Spatial legibility for Visually Impaired

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Abstract

Creating public spaces with a sense of wellness and inclusiveness for the visually impaired throws up distinct challenges. It is surprising that with the well-thought-out structures to support accessibility, a lot of these environments fail in helping visually challenged mobility and decrease independence by merely increasing cognitive load. Space syntax analysis for spatial legibility for Jawahar Kala Kendra (JKK), Jaipur, has been employed to identify and address design gaps. Key parameters such as connectivity, integration, and visibility were examined for appropriateness with visually impaired design through the use of the Depthmap software to accomplish better well being.

The significance of human-centric design strategies for improving public spaces for diverse users is discussed in this paper. The analysis of connectivity of JKK shows how ongoing streaks around a central courtyard also facilitated intuitive orientation. Integration analysis trace high integration spaces such as library and museum which stand as circulation nodes while the visibility graph analysis indicated the high visibility those areas having which can orientate users better. These results were validated by field study with participation of visually impaired users who preferred linearity in movement and sensory landmarks to move in total independence into surrounding rooms.

This research also emphasizes that inclusive design really means to public buildings through righteousness in design-it recommends that visual landmarks might be provided to help a visually impaired individual not only see but also feel things. This study closes with many practical suggestions on how public spaces can be inclusive and more accessible to people with limited vision, starting with JKK.

Introduction

Public spaces are the very first scenes where social interaction, well-being, and culture take place. However, most of the time these open areas that cater to the eye

leave some of the physically challenged groups-have provisions for-unsighted persons have a difficult time in manoeuvring around them. Designs in most cases are at-a-glance, complying with basic accessibility requirements without much care or thought given to more nebulous concepts of cognitive access or intuition in wayfinding.

The most recent trend in approach is the useful practice of designing human-centric spaces to accommodate the widely different needs of users, including the visually impaired. This paper looks at a work with Jawahar Kala Kendra in Jaipur, as executed by Charles Correa using space syntax analysis. The task is a structural and spatial analysis of some important aspects of the centre's planning, done in an attempt to understand which part in its design makes or breaks its usefulness as a space, apart from consumption of purely aesthetic results.

The main aim of the study is to find a way in which JKK can be designed intuitively so as to support and improve accessibility for visual-impaired people as well as reducing cognitive load for them so as to empower their mobility. Therefore, from the perspective of this research, this also aims at inclusive public space that brings in parameters like connectivity, integration, and visibility at JKK.

Research statement

How can Jawahar Kala Kendra be redesigned to enhance spatial legibility and intuitive navigation for visually impaired users?

Research hypothesis

"*Spatial legibility for visually impaired individuals can be significantly improved through intuitive design strategies"*

Gap of Study

It may exclude cognitive strategy without considering the fact that the prevailing guidelines on access largely address physical modifications. These constructions would include tactile paving and ramps, but none could cover cognitive contexts. Especially for those who are sighted and those who may be visually impaired, there are were few shared design strategies that could embrace the senses of touch, hearing, and space.

Need of the study

Building of public places most notably JKK is esteemed to be a central gate-way of spreading culture and encouraging social interaction. Awarding an inclusion of public places is seen to be the surest avenue whereby a person can enjoy good living as well as social integration. It is for this reason that this research addresses the development of human-centric design solutions catering to a multitude of sensorial needs while making possible improved usability of public spaces.

Objectives

1. To analyse the existing spatial configuration of Jawahar Kala Kendra using space syntax methodologies to identify design gaps that hinder navigation for visually impaired users.
2. To assess the impact of connectivity, integration, and visibility on spatial legibility and navigation ease for visually impaired individuals.
3. To conduct field experiments with visually impaired participants to evaluate the effectiveness of existing navigation features and identify challenges.
4. To propose practical, human-centric design interventions that enhance spatial legibility, reduce cognitive load, and promote independent mobility within JKK.

Methodology

The above research currently uses the analysis of space syntax using Depthmap software to improve spatial legibility for the visually impaired users of Jawahar Kala Kendra (JKK). The methodology includes a methodological set of below:

1. Site Analysis

JKK is the most recent complex construction of Charles Correa in Jaipur. It was designed by having nine houses, each house representing Navagraha of the cosmic system. Main programs within the architecturally defined territory generally utilize a central courtyard, surrounded cultural spaces, galleries, libraries, and an auditorium. In the study, information was collected on the spatial configuration within the JKK complex and the circulation pattern analysis to understand the design types.

2. Space Syntax Analysis Parameters

Connectivity: It is a measure of the direct connection of the space of each origin. High connectivity denotes smooth movement and less ideological burden of movement.

Integration: This measures how accessible and central different spaces are located in the entire layout. High integration spaces are more likely to be the key points of circulation.

Visibility Graph Analysis (VGA): it can capture the sightlines and visualize accessibility within a space. This means to identify areas needing additional sensory cues.

3. Field Experiment

A field experiment was performed inside Jawahar Kala Kendra with the participants being visually challenged. The participants were to navigate

individually through sensory cues or a combination of textures, sounds, and scents. Their level of cognitive load, ease of navigation, and any challenges faced while navigating were recorded for in-depth understanding and comparative analyses population & Sample

Subject Characteristics

. 4 women of age group 15-20

Experiment Location

This experiment was conducted at Jawahar Kala Kendra, Jaipur, which is a culturally and architecturally significant public place. Jawahar Kala Kendra was designed by the renowned architect Charles Correa. It is considered as an ideal in urban design, allowing complex spatial layouts that are helpful for studying sensory and secured interactions with space.

Methodology

Participants would enter the space at intervals of 5 minutes so as to avoid influences from each other, thus allowing for individual unbiased experience.

Participants noted any obstacles in navigation and likely through their feedback, possible roadblocks or confusing aspects in layout came to light.

Observers noted the pathways taken, as well as any notable structural (architectural features) and sensory (sounds, textures, etc.) landmarks that the participants used.

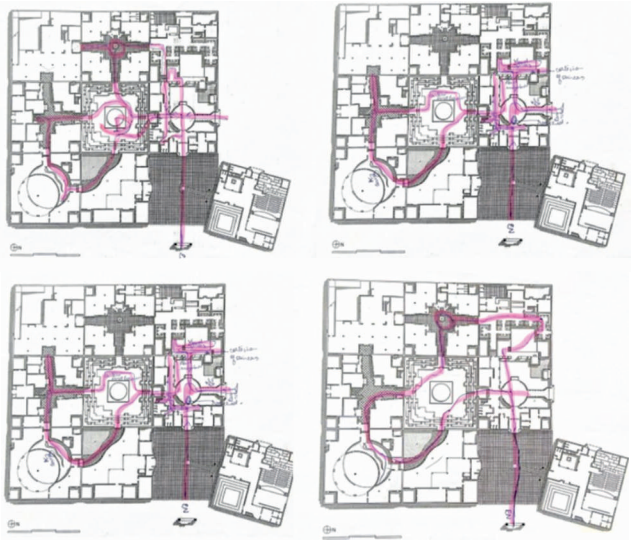
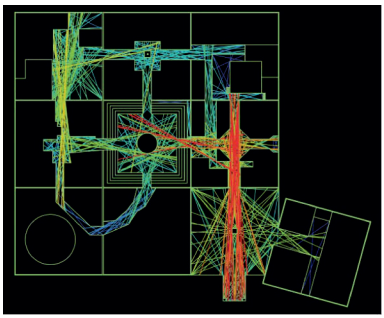


Figure 1 Circulation followed by visually impaired people at JKK

Space syntax analysis. of JKK found several points of insight:

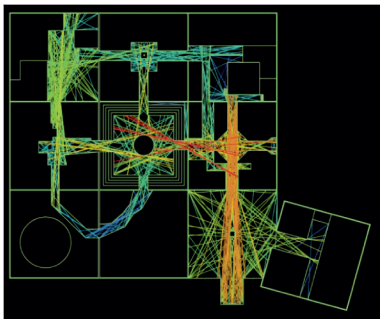
ATTRIBUTE	MINIMUM	AVERAGE	MAXIMUM
Connectivity	5	83.2083	175
Integration [HH] R3	2.96449	5.23398	7.44855

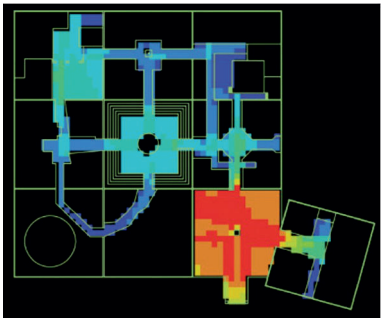
Table 1- Attribute summary



Connectivity. Axial mapping brought out the fact that there were some areas in JKK that were very weakly connected between inner courts and main access points. In those areas, connectivity could make the space more accessible and welcoming.

Integration. Visibility graph analysis showed that higher-integration spaces were seen as safer and more welcoming. Higher-visibility zones allowed easier navigation and greater social interaction.





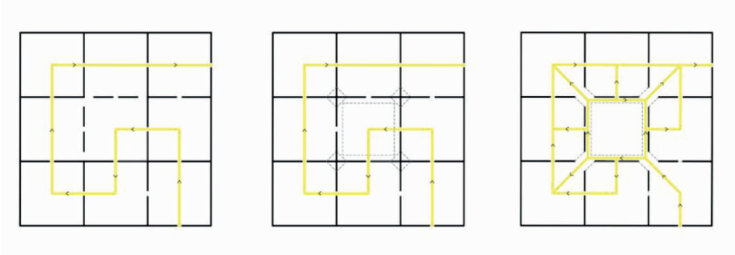
Visibility. The convex space analysis shows that some parts of the JKK lack enough visibility especially in secluded corners. It can be improved by eliminating obstructions and creating an open sight.

Design Recommendations

Design strategies

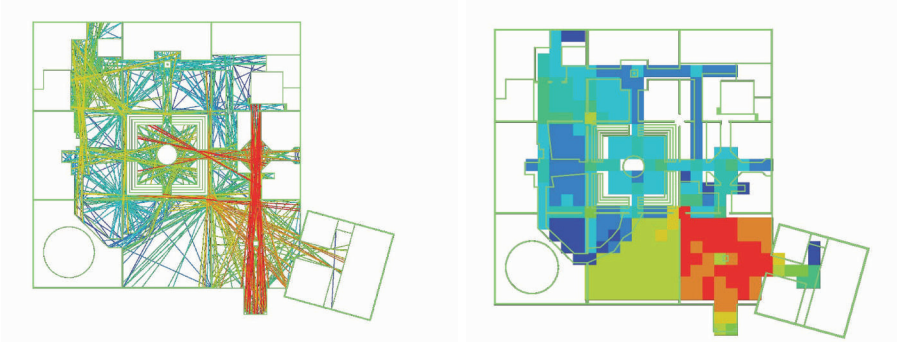
Conclusion from the dissertation findings, there are several recommendations to promote intuitive design in JKK as given below:

Strengthening of spatial connectivity to enhance integrity overall of the space: To achieve this, linkages are to be made from central courtyard to all the sides so that continuous circulation pathways surrounding the courtyard are developed at key junctions with some opening.



Space syntax Scheme

1. Continuous Pathways: Linking the central courtyard to all surrounding areas through uninterrupted pathways.
2. Sensory Landmarks: Incorporating textured surfaces, sound cues, and contrasting colors to aid navigation.
3. High-Integration Nodes: Ensuring that key circulation nodes, such as the library and museum, are easily accessible.



Conclusion

This study, as a case study on Jawahar Kala Kendra (JKK), identified the potential to be relevant to allow the public spaces legible through the application of methods of space syntax. The method focuses on connectivity, integration, and

visibility analyses and identify places where space design interventions can relatively improve the navigation for visually impaired users.

Findings suggest that human-centered design strategies such as continuous pathways, sensory landmarks, and high-integration, circulation nodes, significantly reduce cognitive load and facilitate independent mobility. Connectivity analysis identified that intuitive navigation could be achieved by connecting the central courtyard to the surrounding areas by means of an uninterrupted connection. Integration analysis showed that better spatial coherence is created by including important nodes such as library and museum in the entire design. Besides that, visibility graph analysis reveals the fact that users may get oriented more easily in high-visibility spaces, while caves with tactile and auditory cues may improve non-visual navigation in low-visibility zones.

The above transitional treatments could transform JKK into a universally accessible public space. In view of establishing inclusive environments with provisions for different sensory needs, space syntax methodologies could well be advocated at the inception level of public projects.

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