Domestic Tourism Survey , 2002-2003)

There is whole range of diversities that can be seen in the practice of religion in India. However, Hinduism is professed by the majority of population in India and according to the census 2001, out of 1028 million populations, little over 827 million (80.5%) have

returned themselves as followers of Hindu religion. This large proportion of Hinduism follower itself promotes the larger number of Hindu pilgrimage tourists and the high attraction factor of Hindu pilgrimage site in the Nation. Hindus call the sacred places to which they travel or their pilgrimage site as "tirthas" and the action of going on a pilgrimage as "tirtha-yatra". The Sanskrit word "tirtha" means "river ford", "steps to a river", or "a place of pilgrimage". (S.Vijayanand, 2012). For the conduction of this study, Haridwar, one of the famous pilgrimage centre in India, has been chosen for the case study purpose. Haridwar is city with "Ghats" or "steps to a river", which has already been discussed as holding significant aspect in Hinduism pilgrimage and religious proceedings along those steps. As in 2005 Haridwar noticed highest annual tourist influx than any other pilgrimage city in India at approximately 75.3 lacs (when compared to Varanasi with approximate 32 lacs and, Mathura with 62.38 lacs where Varanasi and Mathura are also significant Hindu pilgrimage spots). Also in 2012 Haridwar noticed annual tourist influx of 1.5 crore which represents significantly a large number of tourists.
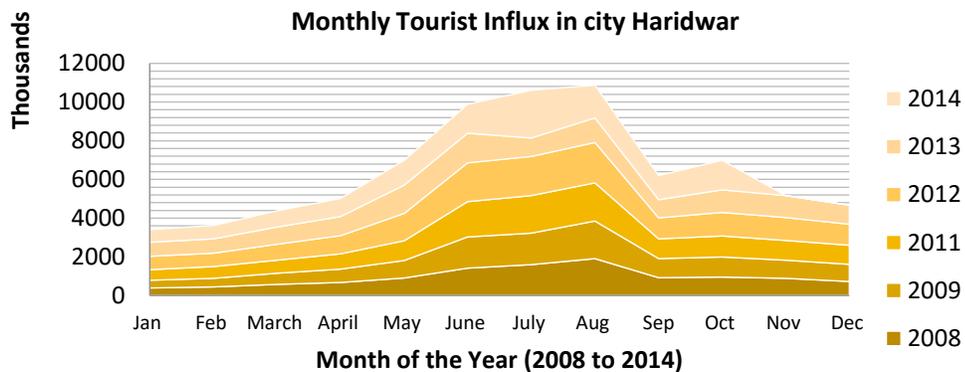


## Literature Review

Accessibility is the central element of any responsible and sustainable tourism policy, it is both human right imperative and exceptional business opportunity. (Taleb Rifai, UNWTO 2013). Barrier free tourism is the provision of barrier free environment for tourists at all stages of their journey. Barrier free environment is space that allows free movement, function and access regardless of age, gender, physical abilities etc., or a set

of service that can be accessed by all tourists without obstacles and with dignity and as much independence as possible. (Ferneeuw, 2005*). Barrier Free Tourism is that enables people with disabilities to function independently and with equity and dignity through the delivery of tourism products, services and environments that are inclusive of physical, vision, hearing and cognitive dimensions of access.*

Alen, Dominguez, & Losada in 2012 studied different terms with somewhat similar concepts related to barrier free tourism, such as senior tourism, accessible tourism, tourism for all and accessible tourism for all. The concept of senior tourism is ambiguous and make it difficult to compare similar studies of senior tourism as criteria used in marketing senior tourism is: chronological age and retirement and age of retirement vary with nations. Accessible tourism term was first used in 1980 during Manila Declaration, which recognized tourism as a fundamental right and key vehicle for human development; whereas in 2002 according to Gomez it is defined as the variety of activities occurring during the free time devoted tourism by people with restricted capacities, which enable them to fully integrate their functional and psychological perspectives. In 2003, Perez and Gonzalez stated that accessible tourism is the one that guarantees the use and enjoyment of tourism by people with physical, mental or sensory impairment disabilities, i.e. to facilitate people with disabilities to infrastructure and tourism services and follows that accessible activity is synonymous with integration. In 1980s the term "tourism for all" arose to refer to tourism for people with restricted capacities and its objectives are to achieve the normalization of tourism and leisure for all people and contributing to their incorporation as users of tourism and infrastructure services. If one tries to design tourism for all, it means activities that can be enjoyed by individuals without any disability as well as by different groups with specific accessibility needs (physical, mental or sensory) without any discrimination among them. According to Dr. Rudiger Leidner in 2001, the concept of "accessible tourism for all" which is almost identical to tourism for all, "is not based on the separate creation of services for people with disabilities, but aims at full integration and inclusion of people with special needs, which means all tourists can be active participants in the tourism sector, regardless of their characteristics, abilities and needs

Beyond the design of the environment, the accessibility is related to the behaviors of its users and owners. According to Sophie Ferneeuw, 2005, it is only persons with disabilities for whom barriers becomes major obstacle but it is necessary to realize that every person, at some stage of life faces barriers like an elderly person, a pregnant lady and, the temporary disabled etc, all are vulnerable to barriers. Barriers not only make environment unsafe and cause difficulty to users but also causes space out of reach, denying people the opportunity of participation. The important concept for accessibility of environment is that of "trip chain". A typical trip consists of many links for e.g. to go to workplace from home, a person has: to go from home to sidewalk, enter a vehicle, go out of vehicle to sidewalk, reach the entrance of building, enter the building, move around in building and enter workstation. And each link can be further divided in more detail, so if only one link is not accessible, then the journey becomes difficult. (Ferneeuw, 2005) Same is the case for tourism and therefore barriers have been identified by Cameron, Foggin and Darcy, 2003 as those that are faced by people with various abilities at each stage of their journey and which can be identified and categorized through their tourism experience
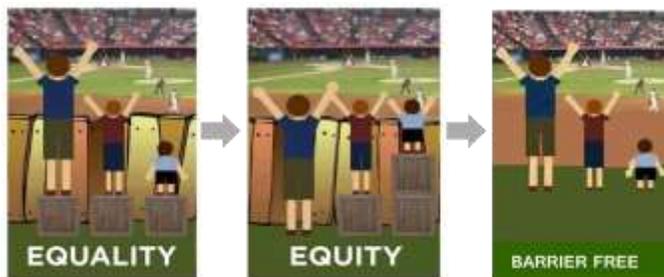


**Figure 1** Concept representation by comparing equality to integrity, equity to inclusiveness and barrier free for Universal Design approach. (Source: http://schoolsofequality.com/)

## Methodology

Tourists include all people with no discrimination of age, gender, nationality, linguistics, as well as physical impairment. They are sanctioned to provision of comfortable access at destinations. For the provision of barrier free mobility at these destinations, it is essential to list down the barriers faced by each profile while touring a destination. After identification of barriers it is required to mitigate those barriers by the help of universal design strategic framework. For the very purpose of identification and mitigation of barriers at the holy destinations, this study use multi method approach

based on state of art, review of literature, ethnographic methods of study for user mobility experiences, evaluative tool to conduct access audit, review good practices from International case studies.

## Data Collection and Analysis Techniques

This study uses multi method approach and majority of data vital to conduct study is primary, therefore primary data collection techniques like interviews, surveys and structured and non-structured observations are used. For understanding of street typology light road inventory along with traffic volume count at mid-block of important street is performed. For the identification of barrier, majorly adopted technique of access audit is used. Primary data for the purpose categorizing tourist in different profile is collected, structured observation surveys. Survey format is prepared by identifying the categories in which profiles are to be categorized, parameters for categorization include gender, age, group size, luggage, dressing style and also physical impairments. These parameters are selected on the basis of previous studies done by researchers and best applicable in the context of city along with on ground check. As Haridwar is city with religious tourism it shows diverse culture and ethnicity, the culture parameter was not taken due to limitation of study. In any empirical study, population is represented by samples and for this purpose an accurate sample size is to be chosen. Estimated average tourist influx for a day for year 2014 is calculated to approximate 35,100 tourists each day (derived from tourist influx data provided by Uttarakhand Tourism Development Board). So for representing a population size of 35,100 at acceptable significant level of .025 with variance estimate of 1.5 and acceptable absolute error 0.1 is calculated to be 738 samples. For the conduction of this study 200 tourist's groups were studied which comprises of 864 tourists in total contributing to 864 sample size which is greater than required 738 sample size, for more accurate results. This survey was conducted at important spots with high significance in term of tourism and mobility of tourists, e.g.Har ki Pauri, Bus stand, Railway Station, and important junctions. As this survey is conducted to find category of tourists therefore it gives the flexibility of time of conduct of survey. This survey was conducted in identified route of study area with random sampling techniques used without pre fixing the number of samples to be calculated at each spot. To identify the challenges faced by tourist in their journey to destination and

for identification of barriers in mobility, semi structured interviews with tourists is conducted. For this study purpose, semi structured interview was opted as the best possible way to get the opinion of tourist without any boundaries, so that undiscovered aspects can be recognized and taken in account. This is subject to qualitative analysis for interpretation of problems in their trip making as recognized by them and their trip chain behavior.

This interview is conducted with basic questions related to trip chain movement at destination and in city, and the major part of this interview constitutes of accounting travelers' issues and barriers faced in mobility. This format of informal interaction and use of semi structure interview methods helps in better understanding of the thinking of tourist and reason for their certain travel behavior at destination can be estimated. This interview type helps a lot in recognizing barriers that may be overlooked in case of structured interview. This is a process involving lot of time and good communication skill. Sample size of 35 is chosen with 7 samples collected at specific chosen location for the purpose of semi structured interview, five major tourist location were chosen in study area that includes all the major Ghats According to Bhakuni, 2007, the first step towards access improvement is to undertake an access audit which means audit that are done on site to determine the existing condition of path or route based on the principle of least restrictive approach. The purpose of this audits is to provide an assessment tool to check the accessibility of streets and Ghats through accounting information about the infrastructure on the route by simple techniques of clicking pictures and walking on the route. This is preliminary type of audit to account the accessibility of study area through graphical depiction with help of images and based on observation studies. Access audit generally follows principle of universal design and therefore uses the parameter that follows maximum principles of universal design. However, for this study access audits are carried out by no pre fixed parameters, but the only one, that it is to be conducted with view point of barrier free facility. If there is any kind of barrier noticed, that is clicked and taken into account with help of captured images. It is conducted on all the important points as Ghats, bus stand, railway station, streets joining these important locations and all the public infrastructure facilities located in study area. This is used as an important tool to identify the barriers faced by street users in study area. Secondary

data is collected through various sources like internet, books, research papers and government offices. Documents on best practices in accessible tourism, methodology and approach used by different studies for the provision of barrier free transportation system, gaps of studies and further historical account of case study, and data like tourist influx data of case study by Uttarakhand Tourism Development Board (refer annexure) and imagery of IKONOS satellite image for preparation of base map of Haridwar city is collected through secondary sources. The data analysis is done quantitatively with help of tools as ArcGis, Ms excel etc. and done qualitatively through interpretation of behavior and answers given by the interacted tourists along with image interpretation.

## Street Typology

Haridwar has major destination at Har ki Pauri and ghat areas surrounding it. The streets connecting Har ki Pauri and nearby ghats are of utmost importance as they are the most travelled path by majority of tourists visiting Haridwar. The two important streets connecting the bus station and railway station to the famous destination "Har Ki pauri" are the upper market stretch and the lower market stretch. The upper market stretch caters to 1251 number of pedestrians per hour whereas lower stretch caters to 757 numbers of pedestrians per hour during the peak hour of an average day. Both of the streets are denied access to the 4 wheelers to cater to smooth traffic flow; however public autos and battery rickshaws are allowed to share the street with other traffic.

Upper market area has average right of way of 15 to 18 m throughout the stretch, and majority of the building along the stretch has elevation of G+ 3 floors with heritage value attached to these buildings. The market stretch caters to 1521 PCU per hour of traffic volume which surpass the capacity of the two ways two lane street of 1200 PCU per hour as per IRC 106-1990 guidelines. The upper market street is not only overloaded with the traffic volume but the major constituent is NMT users (30%) after two wheelers (67%).
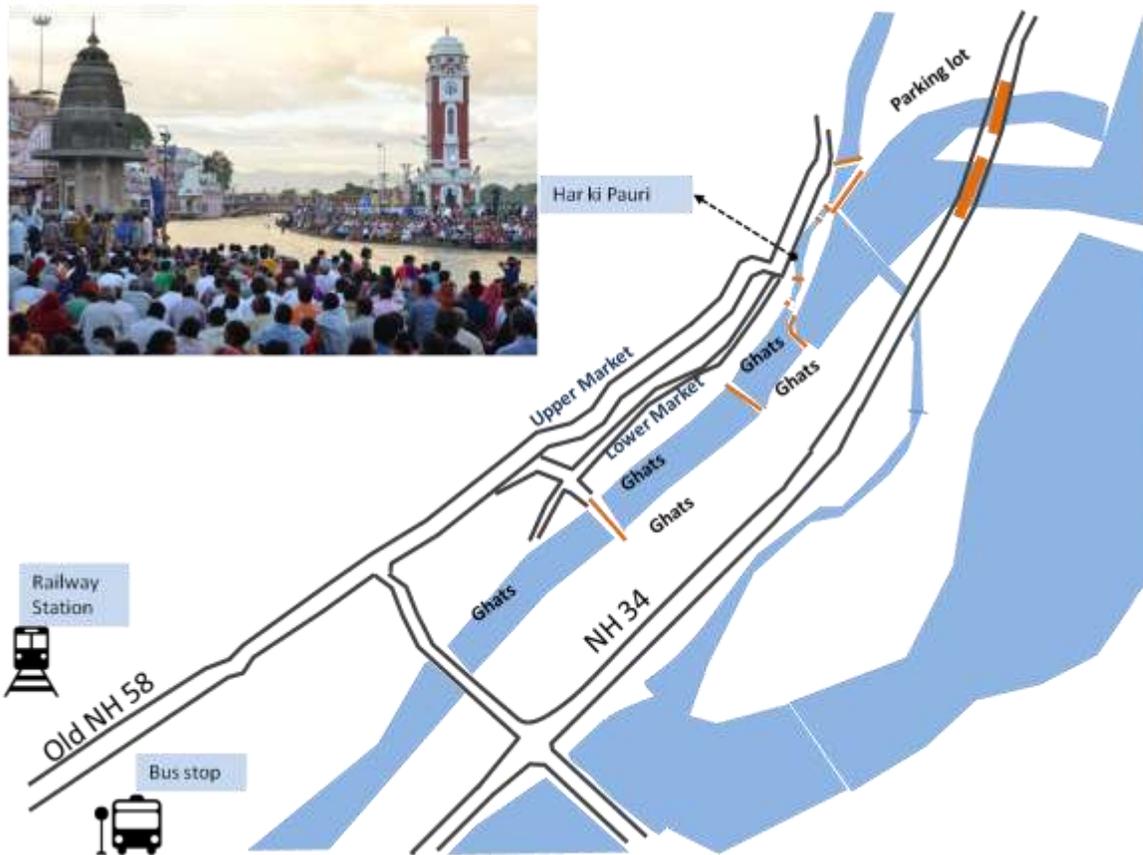
**Figure 2** Schematic map representation of connectivity to major tourist destinations from bus station and railway station and a view of "Har ki Pauri" (map not to scale)(source:author)

The lower market area has street with right of way ranging from 6m to 8m, catering to 757 number of pedestrian per hour along with 205 p Cu per hour of traffic volume during on peak hour of an average day. The streets in both the stretch are encroached by extension of shops along the street and with street vendors in the rest.



**Figure 3** Upper market street view. (Source: Shashank clicks)

**Traffic volumemovement through the lower market**

- bicycle
- cycle rickshaw
- horse cart
- cycle lcv
- battery rickshaw
- two wheeler
- car

1%
14%
8%
5%
56%
16%
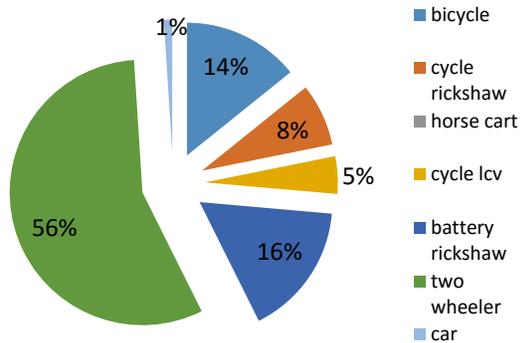
**Traffic volumemovement through the upper market street**

- bicycle
- cycle rickshaw
- horse cart
- cycle lcv
- battery rickshaw
- two wheeler
- car
- tempo
- lcv

1% 1%
12%
18%
67%
1%

.
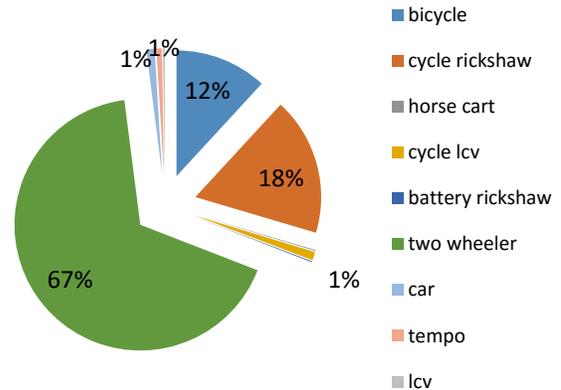


**Figure 7**Lower market street view (Source: author)

Tourists face wide range of issues of mobility in these streets which range from frequent interactions between pedestrians and vehicles to lining up of pedestrians waiting for a vehicle to pass through for clear movement (especially at lower market stretch). The core issue at these streets not only lies in vehicular and pedestrian conflicts but also in the shopping pedestrians at a halt on the street for purchasing from the shop along the streets. Encroachment, high rise stairs at 80% of locations for bridge and street access, illegal parking, and encroachment of public space by tourists hindering the movement of other tourists are the general problems for at ease movement of all the tourists

## Findings from structured observation of tourists

The sample size of 864 tourists was studied through structured observation survey method. Based on the data collected, It is found that male and women percentage differ by mere 2% in use of space at Haridwar, as 51% are male users and 49% are female users, representing equal contribution of women tourist in space usage at the. pilgrimage hub. In terms of age group, the majority of tourists range in between 16 to 45 year of age which contributes to 57% of all tourists. The rest percentage range is of children (13%) and elderly (30%) contributing to 43% in total. The major reason of children being in little percentage shows their dependency on the adults to visit the place. The interesting percentage of children and elderly which differ only by 14% from the majority age range show the immense need of interventions in study area needed to enable them wholly to access the space and enjoy their trip.

**Representation of the male to female percentage of tourist visitors**
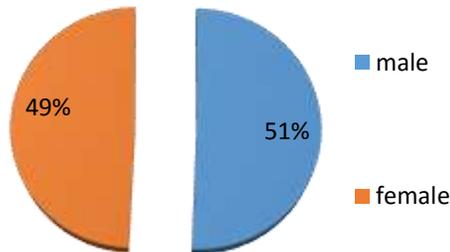


**Percentage representation of three major age range** (below 16, 16-45 years and above45 years of age)
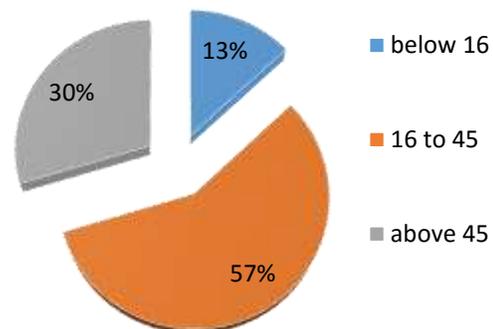


**Proportion of various group size visiting the pilgrimage hub**
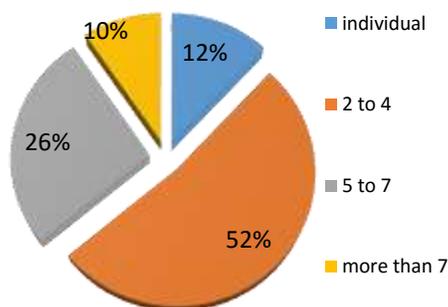


On the basis of data, it is evaluated that majority of tourists i.e. 71% of the total travel in group size ranging from 2 to 4, whereas only 12% tourists are individual visitors of destination. Group size is evident in role of freedom played by each individual and generally in the range of group size from 2 to 7 person the level of individual freedom tends to be lesser. However individual and group size of more than 7 may

generally lead to greater sense of freedom. The varied group size demands the varied needs to be fulfilled in term of safety individuality and sense of freedom at tourist place during their trip movement.

A lot of diversity in the luggage type carried by individuals is perceived at the destination. Luggage varied from no luggage, small hand bags, Light weight shopping bags, medium size backpacks, heavy weight suitcases and bags to heavy sacks etc. Findings of the data show that majority of individuals i.e. 58% of total carry heavy luggage with them on their own without the support of any luggage carrier facility. Luggage plays an important role in mobility of tourists, as heavy luggage carried for lengthy distance by tourists can result in exhaustion and can restrict the ability of tourist to travel further.

If we compare a heel and a sport shoe and think about going for a trek, which one among the two we may choose? definitely the sport shoe, but, what about the heel then? Why we don't go for heels? The answer to it is pretty simple i.e. sport shoe as it may make us feel more comfortable and enable to complete the trek than heel. This example can be related to the dressing style for occasion and places, however the cultural and societal norms may differ in opinion and the dressing style may be borrowed from our family and cultural and religious traditions which may or may not lead to disable environment at times for people. In the study area huge variation are observed in the dressing style of tourists. For ladies it varies from the western wear like jeans-top to the mixed ethnic wear like skirts, suits etc., to the traditional dresses like saree and other cultural and regional dresses. Majority of the female tourists i.e. 49% followed saree as their dressing style, while 38% salwar suits and the remaining 9% and 4% of female tourists were noticed to wear jeans and other dressing styles. Similarly, for men it varies from range of western dresses like shirt-pant, tees etc to mixed ethnics like kurta-pajama and traditional as dhoti

**Proportion of tourists with heavy/medium luggage to very light or no luggage**



- with heavy/medium luggage
- with very light or no luggage
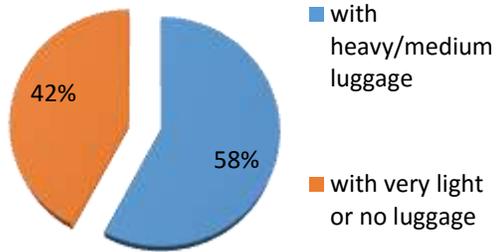
**Proportion of the various dressing styles followed by female tourist visitors**



- saree
- salwar suit
- jeans
- other
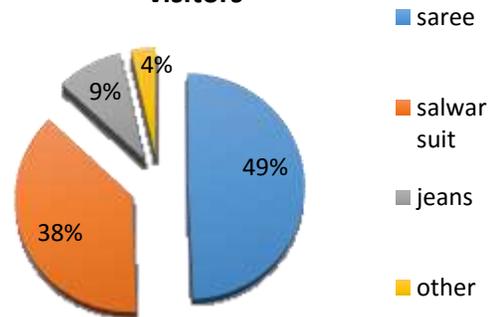
Physical abilities of an individual are a dynamic term which varies from different age to different kinds of physical impairments in an individual. Physical impairment can be the issue of an individual but the disability is the issue of an environment. On the basis of varied physical abilities, our observation study shows that tourism of city caters to the diverse profile of individuals with different abilities. There is huge range of diversity noticed in tourist profile on the basis of their physical abilities. The range includes from visual impairment, physical impairment, hearing impairment and the elderly population with different impairments and pregnant ladies to individuals with multiple impairments whatever that is accessible for an individual may not necessarily be the same for others with different physical abilities



(a)



(b)

**Figure 8** (a) Woman carrying heavy weight sack on head and a light weight bucket in her one hand, while holding the sack by other, which makes her nearly impossible to use her hand for the time being.; (b) Two women in veil, wearing saree, rushing through a busy street near Vishnu Ghat in Haridwar. (Source: author)

| (a) | (b) |

**Figure 6** (a) Three individuals with total visual impairment walking on street near Har ki Pauri, with the help of each other for way finding.; (b) Lady walking on lower street market with her face completely covered in veil as her dressing style.(Source: author)

Findings and Issues sensitized by tourists at destination

1. Ladies face the issue of changing facility at Ghats. However, Mahila ghat (ladies changing facility) is present, which is exclusively for ladies only, but still many ladies are unable to avail the facility because:

    a. Majority of tourists are unaware of the presence of Mahila ghat (separate bathing and changing facility for women.

    b. Religious proceedings strict them to take the holy dip at particular ghat other than Mahila ghat.

    c. Interior of Mahila ghat is in highly dilapidated condition and difficult to use.

2. Many are unable to use toilet facility present at ghat because

    a. They are not able to locate toilets on Ghats

    b. Even if few have been able to locate facility, still they feel disable to use the facility due to following reasons:

        i. It was found that few people from economically weaker section do not wish to pay for the facility.

        ii. Even men from higher income groups do not like to waste time in finding toilets at times as it involves efforts to search for it.

        iii. Ladies generally search for facility but unhygienic condition of toilet at times forces them to refrain from using it and prefer using toilets of hotels or restaurants.

iv. In either of toilet present on streets and Ghats there is no accessibility so that a person who is physically challenged can make use of the facility alone. Even with the help of any assistance from other gender, the facility is unavailable as there are no family or unisex toilets present for such conditions

3. Lack of proper guidance and accessible information system at the hub

   a. There are instructions written in very small letters in Hindi on Ghats, which nearly go unnoticed because of its font and few those can't read Hindi language are unable to follow them.

   b. There are so many hoardings present in the streets which are majorly advertisement of shops; that they cover all the street and important information if present goes unnoticed at times by tourists.

   c. All instructions are written in Hindi majorly and few in English. The one who is not able to read finds it difficult to follow them. There is hardly sign and symbols used for important services like toilets or drinking water etc.

   d. There is no guide map available to tourist. Even if available, tourists who may even wish to have one can't locate the office to get it.

   e. There is no guiding system present on the streets to help tourists in way finding and therefore they mostly depend on asking the way from other street users or shopkeepers.

   f. Majority of International tourists depend on books like lonely planet and internet sources for information before visiting city. Whereas many domestic tourists hardly use any information source before visiting the city

4. Access to clean drinking water facility

   a. Few tourists may not find river water at Ghats clean enough to bath, whereas some tourists are dependent on the same water for drinking purpose and they perceive it as the cleanest water in world as per their religious values attached to the river.

   b. Generally lower income groups and economically weaker sections are dependent on this water for drinking purpose because of lack of proper public drinking water facility at the hub

5. Lack of proper access to ghats for those with physical impairments along with children and elderly.

   a. Steps are slippery on the Ghats and few tourists above certain age or with some kind of physical impairment are completely dependent on assistance for taking the holy dip at Ghats.

6. Lack of proper baggage keeping or carrying facility nearby railway station or bus station or at the ghats.

   a. Tourists are forced to carry the luggage with them throughout the trip and even for religious procession as there is no safe public locker facility available near the centre of activities to aid tourists. As per data 58% tourists carry heavy baggage, this make their trip more complicated than enjoyable.

   b. In addition, tourists are forced to carry the luggage on their own as no trolley or bag carrying facility is available at the hub.

7. Others:

   a. Tourists are irritated by constant asking of many rickshawalas (taxi drivers) to escort them and about provision of accommodation services, as soon as they step out of Bus station or Railway Station. But few of tourists find it helpful.

   b. Tourists from economically weaker class generally know major facilities present at Ghats as they are much dependent on them.

   c. Tourists from middle income group and higher income group frown on the issue of beggars bothering tourists at Ghats. However much shockingly few tourists come to Haridwar for the core purpose of their survival by begging on Ghats.

**Figure 7** Representing identified stairs of important bridges on map. These bridges are used for connectivity purposes of Ghats and streets. Source: author. Map not to scale



**Figure 8** Staircase joining Ghat and Major Street. Riser is 17cm, run is 38 cm, height of side rail is 1 m. (Source: author)



**Figure 9** Representing one of the staircases of an important bridge. Riser is 17cm and runner is 27 cm. (Source: author)

## Conclusion

Based on above findings it can be inferred that the major issues for barrier free tourism experience at the pilgrimage city Haridwar are related more to the information system and basic facilities of infrastructure systems along with the design of it. The key issues which require immediate intervention are identified with the target user group as explained in the following table:

Table 1 Key issue of tourists experienced by majority of tourists and target group which are highly affected.

| Key-Issues Detected | Target groups |
| --- | --- |
| Changing Facility at Ghats | Women and Elderly age tourists |
| Access to Ghats and religious practice of bathing facility | All tourists but majorly elderly and children feel it unsafe to access |

| | |
|---|---|
| Access to Toilet Facility | All tourists but majorly women elderly unisex and person with physical impairment face it severely |
| Access to information: <br><br> a. *lack of information,* <br> b. *unclear information,* <br> c. *not-perceivable information and important* <br> d. *information lost in excess of information* | All tourists but majorly include people in large groups, illiterates, tourists from different state or country or belonging to different linguistic region, tourists with visual impairments face the impact severely |
| Access to clean drinking water facility | All tourists |
| Lack of baggage carrying and locker facility | All tourists |

The above issues and findings reflects the immense need of Universal Design interventions in principle approach to eliminate the barriers experienced by the various typologies of tourists identified at a pilgrimage centre. Issues aren't small or big in size but the similar small issue faced by a huge number and various profile of tourists at a destinations are worth to be taken care of to not only improve the experience of tourists at a destination but to enhance the image of city. According to Ron Mace, Universal design is 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. Whereas according to Elaine Ostroff, who identified UD as an approach to design that honours human diversity and addresses the right for everyone--from childhood into the oldest years--to use all space, products, and information in an independent, inclusive, and equal way. For the purpose of guidance to create Universal designed product, the 7 principles were developed by a group of researchers under Ronald Mace in 1997. These 7 principles are: (1) Equitable Use (2) Flexibility in Use, (3) Simple and Intuitive Use, (4) Perceptible Information, (5) Tolerance for Error, (6) Low Physical Effort, (7) Size and Space for Approach and Use

The principles against the issues are compared to represent the domain of issue where these principles are to be followed to achieve barrier free experience by tourists at the destination.

**Table 2** Critical domain of intervention and their relation with the principle of Universal Design to achieve that particular principle exclusively (Source: author with help of NCSU website for principles)

|  | Principles | Design is: | Interventions required in domain |
|---|---|---|---|
| Principle 1 | Equitable Use | Useful and usable by people with diverse abilities | Infrastructure related to space on ghats, streets and bus terminal and railway stations. |
| Principle 2 | Flexibility in Use | Accommodates a wide range of individual choice of use and abilities | Changing facilities  Drinking water facility and toilet facility at destination |
| Principle 3 | Simple and Intuitive Use | Easy to understand, regardless of user's experience, knowledge or language skills. | Information System |
| Principle 4 | Perceptible Information | Able to communicate necessary information effectively to user regardless of ambient conditions or sensory abilities of user. | Information Systems |
| Principle 5 | Tolerance for Error | Able to minimize hazards and adverse consequences of accidental or unintended actions. | Ghat bathing facility |
| Principle 6 | Low Physical Effort | Used effectively and comfortably, with a minimum of fatigue | Street infrastructure, intervention for baggage care support, |
| Principle 7 | Size and Space for Approach and Use | Able to provide appropriate size and space for approach, reach and use regardless of user's body size, posture, or mobility. | Infrastructure facilities like drinking water kiosk, toilets, parking facility, street infrastructure, access to bridge, movement of Non-Motorised Transport users |

The strong policy framework with strategies and design based interventions geared up by the approach of Universal design are needed to solve these issues and provide all tourists with the spiritual and divine experience for which they visit the pilgrimage destination.

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## Books published



Inclusive Design for Rural Environments

Gaurav Raheja

# Enabling Environments for the Mobility Impaired in the Rural Areas

An Inclusive Design Approach for Rural Contexts

Raheja

LAP LAMBERT
Academic Publishing

Foreword by
Prof. Edward Steinfeld, Director, IDeA Center, State University of New York, USA

Centered upon the lives of individuals with mobility impairments in low resource rural contexts of India, it explores a fairly simple yet largely ignored question. How do people with movement disabilities live and negotiate disabling barriers in their performance of Activities of Daily Living (ADLs) in diverse rural contexts? Based on ethnographic and visual methods of documentation, it demonstrates how simple and affordable accessibility solutions can be provided to overcome the most serious barriers to independence and social participation as faced by the rural disabled. This work significantly contributes to the knowledge base in inclusive design, a human centered design philosophy that addresses the needs of people who are often ignored or marginalized. Contextualizing Universal Design theory towards low resource environment remains one of the key highlights of this book. It ideates an understanding on 'accessibility for all' in rural contexts, taking the discourse towards enablement and inclusion. Disability and rehabilitation experts, inclusive policy makers, social thinkers, design researchers, architects & planners may find a useful insight into this lesser researched area.

Dr. Gaurav Raheja is an Associate Professor of Architecture at the Indian Institute of Technology(IIT)Roorkee with over ten years of teaching and research experience. Design for inclusion of persons with disabilities, elderly & children form his core research interests. He is a DAAD Fellow and a recipient of the Mphasis Universal Design Award 2010.
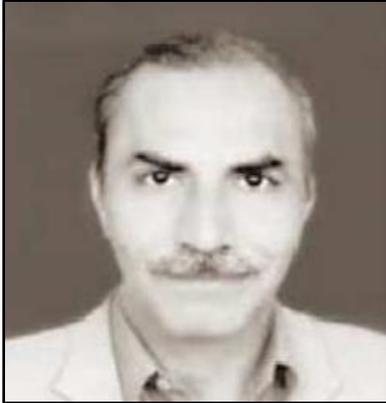
# Letter from the Chairman's Desk
## By Sunil Bhatia PhD

Astronaut was interviewed by television journalist and his answer was "from the space a line is visible on earth surface and it is Great Wall of China". Electricity went off and I could not watch his complete interview but I brood about wall and my curiosity surged 'what was the objective of China wall that had thickness where four horse riders in row could travel on top of it , was designed for protection from enemies'. Fort and jail walls are unusually thick and high which cannot be easily destroyed and scaled by enemies. Enemies counter the design of static strong wall by devising trick with the use of bamboo pole to jump over using it as dynamic wall. Who guided them to design such a huge wall and what made the enemies to penetrate and devise innovative techniques for overcoming blocked of the wall.

I recall the motivational phrase whenever someone is facing mountain task that is to be executed and it creates fear of failure then wise man around him generally advice by quoting 'Rome was not built in a day. It was build brick by brick'. Brick is basic element of wall. When person is overambitious then they say 'other side of the wall grass appears greener'. Memorial wall has inscribed the name of the soldiers who died defending inspire the common people for sacrifice their lives for the nation. 'Individual survival is insignificant when compared to collective survival.' Army and its

armors are creating a wall that protects the territory. Civilians use the wall for graffiti as expression for ruling classes. Role of wall has various purposes and these changes with technologies and the progress of human index.

General perception about design of wall in common people is that it has three prime functions- protection, support and defining territory but in fact it is beyond something it is not yet noticed by us. My curiosity to know about the wall design suddenly arises and I start thinking about origin of it and realized dense jungles' trees and plants or huge river current or vast sea or mountain were in fact acting as wall preventing and created hurdle in primitive people movements . Even some places they encountered dust storm or heavy snows were as wall. As I look at my dress it astonish me that it is one kind of manmade wall. Layers of dress are like thickness of wall designed to meet cold weather. Thin dress means meet the challenges of other conditions. A person was driving motorcycle wearing helmet is another kind of wall design to face eventualities since these can be fatal due to head injuries. As I think over it I experienced limitation of my mind was with blocking as wall.

There are various type of wall designed in human history and its journey from intangible to tangible is interesting and later on its role changed to static as well as dynamic . At some places we introduced slanted wall as ramp and vertical wall is visible everywhere but horizontal wall is noticed by a few as roofing is also common. Sometime walls are designed as submerged as we did in well or in drainage design .In initial stage of human history, designed of wall was invisible and his all senses were limited but we created wall around him for protection. As senses located some untoward

warning signals it alerts the minds for actions and majority of the times it swing into actions for protection of life but sometime danger is so close and staring his minds slips to shock and failing to take any actions is nothing but wall. Overcoming of this limitation by ancient man was beginning of journey of progress and what we are today because they learnt the art of expansion of limited wall around us by introducing telescope for overcoming limited eye sight , running is overcome by automobiles and reach out to person by mobile phones for audio and video and ultimately all these exercises in totality converted us to modern person.

Primitive man was more relying on his physical strength that was the biggest and reliable asset for protection and he used hand power to keep away enemies not to harm him was the first wall. They even designed vocal sound for creating wall that was invisible and people used to shout in mass for instilling fear among enemies that exercise was protecting as well helping in hunting. Later they designed drum beat sound along with unusual vocal sound as wall for protection for fearing animals for hunting as well from protection from enemies. In modern time, we have designed ultra sound devices that produce sound to keep away rodents, insects as wall. Even entrance door of the airport opens as sensor senses someone presence. That is the combination of invisible wall in the form of sensor and opening of glass door is visible wall. In fact sensors are extensively used for creating an invisible wall and as it senses any intrusion it activates the predefined designed activity. Even we have designed the electronic jammers for blocking the frequencies of mobile phone in hospital or sensitive areas as wall. Later his knowledge improved and he then used dry strong log as wall by holding resting on earth and as sense enemy is eyeing for attack he lifts log for hitting or his

actions instil fear in enemies and it made them running away from him. That knowledge of bamboo is still in practice and we erect the cloth tents for as wall and concept of concrete column in architecture is extension of it for laying roof. Design of umbrella is wall design based on same principle. That was era of design of visible wall for protection.

Knowledge of fire added new dimension in wall designing and used smoke as wall not hurt by bees as goes closer to beehive for honey or other poisonous insects. Even to control the jungle fire they learnt the art of controlling damage fire by ignite fire on other side of jungle for creating a smoke wall that blocks the supply of oxygen needed for fire and due course of time fire came under control. The same word is used for protection of computer from external sources was designing the firewall either with software or hardware or both.

Man started living in caves to meet the challenge of vagaries of weather as well it protected him from enemies. As he learnt the art of blocking the entrance of cave not to allow others to enter he placed heavy stone covering cave gate and as he needed to come out by sliding the stone. They might have designed a log and moved in such a way it either instil fear among enemies or hitting might hurt they runaway to save their lives. Placing a heavy stone gave us dynamic door and it was better arrangement than holding the log all the time as dynamic wall for protection. Later log was replaced with bow and arrow because of power of striking helped in expansion of his range, so his wall as protection. Iron Age witnessed sword and shield since these were designed as wall. Till date security personnel uses sand bag as wall from attack of enemies in gun fighting. Man started agriculture and found flour is difficult to swallow because of

limited saliva that allows powder to stick to wall of his food pipe that is resisting for it to slide down to stomach and functioning as temporary wall and as we gulp water it helps in sliding to stomach. That idea to compensate limited saliva we add water in flour and prepare dough outside mouth that does not require much saliva and this technique prevents generating wall in food pipe.

Covering of face by hands is social wall to avoid embarrassment or not to exhibit love for others. It is still in practice in modern time at the time of marriage where bride wears special dress that has veil for covering her face. In religious place they allocate the place that is known as confession wall  to relieve the sinner to turn to normal .It is natural in human ear to developed wax sometime it is strong that not only lowers the intensity of hearing but when completely blocked it works as a wall. Deafening sound with explosion we cover the ear with both hands and design a wall to protect the eardrum from damaging.  When man learnt the art of domesticating animals for his own benefits that time he covered the eyes of the horse not to see other side and focus on his limited visibility was acting like a wall.

Fencing through bushes or barbed wire is one kind of wall to protect the territory. I remember football match where player are designing human wall not to allow the ball to reach goal awarded as free kick to opponent.  Our eyelids are natural wall that close involuntarily as these experience foreign elements are about to strike. It is inbuilt character of nature to protect the future where pregnant animal is surrounded by others animals of the herd by creating wall and sacrifice life but not allow her to be prey. In plant kingdom, outer surface of the stem is harder and these behaves as wall for bearing

load as well protect from attack from external forces. Osmosis basic principle is a porous film or screen act as a wall for allowing high density liquid to travel lower side and it is visible when we drop of fresh grape into water it squeezes where raisin swallows water and inflates. Coconut or fruits are protected under shell is nothing but wall. Birds designed the nest that is in fact wall around to protect the newly born chickens from attack of enemies. Honey bees design the abode by using wax wall for protection. In animal kingdom not to be prey they releases gas or urine to get away and it works as wall for protection. Man uses concept of wall around the fruits for enhancing its shelf life by using wax layer on fruits and refrigeration not to allow bacteria attack the fruits. Similarly in absence of refrigeration idea Europeans were relying on natural product like Black pepper for marinating as wall for enhancing the shelf life of the animal meats. There was concept of belief among some tribes that one day their king and queen would resurrect and their bodies should be protected and burial was designed in pyramids and cover the dead bodies with chemicals not to allow the decay was nothing but wall. Clouds cover the sun and prevents sun light to come to earth is another wall that is natural phenomenon. Rain settles the dust and man learnt of creating a wall for dust not to mix with air by sprinkling water. Ponds, lakes, river banks have natural walls to hold the water. Our first man made natural design of wall was carrying the water by joining both palms and extension of it is various utensils made with different items. Some fruits stored the natural mineral water as we see in coconut within the hard shell and it works as wall. Pickles are designed by creating the wall by spices and oil that does not allow to attack of bacteria that can damage the content. When police open fire or use plastic pellets or tear gas or

water jet, in fact they are creating wall not to be attacked by unruly masses. When a man expressed his words in pictorial form and it was the origin of writing and as we used paper and ink for designing the book we also designed cover with hard substance to protect from termite was nothing but wall. In achieve these people keep the manuscripts under wrap of red colour clothes that red clothes proves to be wall for manuscripts.

Automobile bumper is like a wall protect from impact of accidents. Similarly air bags open and save the lives of the passengers as vehicle met with an accident. Windscreen also behaves as wall. Even packaging industries design the wall around the content not to be damaged during transportation for meeting the handling eventualities.

Goggle or welder shield is another wall protect from light. Lamp shades are wall designed around electric bulbs. Insulated wire is wall protect from shock. Circuit breaker is another wall that protects. Stabilizer creates wall to meet the challenges of surge and high voltage and protect from damage. Lubricants are wall to protect from wear and tear of machines. Flexible rubber wall are designed for sound by pressing in horn. With the era of cinema a new concept of wall generated and it was special white cloth for projector of true colors of the  motion picture. As talkies era began, it required listening of proper sound for everyone that helped us in designing acoustic wall.

Doors, window and curtains are dynamic walls. At certain places they design air curtain which act as wall for preventing enter foreign elements. Interior or exterior enamel painting of the house is

nothing but wall over wall. In architecture level difference is one kind of wall where sitting person at lower level cannot see inside of the higher level and to counter difference in level we design ramp. I treat flooring as horizontal wall. If floorings are supported with special sign tiles that helps in walking the visually impaired. Even in street we were laying baked bricks and later cemented as horizontal wall. Slant wall helps us in climbing vertical height as we design steps for staircase. Mesh walls allows the ventilation and prevents insects to enter. Moving wall concept came to the existence with design of escalators. In the beginning they designed pulleys to lift and later with electric motor. Key pad of mobile or computer or typewriter is nothing but wall has number of keys with moving bricks. It was similar to ventilator that opens and closes in wall for sunlight and air.

Fountain or water cooler creates water wall that cools the nearby area. Insulated walls help in designing vacuum flask for maintaining temperature. In coal mines, fire accidents are high because of presence of highly inflammable gas and it catches fire with little spark. To counter Davis designed a wall that never allows fire to catch the fire and he improved the design of wall on fire lamp and we called it Davis Lamp. Mosquito net, repellent, purifies are creating walls and protecting us from insects attack. Mattresses and even bed sheet or blankets are one kind of wall. Knob of LPG or water taps act as wall as we closes not to allow the water flow. Red traffic light warns the drivers not to cross and it behaves as wall but green light is open wall and yellow light is ajar wall.

We have designed various products for family planning and basic principle remains the same of creating a wall either by rubber sheath

or creams. Bandage, band aid and medicinal cream works as wall against infection for better and speedy recovery. Immunization is a wall to fight and resist the attack for diseases.

I am thankful to Dr. Gaurav Raheja DAAD Fellow ,Associate Professor Dept. of Architecture & Planning & Joint Faculty Centre for Excellence in Transportation Systems Indian Institute of Technology(IIT), , India . He has great appreciation for our little efforts for making our earth planet better and accepted our invitation for special issue as Guest Editor. He has selected articles of different authors who are either executing the concept of universal design in specific areas or discussing the scope where it is yet to address. Theme of the special issue is 'Mobility for All'.

*Enjoy reading*

*With regards*

*Dr. Sunil Bhatia*

*Design For All institute of India*

*www.designforall.in*

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# Forthcoming Issues

## July 2017 Vol-12 No-7

**Mark Watson** was chosen from an international field of Designers to participate in the International Society of Councils of Industrial Design Interdesign Workshop, a two week workshop looking at Smart City solutions to social, environmental and economic problems in Mumbai .

Mark has a 15 year long engagement with Design in India presenting at leading Design Conferences on Design Thinking and Experience Design and is currently adviser to the Indian Design Festival.

Mark Watson MDIA Managing Director Design Providence http://www.designprovidence.com.au Lead Partner Design Thinkers Group Australia http://www.designthinkersgroup.com/

Co-Founder Indo Australian Design Research Alliance

## August 2017 Vol-12 No-8

**Imma Bonet** of Design For All Foundation, Spain will be the Guest Editor . After high education in Pharmacy in the University of Barcelona, she developed her professional carrier in the field of healthcare, associations, education, accessibility and Design for All.

She has been responsible for the development of many national and international projects in her position as: Design for All in Spanish Universities, The Flag of Towns and Cities for All, Auditing system for the use of Design for All in companies, etc.

She has been also lecturer in several Spanish Universities, design schools and congresses.

## September 2017 Vol-12 No-9

**Prof Lalita Sen, Ph.D.** Department of Urban Planning & Environmental Policy Texas Southern University Houston, Tx 77004 will be the Guest Editor.

## October 2017 Vol-12 No-10

**Dr. Sushma Goel,** Associate Professor at department of Resource Management and Design Application, Lady Irwin College, Delhi University has been teaching from past more

than three decades. She has authored subject manuals, modules for distance education, text book, etc. She has several publications in national and international journals to her credit. She has been supervisor for 60 masters' dissertations and 9 doctoral researches (some ongoing). She had been principal coordinator for projects with DDA slum wing, DST, Ministry of health and family welfare, Ministry of social Justice and empowerment and Delhi University Innovation projects.

# New Books

## Universal Design in Higher Education:



"Fresh, comprehensive, and engaging, *Universal Design in Higher Education* is expertly written, thoughtfully crafted, and a 'must-add' to your resource collection."

—STEPHAN J. SMITH, EXECUTIVE DIRECTOR, ASSOCIATION ON HIGHER EDUCATION AND DISABILITY

**Harvard Education Press**

**UNIVERSAL DESIGN IN HIGHER EDUCATION**
**From Principles to Practice, Second Edition**
EDITED BY SHERYL E. BURGSTAHLER • FOREWORD BY MICHAEL K. YOUNG

This second edition of the classic *Universal Design in Higher Education* is a comprehensive, up-to-the-minute guide for creating fully accessible college and university programs. The second edition has been thoroughly revised and expanded, and it addresses major recent changes in universities and colleges, the law, and technology.

As larger numbers of people with disabilities attend postsecondary educational institutions, there have been increased efforts to make the full array of classes, services, and programs accessible to all students. This revised edition provides both a full survey of those measures and practical guidance for schools as they work to turn the goal of universal accessibility into a reality. As such, it makes an indispensable contribution to the growing body of literature on special education and universal design. This book will be of particular value to university and college administrators, and to special education researchers, teachers, and activists.

**SHERYL E. BURGSTAHLER** is an affiliate professor in the College of Education at the University of Washington in Seattle, and founder and director of the university's Disabilities, Opportunities, Internetworking, and Technology (DO-IT) and Access Technology Centers.

"Sheryl Burgstahler has assembled a great set of chapters and authors on universal design in higher education. It's a must-have book for all universities, as it covers universal design of instruction, physical spaces, student services, technology, and provides examples of best practices."

—JONATHAN LAZAR, PROFESSOR OF COMPUTER AND INFORMATION SCIENCES, TOWSON UNIVERSITY, AND CO-AUTHOR OF *ENSURING DIGITAL ACCESSIBILITY THROUGH PROCESS AND POLICY*

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From Principles to Practice
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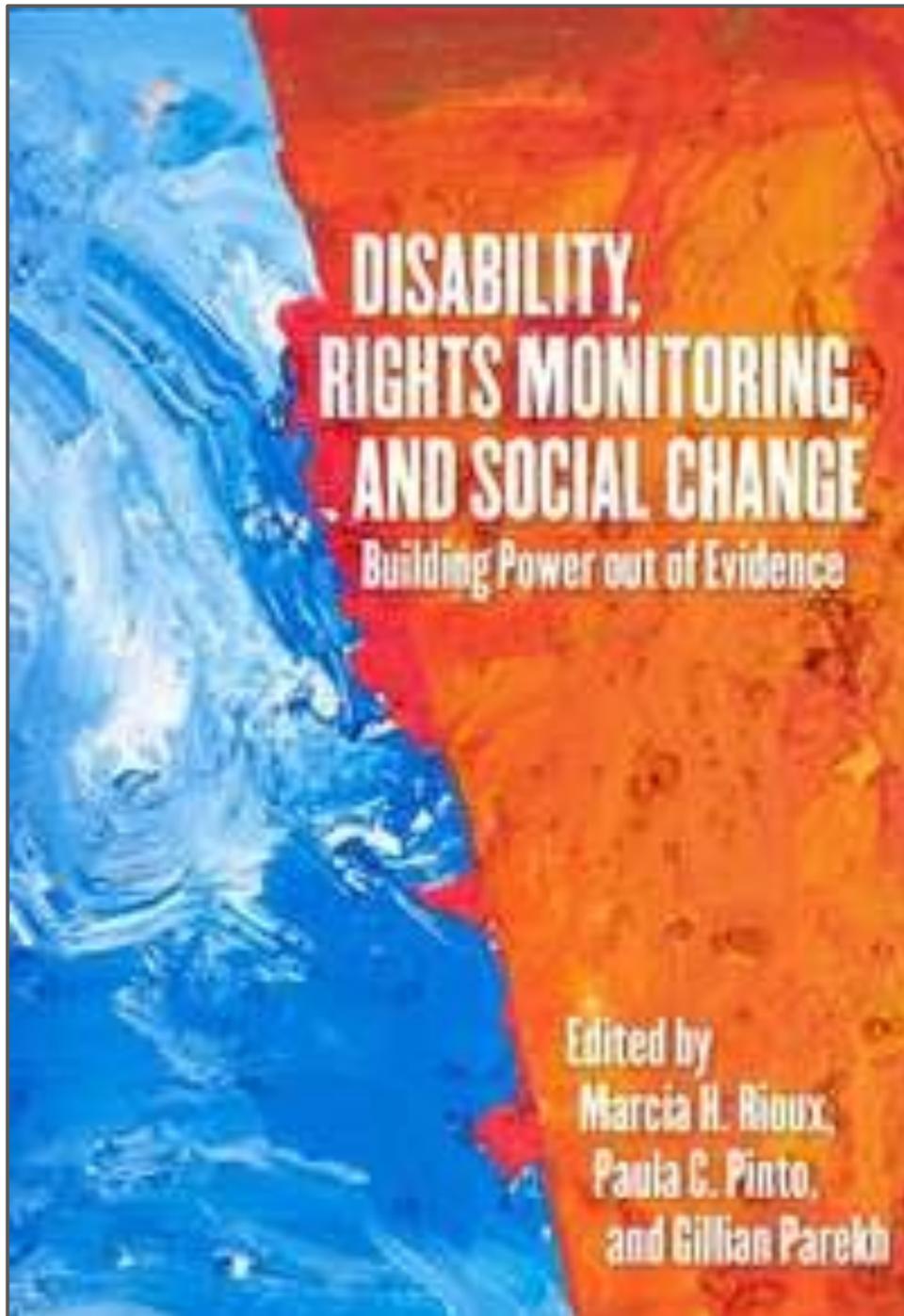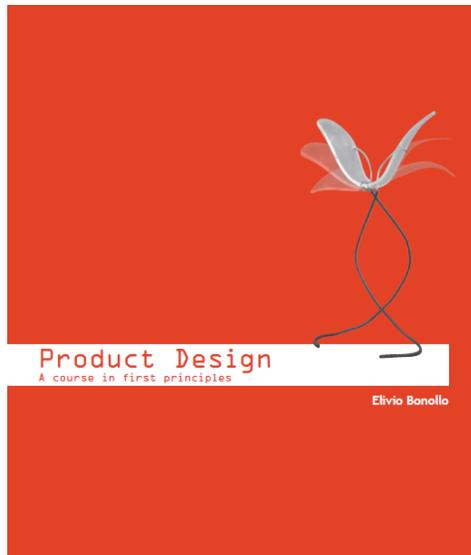
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## Product Description

In this book, Elivio Bonollo takes us on a 'learning journey' about design including a scholarly explanation of the characteristics and power of the design process. It provides valuable insights into the attitudes, knowledge and skills that underpin the design discipline at an introductory level of expertise, and has been developed to meet the needs of aspiring designers in many areas including industrial design, design and technology, art and design and architecture. Elivio uses an operational model of the design process - along with related educational strategies, learning outcomes and an ordered set of design briefs - to develop a systematic, problem-based method for learning design from a first principles viewpoint. The beauty of this approach is that it brings structured learning to aspiring designers whilst being mindful of diverse cultures and backgrounds. Each part of this book encourages self-expression, self-confidence and exploration: it is has been carefully designed to take the reader on a highly motivating journey of design thinking and creativity, supported by excellent sample solutions to design problems, lucid discussions and extensive references. These solutions, developed by design students, serve as novel examples of how to solve real problems through innovative design without restraining creative freedom and individual personality. The design learning method and strategies in this book will greatly assist design and technology teachers, students of design, aspiring designers and any individual with an interest in professional design practice.

I cannot recommend this book highly enough, it was a complete lifesaver throughout my undergraduate studies and honours degree and now continues to serve me well as I move into industry practice. The content is easy to understand and follow, providing a practical guide to understanding design principles and every aspect of the design process. It includes great project examples and reflects the wealth of knowledge and experience possessed by this accomplished educator. I have purchased multiple copies of this book for peers and would suggest any student who is studying a design discipline to pick up their own copy as this has quickly become the most useful book in my design collection.

Comment | Was this review helpful to you? [Yes] [No] Report abuse

★★★★★ A 'Must Have'.
By Amazon Customer on 7 April 2016

As a Design Education professional of many years standing, I endorse this book without reservation. It is comprehensive, lucid and above all, useful in a very accessible level at the coalface. Professor Bonolo has an enormous cache of experience as an engineer, designer and design educator and his experience is well demonstrated in this book. A 'must have' for anyone in the business of educating or being educated in the product design arena.

TAPPING INTO
HIDDEN
HUMAN CAPITAL

How Leading Global Companies Improve their
Bottom Line by Employing Persons with Disabilities

DIS ABILITY

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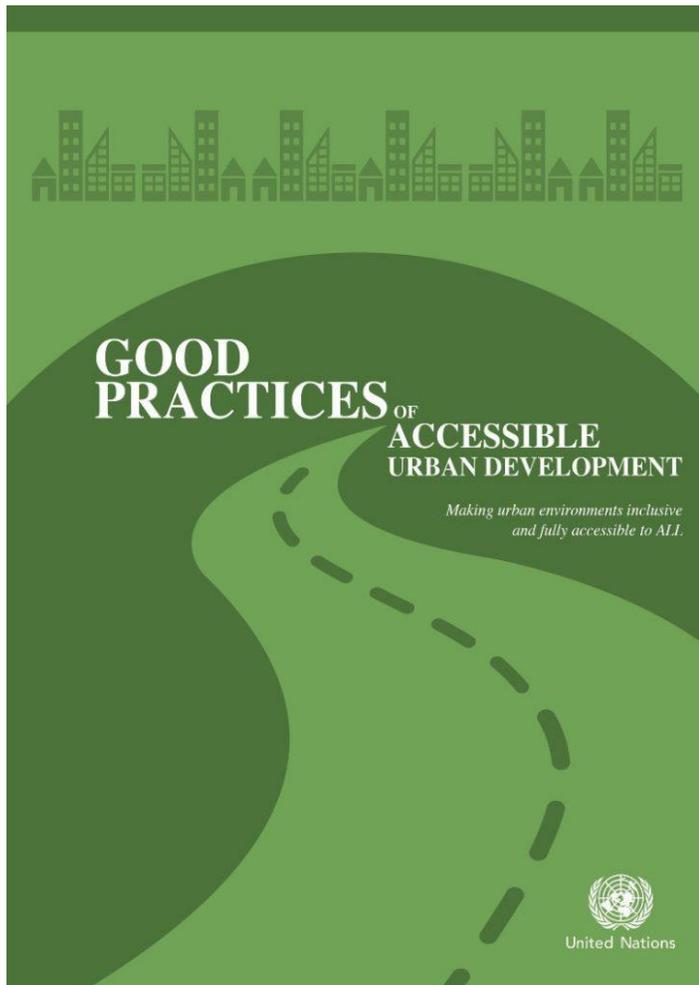
In light of the forthcoming United Nations Conference on Housing and Sustainable Urban Development (HABITAT III) and the imminent launch of the New Urban Agenda, DESA in collaboration with the Essl Foundation (Zero Project) and others have prepared a new publication entitled: "Good practices of accessible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

**FROM MODULARITY TO EMERGENCE**

**A PRIMER ON THE DESIGN AND SCIENCE OF COMPLEX SYSTEMS**

Chih-Chun Chen and Nathan Crilly

CUED/C-EDC/TR.166
Engineering Design Centre
Department of Engineering

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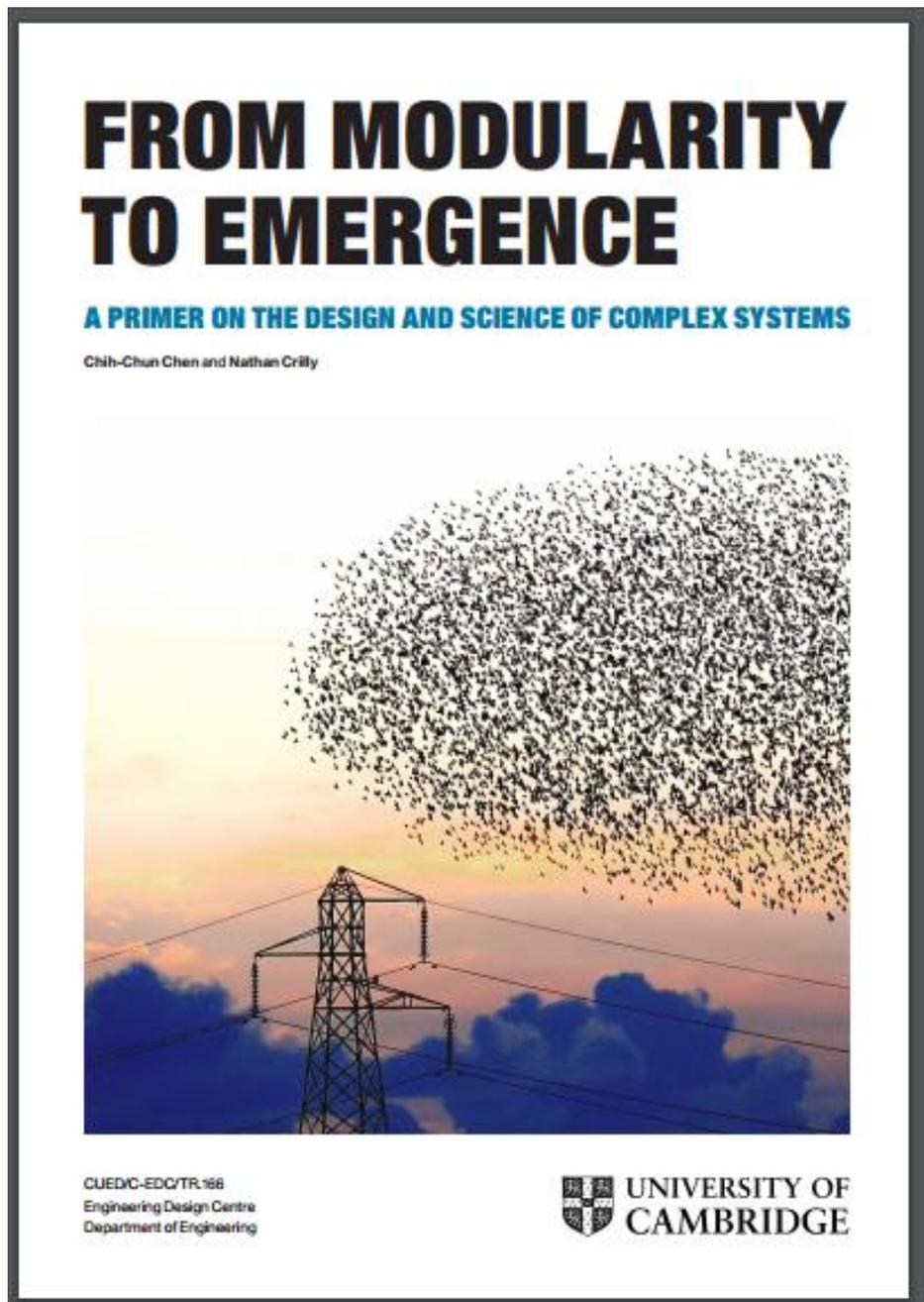
Dr Chih-Chun Chen and Dr Nathan Crilly of the Cambridge University Engineering Design Centre Design Practice Group have released a free, downloadable book, _A Primer on the Design and Science of Complex Systems_.

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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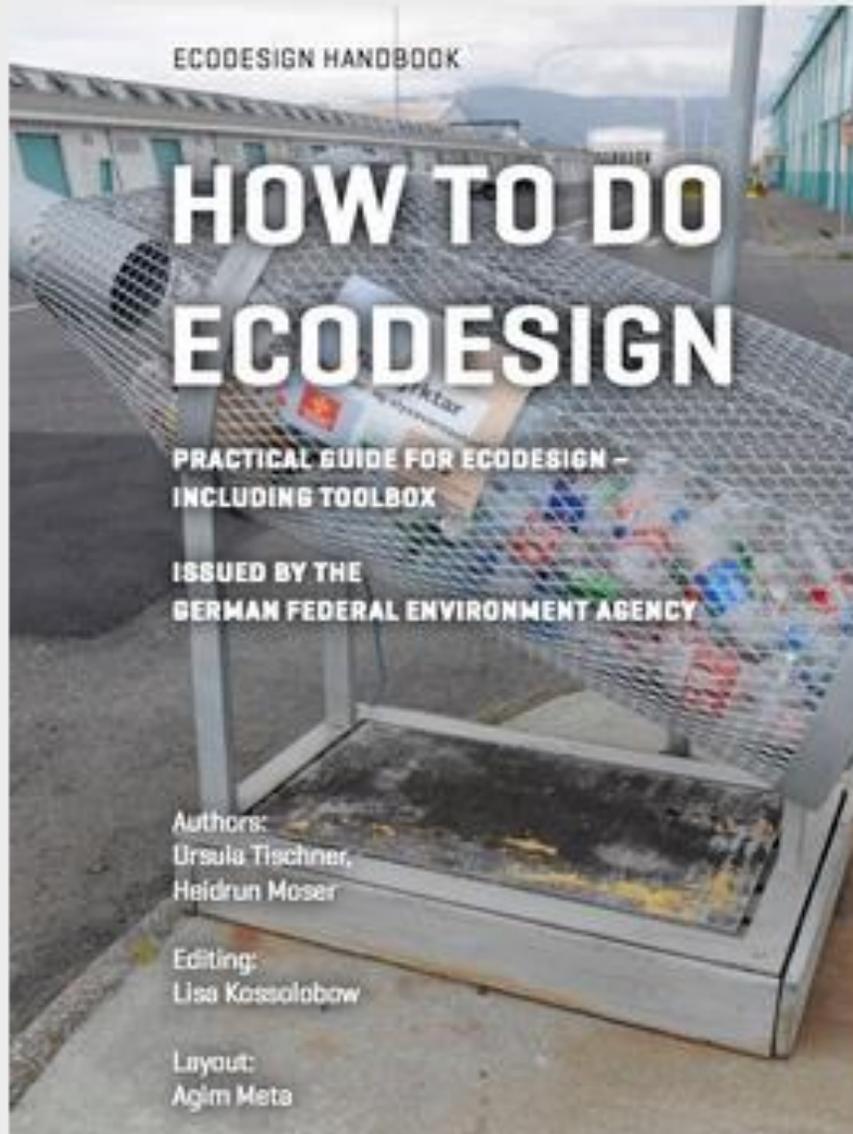
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Author: Ursula Tischner
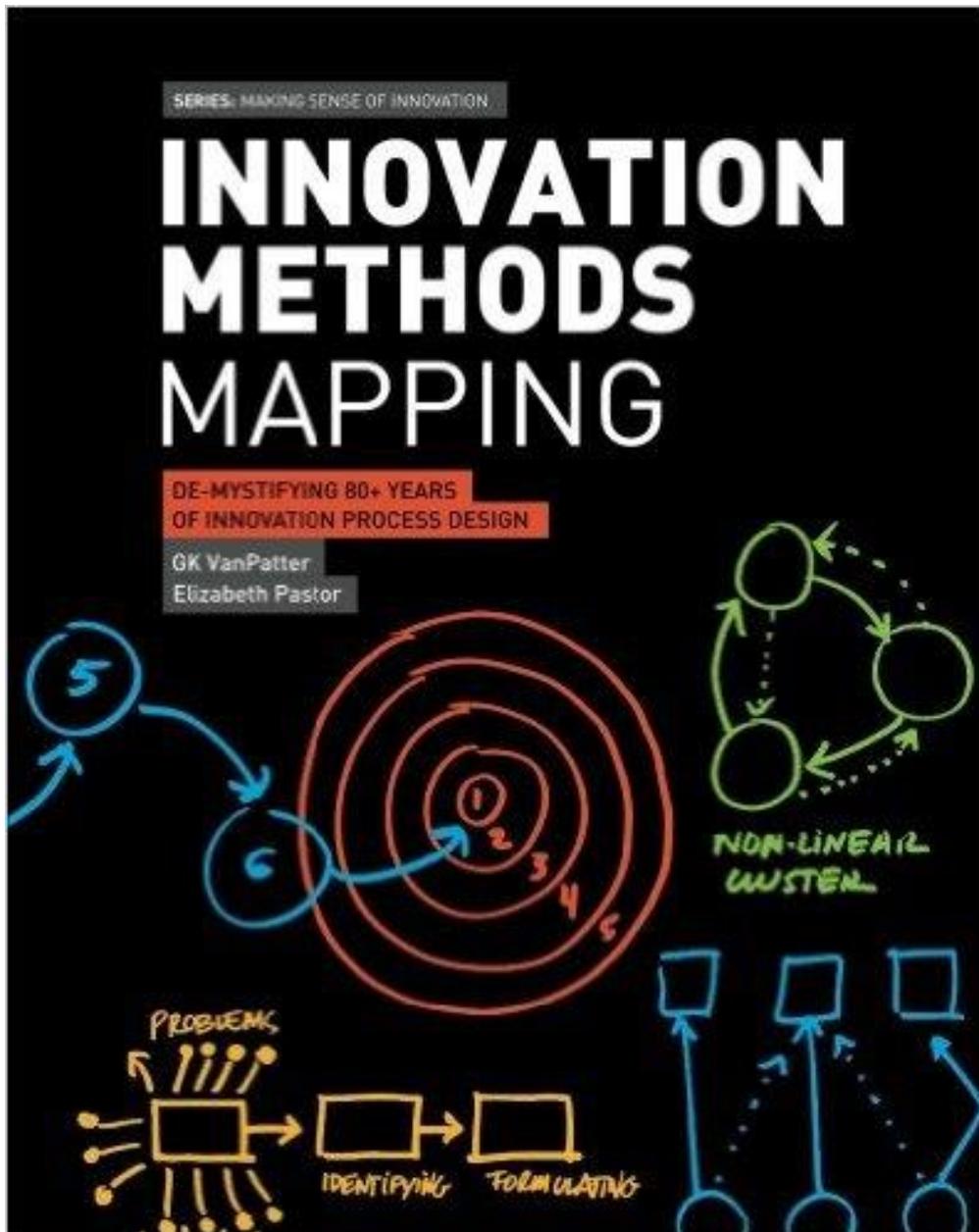
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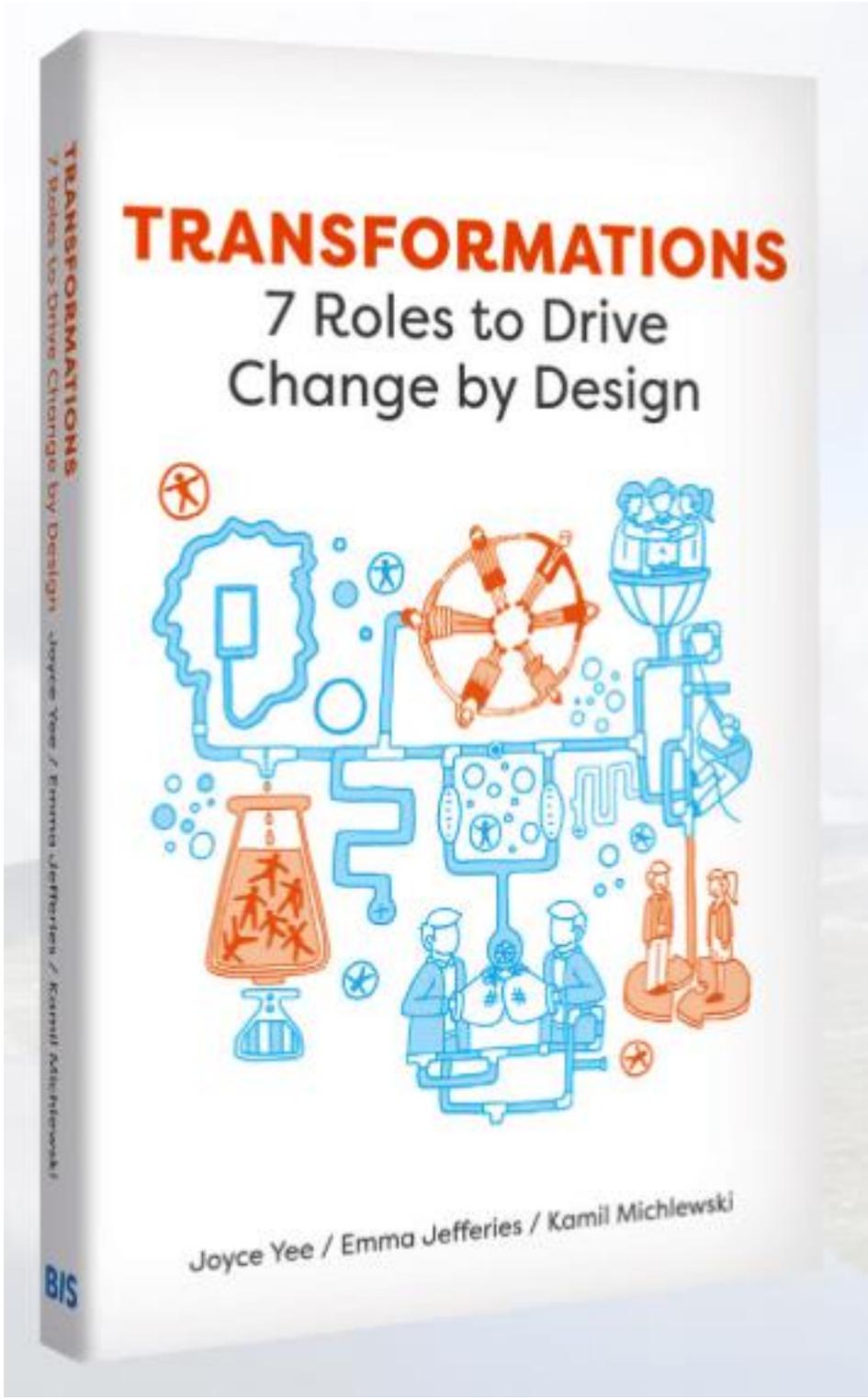
# Pre-book form

Thank you for your interest in the book, 'The Design Journey of Prof. Sudhakar Nadkarni'. Few limited copies will be available for purchase on the day of IDC Alumni Meet, on June 11th, Sunday, 5:30 to 6:30 pm. Rest of the book orders will start shipping June 25th, 2017 onward.

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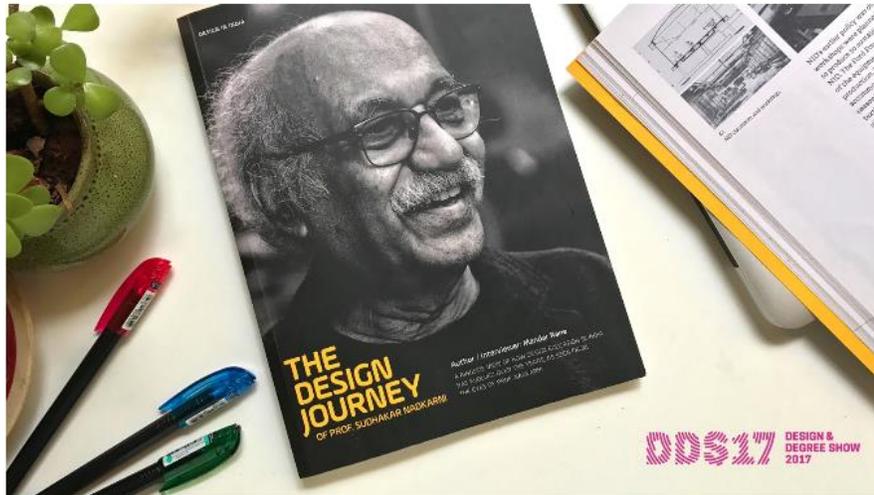


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# Appeals

**Design Challenge for Students and Young Professionals**

**DESIGN ENABLED DIGITAL TECHNOLOGY FOR SOCIAL IMPACT**

**Digital Technologies have become the driving force in today's world and our lives today are heavily dependent on these; how we interact, connect, communicate, shop, access various services like financial, healthcare, educational and entertainment etc.**

**At the same time, the world is also facing many challenges, such as financial and social inequalities, illiteracy, poor healthcare infrastructure, growing aging population, safety, security and climate change etc.**

**Being digital is not simply adding digital to our existing product and services but we need to make a paradigm shift in our imagination of digital technologies and enable them through the power of design & design thinking to address the significant social challenges this world including India is facing.**

**The Challenge**

**Design Challenge 2017, is a pre festival event of Delhi Design Festival and offers an opportunity to the students of design and technology and also the young professionals below 30 years of age, to imagine, ideate and showcase how design can enable digital technologies to address social challenges India is facing including:**

- **Poor Quality of Healthcare System & Delivery,**
- **Safety & Security of People, especially Children and Women,**
- **Financial Exclusion,**
- **Increasing Aging Population,**
- **Pollution Climate Change?**
- **Corruption in Public Service Delivery etc.**

**PRIZES**

Worth Rs.1, 00,000, (One Lakh) and free pass for the DDF2017 Event.

**WHO CAN PARTICIPATE**

Any student of design & technology enrolled as regular student and the young professionals below 30 years of age

**TEAM SIZE**

An individual or a team comprising of maximum 4 members can participate

**IMPORTANT DATES**

Registration: by July 15, 2017

Submission: by August 20, 2017

**FOR MORE DETAILS**

VISIT **WWW.USIDFOUNDATION.ORG/ddf2017**   or send a mail at usid@usidfoundation.org

2.



The Central University of Catalonia together with the Design for All Foundation collaborate to offer a Master's Degree in Management of Design for All. Coordinated by Francesc Aragall counts with several international reputed lecturers.

By means of study visits, tools and methods learned, projects developed under each Module, on-line discussions and the final project, the student will be able to manage all aspects of the implementation of Universal Design in all areas of the public and private sectors.

The course consist in 6 weeks training in Barcelona along the year plus tutored home work around the areas of interest of each student.

Schedule: From 2/10/2017 to 15/06/2018

Addressed to: Civil servants responsible for the implementation of UD policies at local, regional or national level. Graduated in architecture, engineering, landscape, design, geography or social sciences willing to specialize in Universal Design with the aim of becoming managers or consultants in UD for administration or companies.

More information in: https://www.uvic.cat/formacio-continua/en/master/master-management-design-all-1

I will appreciate if you can forward this information to people that may be interested.

Thank you in advance.

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# News

## 1. International Design for All Foundation Awards 2017

## Winners Announced



**On 18 May 2017, during the gala dinner of the 1st International Congress of Active Tourism for All, in Sant Antoni de Calonge, Girona, the Design for All Foundation award ceremony took place. See pictures**

**For the 8th edition of the awards, the Foundation awarded a total of 36 projects/products from 13 different countries as "Good Practices 2016" as they had met the assessment criteria. These Good Practices were then assessed in terms of their relevance, methodology, outputs, impact and innovation by an international jury to select the five winners of the trophy 2017. Four Special mentions were also given.**

**Winners 2017**

**Category: Spaces, products and services already in use**

- **Mímisbrunnr Climate Park 2469 - Our times' knowledge source in Jotunheimen is accessible to everyone (Oppland County Council) - Norway**

- **EVA Facial Mouse (CREA Software Systems and Vodafone Spain Foundation) - Spain**
- **Accessibility to religious heritage in five temples in the Historic Center of the city of Puebla (Re Genera Espacio and @ 0.0 Arquitectos) - Mexico**

**Category: Projects, proposals, methodologies and studies**

- **On Thin Ice - Emergency and Disaster Preparedness for Persons with Disabilities in Canada's Arctic North (GAATES) - Canada**

- **aim4it-Accessible and inclusive mobility for all with individual travel assistance (Wiener Linien GmbH & Co KG) - Austria**

**Special Mentions 2017**

**Category: Spaces, products and services already in use**

- **Seable active holidays for physically and visually impaired people (Seable Ltd) - United Kingdom**
- **Sjöängen centre of culture and knowledge in Askersund (Askersund municipality) - Sweden**
- **Inland region universal designed by 2025 from vision to strategy (Cooperation between the regional county councils of Oppland and Hedmark) - Norway**
- **Travolta Suite Astoria7 (Hotel Astoria7) - Spain**

**Once again, the Foundation would like to offer sincere congratulations to all those who were recognised for their Good Practice and winners. We would also like to thank all those who attended the event for joining us on this event especially important for the Foundation.**

**(Source: Design for All Foundation, Spain)**

# Programme and Events



Graphic Design: Groupa Ee

Photo: Delfino Sisto Legnani.

## FARAWAY, SO CLOSE
**25th Biennial of Design**
**Ljubljana, Slovenia**
**25. 5.–29. 10. 2017**

The 25th edition of the Biennial of Design in Ljubljana is set to strengthen its role as an interdisciplinary collaborative platform where design is employed as a catalyst for change.

BIO 25, under the title *Faraway, So Close*, will be curated by **Angela Rui**, a Milan- and Rotterdam-based design critic and curator, and **Maja Vardjan**, curator of Museum of Architecture and Design (MAO).

In line with their focus on the humanistic side and expression of design, they will use the Biennial **to decode through design the effects** of environmental changes, asset migration, and reactions to the systemic crises.

In the face of the total failure of the theory of Positivism, we are now forced t**o confront the crucial and still largely hidden meaning** of the consequences of "post-modernization", for which the city seems to have lost its authority as the territory where we look to find the source of quality existence.

Small changes are already taking place and gaining ground, and new inputs are slowly modifying our urban and rural environments. New frictions emerge out of the co-habitation of remote meanings and contemporary habits, as we look for new territories to signify, places to re-inhabit, ancient relations to re-enact, basic coexistences to re-imagine. **Can this friction between distant conditions produce new scenarios for a different present time?**

Along with the main subject-themes of the biennial, BIO 25 will de-centralize and will be interpreted as **a shift towards new territories** to be seduced by research and discourse, as well as by the idea of an event with which to produce knowledge. In the age of super information consumed in real time, the challenge of a biennial becomes increasingly closer to real conditions of everyday systems; **to provoke and challenge the paradigms** related to design and architecture through their pragmatic application, acting as a "permanent work in progress".

Slovenia, in accordance with its geographical conditions, will perform as a paradigm to stimulate, discuss and test the status of this global shift.

## SAVE THE DATE FOR THE 25TH BIENNIAL OF DESIGN

Open Call          12 May -  5 July 2016
Kick-off event   15 September 2016
Process             Autumn 2016 – Spring 2017
Exhibition          25 May – 29 October 2017

Typography Day 2017

Department of Integrated Design,
University of Moratuwa, Sri Lanka.

23rd - 25th Feb 2017
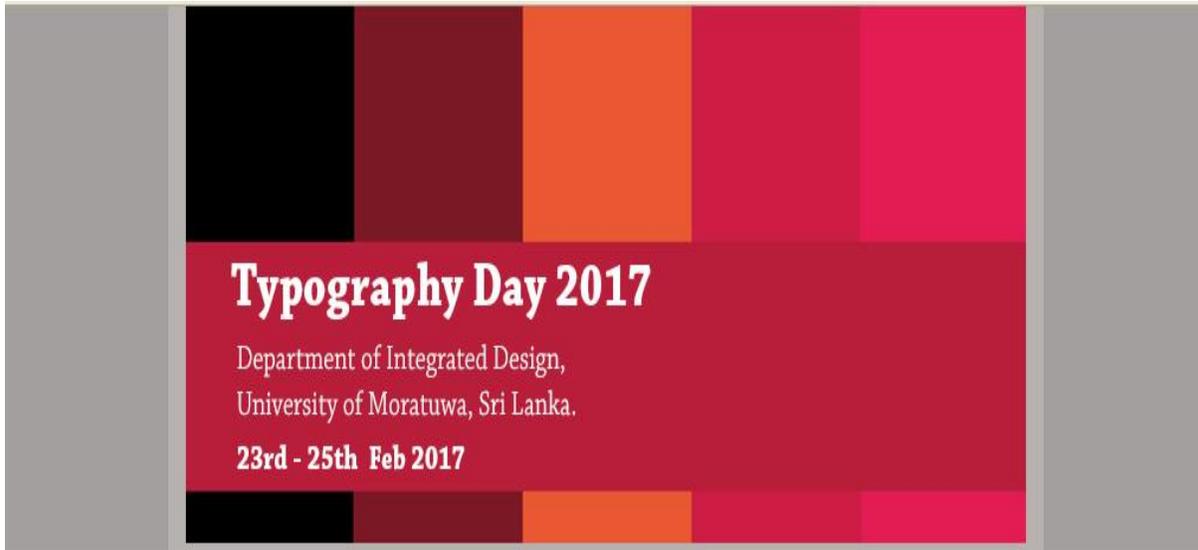


**DESIGN EXPERIENCE** is an initiative conceived by designers, made possible through designers and directed to designers.

We organize **a one-week intense seminar in Barcelona** where we explore the main concepts of Office Management, Project Management, Teamwork, Customer and Space Psychology, Creative Process, Sustainable and Ethic Design.

Important Barcelona designers will open the doors of their offices for us, will show us their construction sites and will tell us about the way they work.

We organize visits and round trips in the most important factories, showrooms, retails, places and sites in the area of Barcelona.
We discuss in a design environment about the most advanced topic about the design process



 6th IFIP TC.13 International Conference on Human-Computer Interaction - INTERACT 2017

Theme: Global Thoughts, Local Designs
**at IDC, IIT Bombay25-29  September, 2017http://interact2017.org/**

# UIA Awards 2017

The UIA Launch the 'Friendly and Inclusive Spaces' Awards 2017

**RIAI**

**FRIENDLY AND INCLUSIVE SPACES AWARDS**

**uia›**

**ENTER**

RIAI Awards Administrator

·THE BERKELEY PRIZE 2017

Essay Competition
Travel Fellowship Competition

## ARCHITECTURE REVEALS COMMUNITIES

### 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: 25,000 USD; 5,750 USD first prize; Multiple prizes
Travel Fellowship Competition: Stipend and airfare; Multiple prizes

### 2017 JURORS

**Sangeeta Bagga-Mehta**
Architect; Professor, Chandigarh College of Architecture, Chandigarh, India where she has conducted multiple collaborative student workshops focused on the examination of urban landscapes, environmental design and social issues; Internationally-recognized figure in modern heritage conservation and urban social history studies of Chandigarh; and Member, BERKELEY PRIZE Committee.

**Mark L. Gillem**
Architect (FAIA) and Planner; Professor, architecture and urban design, University of Oregon, Eugene, U.S.A.; Director, School of Architecture's Ph.D. Program and the Urban Design Lab; Director of the International Association for the Study of Traditional Environments (IASTE); Principal of The Urban Collaborative, LLC, Eugene; and author of *America Town: Building the Outposts of Empire*.

**Omar Khattab**
Architect; Dean, College of Architecture and Chair of the Department of Architecture, Kuwait University; Responsible for major design projects including the Care Centre for the Mentally Disabled and the Kuwait Autism Centre; elected representative on the managing board of the RIBA Gulf Chapter; and co-author of *Cities in Transition: Transforming the Global Built Environment*.

**Faiq Mari**
Architect; Former student, teacher and BERKELEY PRIZE Associate Teaching Fellow, Birzeit University, Palestine; current Fulbright scholar at the University of Michigan, Ann Arbor, U.S.A., studying the role of the built environment under settler colonialism in Palestine; Second Prize, 2013 BERKELEY PRIZE Essay competition; and Member, BERKELEY PRIZE Committee.

**EXPLORE ONLINE: WWW.BERKELEYPRIZE.ORG**

te of India

'Reimagining Aesthetic Unfolding – From Conditioning to Awakening'



**Future Architecture platform**
Call for Ideas 2017

**11/15/-1/9/2017**
Future Architecture call for ideas is open to all
who wish to participate in the Future Architecture
program cycle throughout Europe in 2017. The
platform invites emerging creatives to apply with
the ideas, visions and projects they consider
important for the future of architecture. **Deadline
is 9 January 2017**!

## INTERNATIONAL VISUAL METHODS CONFERENCE 5
## VISUALISING THE CITY

### 16 - 18 AUGUST 2017
### SINGAPORE
### WWW.VISUALMETHODS.INFO

The phenomenon of cities is an increasingly important aspect of the everyday life of individuals. The United Nations reports that as of 2014, 54 percent of the world's population live in urban areas, with that proportion rising to 66 percent by 2050. Asia and Africa are projected to contribute the most to this growth. Cities come in, and are engaged with, on a variety of scales, shapes and interactions. From global cities to urban neighbourhoods to the bedrooms of our informants, from walking to sensing to mapping the city – the ways in which we have seen, experienced and documented cities are myriad.

In this 5th instalment of the International Visual Methods Conference, we seek papers, presentations and performances that critically examine the city through visual methods. However, we also welcome proposals for topics not directly related to urban life, but nonetheless encompass visual methods.

### CALL FOR PANELS, PAPERS AND OTHER CONTRIBUTIONS

Hosted in Singapore, itself a unique blend of city and state, we welcome presenters from a wide range of disciplines, from the arts to social sciences to STEM subjects – and particularly encourage interdisciplinary dialogues. Specific themes include, but are not limited to the following

- Critical Perspectives on Visual Methods
- Visual Methods for Urban Areas
- Walking, Sensing and Experiencing the City and other Spaces
- The Science and Technology of Visual Methods
- Mapping Everyday Life
- Visualising the Unseen
- Visual methods as an Agent of Change in the City
- Visual Methods in Teaching and Learning
- Open Stream

SUBMIT ONLINE BY JAN 2017 AT
WWW.VISUALMETHODS.INFO/CFP

IVMC 5
VISUALISING THE CITY
16 - 18 AUGUST 2017
SINGAPORE

## Call for Papers - COINs17
## 7th International Conference on Collaborative Innovation Networks
## "Resilience through COINs"

COINs17 takes place September 14-17 in Detroit, Michigan.
This year's topic is "Resilience through COINs".
We invite you to submit your papers, posters, and proposals for workshops.

Global Architecture & Design Awards:
35 Categories | 105 Awards | 249 Nations

Rethinking The Future Awards 2017
# Absolute Global Architecture & Design Event
RTF Awards 2017 are the absolute Global Architecture Awards Event with 35 CATEGORIES and 15 ESTEEMED JUDGES across the Globe. It's your chance to be distinguished around the Best in the profession.

**The 2018 NKBA Design Competition Is Open**

**The 2018 NKBA Design Competition is open and accepting submissions. The annual competition provides the opportunity to recognize the association's designer members for their outstanding kitchen and bath projects completed between Jan. 1, 2016, and Aug. 4, 2017.**



## GCIC 2018

### Global Conference on Integrated Care

**2018** ADVANCE! Accelerating the Integration of Care

**1 - 3 FEB** | **Resorts World Convention Centre**
**Resorts World at Sentosa, Singapore**
8 Sentosa Gateway, Singapore 098269

**REGISTER NOW**

Early bird rates end on 30 September 2017

**ABOUT THE CONFERENCE**

The **Global Conference on Integrated Care (GCIC) 2018** is an international conference that will bring together clinicians, health and social care professionals and practitioners, and policymakers from around the world to share knowledge, experiences, ideas and innovations

# Job Openings

**1.**Job Opening

**Full-time Faculty Positions**

**Ajeenkya DY Patil University**

**DYPDC School of Design**

**DYPDC School of Design (www.dypdc.com) is a part of the Ajeenkya DY Patil University (www.adypu.edu.in).**

**Education at ADYPU is about learning how to think. Our faculty encourages students not become passive recipients of knowledge, but facilitate their path of discovery.**

**To support our innovative pedagogy we are planning to expand our faculty team. Applications are invited from experienced academics and professionals.**

**UI / UX Design**

**The candidate should have a portfolio of work in the domains of user research, testing and implementation methods. The candidate should possess thorough knowledge in one or more of the following areas: UX design, Internet of Things, Cross-Media Design, Immersive Environments, Rapid prototyping using industry standard tools (eg. HTML, Axure etc.).**

**Graphic Design**

**The candidate would possess thorough knowledge in one or more of following areas: Typography, layout and publication design, branding & identity design, interface design and information design.**

**The candidate should be formally qualified in Graphic Design and should be fluent in contemporary design methodology, theory, and practice. The candidate should demonstrate a broad knowledge of technology and emerging media related to design. Candidate should be adept at the utilizing research methods, user-centered design approach and strategy-based problem solving and should have the ability to teach all levels of graphic design from theory to practice.**

**Candidate Profile**

Candidates should demonstrate potential for scholarly activity through research and interdisciplinary collaboration. Candidate should have a body of creative work that may include exhibition, production, construction, and /or publications.

A thorough understanding of research and design methods; creativity and flair; strong project management skills; excellent communication skills; and a passion for inspiring and teaching are needed attributes.

**How to Apply?**

Remuneration will be commensurate with experience and present pay structure. Applications should include portfolio, a detailed résumé and cover letter including a description of interest areas and teaching philosophies. Candidates must apply online at **careers@adypu.edu.in**

## 2.Job Opening

We are looking for a Ux researcher for a period of 1 yr @ Bangalore (no remote working).
Any one interested do share profile at the earliest.

Tel : +91-944 9565 744
    +91-80 4095 3785
Email : **sam@neointeraction.com**

## 3.Job Opening

**TCS is looking for a experienced UX Designer for its client ERICSSON**

**Exp: 2+ yrs  Location : Gurgaon**

**Interested people can contact via my email nagrajmumba@gmail.com**

## 4.Job Opening

Years of experience: 8+ years
Educational qualification: Graduate or postgraduate in design or related field. Design experience also valid.
Skillsets required :  Visual Design, User research, wireframing, lo/high fidelity prototyping, HTML/CSS as optional skills, ability to work with onsite/offshore teams.
Location: Pune

Please share your resume with **yatindra_gupta@infosys.com** for more details.

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## Forthcoming Events and Programs:

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