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# A Comparative Analysis of Walkability in Indian Educational Campuses: CEPT University, IIT Gandhinagar and Anant National University

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**Abstract**

This paper comparatively analyses walkability in three Indian educational campuses: CEPT University in Ahmedabad, IIT Gandhinagar in Palaj, and Anant National University in Ahmedabad. It examines how each institution approaches walkability through campus layout, pedestrian infrastructure, natural integration, and transportation policies. The research employs qualitative analysis of design features and policies. Findings reveal diverse strategies based on geographical context, institutional focus, and resources. CEPT, situated in the urban core of Ahmedabad, excels in urban walkability. IIT Gandhinagar, located in the peri-urban area of Palaj, prioritizes car-free design with nature integration. Anant National University, established on the outskirts of Ahmedabad, demonstrates walkability principles in newer campus development. The study provides insights for urban planners, campus designers, and administrators, emphasizing context-specific solutions for enhancing walkability in educational settings. By examining these varied locations within Gujarat, the research highlights how local urban fabric, climate, and institutional goals shape walkability strategies in Indian educational campuses.

**Keywords:** Walkability, Campus design, pedestrian infrastructure, sustainable campus.

## 1. Introduction

Walkability in educational campuses has become an increasingly important consideration in urban planning and institutional design. The concept of walkability in educational campuses has gained significant attention in recent years due to its potential impact on student health, environmental sustainability, and community engagement. This paper aims to compare and analyse the walkability of three prominent Indian educational institutions: CEPT University, Indian Institute of Technology Gandhinagar (IIT-GN), and Anant National University. By examining various aspects of walkability, including pedestrian infrastructure, connectivity, safety, and overall pedestrian experience, it seeks to identify best practices and areas for improvement in promoting walkability within these academic environments.

The importance of walkability in educational settings cannot be overstated. A walkable campus contributes significantly to student health by encouraging physical activity, reduces carbon emissions by decreasing reliance on motorized transportation, and fosters a sense of community by increasing face-to-face interactions. Moreover, walkable campuses can enhance the overall learning experience by creating spaces for informal discussions and collaborative activities outside the classroom.

**Objectives:**

1. To analyse the pedestrian infrastructure and design features that influence walkability in CEPT University, IIT Gandhinagar, and Anant National University.
2. To evaluate the impact of campus layout, connectivity, and integration with natural elements on the overall walkability experience in the selected educational campuses.
3. To examine the transportation policies and their role in promoting or hindering walkability within the studied institutions.
4. To compare the strategies employed by each campus to enhance the safety, comfort, and accessibility of the walking environment for students, faculty, and visitors.
5. To identify best practices and innovative approaches to walkability that can be adopted by other educational institutions in India.

**Research Questions:**

1. How do the campus layouts, building designs, and pedestrian infrastructure of CEPT University, IIT Gandhinagar, and Anant National University contribute to their overall walkability?
2. In what ways do the integration of natural elements and the campus' geographical context influence the walking experience in these educational settings?
3. What transportation policies and alternative mobility options are implemented in these campuses, and how do they impact pedestrian movement?
4. How do the selected campuses address safety, comfort, and accessibility concerns to encourage walking among their stakeholders?
5. What are the key similarities and differences in the walkability strategies adopted by CEPT University, IIT Gandhinagar, and Anant National University, and what can other institutions learn from these approaches?

## 2. Review of Literature

Walkability in urban environments, including educational campuses, has been a subject of extensive research. **Forsyth (2015)** defines walkability as the extent to which the built environment supports and encourages walking by providing for pedestrian comfort and safety, connecting people with varied destinations within a reasonable amount of time and effort, and offering visual interest in journeys throughout the network.

In the context of educational campuses, walkability has been associated with numerous benefits. **Zhu et al. (2017)** found that walkable campus environments promote physical activity among students, contributing to better health outcomes. Additionally, **Hipp et al. (2016)** observed that walkable campuses foster social interactions and a sense of community among students and faculty.

The design of walkable campuses involves various elements. **Toor and Havlick (2004)** emphasize the importance of pedestrian-friendly infrastructure, such as wide sidewalks, shaded pathways, and traffic calming measures. **Lau et al. (2014)** highlight the role of mixed land use and compact development in promoting walkability within educational settings.

The importance of walkability in educational settings has been increasingly recognized in recent years **(Rothman et al., 2020; WHO, 2018)**. A walkable campus contributes significantly to student health by encouraging physical activity, reduces carbon emissions by decreasing reliance on motorized transportation, and fosters a sense of community by increasing face-to-face interactions **(Vijayakumar & Mehta, 2020)**.

IIT Gandhinagar's extensive network of wide, well-maintained sidewalks and dedicated pedestrian zones has been noted as a model for new campus developments in India **(Agarwal & Singh, 2019)**. In contrast, CEPT University's compact urban campus offers excellent internal connectivity and integration with the city fabric, reflecting its long-standing tradition of pedestrian-oriented design **(Das & Safdie, 2018)**.

The challenges of implementing walkable campuses in the Indian context, particularly in terms of last-mile connectivity and integration with surrounding urban areas, have been highlighted by several researchers **(Kumar & Sekhar, 2019; Mahadevia et al., 2013)**. These challenges are particularly evident in the case of newer institutions like Anant University, despite their innovative approaches to campus design **(Patel & Patel, 2021)**.

## 3. Conceptual Framework :

The conceptual framework for this review paper on the comparative analysis of walkability in Indian educational campuses - CEPT University, IIT Gandhinagar, and Anant National University - is centered around five key components. Firstly, the study examines the pedestrian infrastructure and design features of each campus, including the quality and availability of sidewalks, crosswalks, and pathways, as well as the connectivity between various buildings and facilities. Accessibility for people with disabilities is also a crucial factor considered within this component. The second component focuses on the campus layout and integration with natural elements. This encompasses the spatial organization and zoning of the campuses, the incorporation of green spaces, water bodies, and landscaping, and the overall relationship between the campuses and their surrounding urban contexts. The third component delves into the transportation policies and mobility options implemented within each educational institution. This includes an analysis of restrictions on private vehicle use, the provision of alternative transportation modes such as e-rickshaws, and any incentives or initiatives put in place to promote walking as a primary mode of transportation. The fourth component examines the aspects of safety, comfort, and accessibility within the campuses. This involves an assessment of lighting, signage, and security features, as well as the availability of shaded areas, seating, and weather protection. Additionally, the inclusivity of the design for diverse user needs is taken into account. Finally, the conceptual framework explores the walkability strategies and best practices adopted by the selected campuses. This includes identifying innovative approaches to enhancing the pedestrian experience, the mechanisms for stakeholder engagement and feedback, and the alignment of these strategies with broader goals of sustainability and community-building.

## 4. Research Methodology:

This methodology employed is comparative analysis approach, examining the walkability features of three distinct educational campuses in India. The analysis is based on the information provided about each campus, focusing on aspects such as campus layout, pedestrian infrastructure, integration with natural elements, and transportation policies. The selection of these three educational campuses for the study was based on a meticulous evaluation of

multiple criteria, ensuring a comprehensive and diverse exploration of walkability in distinct educational contexts. The criteria included geographical location, campus size and layout, demographic composition, and existing infrastructure. This approach allows for examination of walkability, considering geographical, demographic, and infrastructural variations across different types of academic institutions.

## 5. Findings and Interpretation

### 5.1 CEPT University, Ahmedabad:

CEPT University, established in 1962, is located in the university area of Ahmedabad. It offers undergraduate, postgraduate, and doctoral programs in areas related to the natural and developed environment of human society.

**Planning and Layout:**

- The campus is built around a central court with built masses on the sides and green areas providing noise protection from traffic.
- The basic component of the buildings is a derivative of parallel, load-bearing walls supporting flat floor-slabs.
- Uneven contours have been incorporated into the plan, transforming a potential drawback into a delightful spatial experience.

**Walkability Features:**

- Walkways are joined with informal open spaces, promoting creativity and discussions.
- The campus has seven entrances towards the courtyard and two main pathways.
- Sub-pathways are located along the courtyard.
- The path network is simple, with trees providing shade along the walkways.
- Informal open spaces open up as sidewalk amenities.

### 5.2 Indian Institute of Technology, Gandhinagar (IIT-GN):

IIT-GN's campus is situated on the banks of the Sabarmati River, with a master plan that emphasizes eco-friendly and pedestrian-oriented design.

**Planning and Layout:**

- The campus is designed to be mostly car-free, prioritizing pedestrian movement.
- The layout maximizes views along and across the river, promoting walking and bicycling.
- Most buildings are "low-rise" and walk-up structures, with only a few tall residences.
- Courtyards, colonnades, gateways, water features, and a shaded academic spine are key architectural features.

**Walkability Features:**

- E-Rickshaws are available to reduce motorized transport usage.
- Scenic routes for pedestrians make walking enjoyable and desirable.
- Covered and shaded pathways are implemented to promote walking and discourage car use.
- The campus aims to limit car use to connections with surrounding areas, keeping heavily trafficked areas walkable.

### 5.3 Anant National University, Ahmedabad:

Anant National University, located in the Bopal neighbourhood of Ahmedabad, is designed to accommodate 5,000 students and aims to shape design education nationally within India.

**Planning and Layout:**

- The campus is part of the larger Sanskardham campus, which includes two elementary schools.
- Academic blocks are situated within a 400-meter radius, less than five minutes walking distance apart.
- A large green area in the centre of the campus serves as the "campus heart."
- The campus structure preserves over 90% of existing mature trees, enhancing biodiversity.

**Walkability Features:**

- A pedestrian pathway traverses the central green area.
- The academic core is designed to be strongly pedestrian-oriented, with all buildings within a five-minute walk.
- Three distinct living-learning communities are integrated with the academic core, extending the learning environment.
- A series of buildings creates an institutional arrival sequence, connecting the university to the external community.

**Comparative Analysis:**

1. **Campus Layout and Design**: All three campuses demonstrate a commitment to pedestrian-friendly design, but with different approaches. CEPT University's compact layout centered around a courtyard promotes easy pedestrian movement. IIT-GN's riverside campus emphasizes scenic routes and car-free zones. Anant National University's design focuses on creating a pedestrian-oriented academic core with integrated living-learning communities.
2. **Integration with Natural Elements**: IIT-GN and Anant National University both prioritize the integration of natural elements into their campus designs. IIT-GN maximizes views of the Sabarmati River, while Anant National University preserves existing trees and enhances biodiversity. CEPT University incorporates green areas for noise protection and aesthetic value.
3. **Walkability Infrastructure**: All three campuses feature pedestrian pathways as a core element of their design. CEPT University's walkways are connected to informal open spaces, IIT-GN emphasizes covered and shaded pathways, and Anant National University designs its academic core to be within a five-minute walk.
4. **Transportation Policies**: IIT-GN stands out with its strong emphasis on being a car-free campus, even introducing E-Rickshaws for internal transportation. The design of other two campuses suggest a prioritization of pedestrian movement.
5. **Community Integration**: Anant National University's design explicitly mentions connecting the university to the external community through its arrival sequence. CEPT University's multiple entrances to the central courtyard suggest openness to the surrounding area. IIT-GN's approach to community integration is low.

## Conclusion:

The analysis of these three campuses reveals a strong trend towards prioritizing walkability in Indian educational institutions. Each campus demonstrates unique approaches to promoting pedestrian movement, integrating natural elements, and creating spaces for community interaction.

CEPT University's compact, courtyard-centered design offers lessons in maximizing space utilization and creating informal learning spaces. IIT-GN's commitment to a car-free campus and integration with natural surroundings provides a model for sustainable campus design. Anant National University's focus on creating a pedestrian-oriented academic core with integrated living-learning communities offers insights into designing campuses that blur the lines between academic and residential spaces.

Future research could focus on quantitative assessments of walkability in these campuses, user experiences, and the impact of these designs on academic outcomes and community well-being. Additionally, studying how these campus designs adapt to changing needs, particularly in light of recent global events like the COVID-19 pandemic, could provide valuable insights for future campus planning.

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## Profile of Rajat Verma

Architect, Rajat Verma is a graduate of Aayojan School of Architecture, Jaipur and a Master's degree holder from GJUST, Hisar. His long working experience includes a tenure with leading media group Bennett Coleman & Co. Ltd (The Times Group), Chisel Fitness (A Virat Kohli's Venture) and a total teaching experience of 9+ years in the field of Architecture. He is currently a PhD scholar and Associate Professor at World University of Design and research area is walkable cities.

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