

RELATIONSHIP BETWEEN CITY, CAMPUS DESIGN AND SOCIAL INTERACTION IN CAMPUSES OF HIGHER EDUCATION: A CASE OF GERMAN UNIVERSITIES

MITTAL YASH KUMAR¹, MITTAL SOBHAGYA²

¹Malaviya National Institute of Technology, Jaipur, India

²Consulting Engineers Group Ltd., Jaipur, India

¹ar.yashmittal@gmail.com, ²sobhagyamittal27@gmail.com

Abstract

The relationship of an individual to the built environment is influenced by planning and usage of space. A higher education campus can be considered as a small city on an experimental scale. This paper presents a study of German campuses of higher education offering interaction between the city and campus occupants. The comparative analysis includes the examination of the campuses based on parameters like context, land use pattern, connectivity, walkability, social interaction, landscape, etc. The expression of a place in urban settings can be determined through the composition of buildings, open spaces, alleyways and the relationship between density and openness. The conscious creation of public space can harbor human interaction and encourage an environment, which reduces conflict and insecurity. It was observed that campuses that are closely interwoven with the city fabric provide many opportunities for social interaction and cultural exchange among scholars and city dwellers. On the other side, campuses that are located in the city outskirts have lesser degree of human interaction. This paper concludes that it is critical to determine and understand the behaviour and interaction of humans with their social and architectural environments. Inclusion of urban design principles during master planning, zoning, and phasing of campuses can enhance the quality of space and result in healthy interaction of users with built environment. This inter-disciplinary approach requires sensitivity towards societal changes and anticipation of future demands to create new spaces, transform existing ones, or connect new with the old.

Keywords: *Built Environment; Higher Education Campus; Campus Design; Public Space; Human Interaction.*

1. Introduction

An asset called education determines the level of prosperity, security, and welfare of residents of society. National ambitions, technology, urbanization have led us as a society where higher education enjoys a special place. Education is essential to achieve the national objectives of increased productivity, political and social integration, cultivation of moral as well as spiritual values, accelerated modernization, and raised living standards for all.

As a consequence, growth in the number of institutions imparting technical education was observed in Germany. Programs like engineering, technology, town planning and architecture, management, applied arts & crafts, etc. are covered under technical education.

Campus for Technical education requires infrastructure to sustain academics, administration, residential, recreation, and other requirements. Four to six important years of an individual are spent in campus environments. They are the years of maximum potential development and preparation for a life of service to the nation. University campus is a place where a student is confronted with realities of living and working with other people. It is an environment that provides wide variety of conditions for good relationships. Thus, it sets the stage when a student enters mainstream of life, bears his own responsibility, and makes his contribution to society.

Ideally, a university campus is a quiet, comfortable oasis apart from the busy, noisy, congested world. A campus can be compared to a city on a small scale because it provides for most of the needs of the community. Since campus is for people, it must be designed to measure of man himself, his physical dimensions, his senses, his habits, responses, and impulses. A well-designed campus enriches one's life not just through education, but also through non-academic experiences and other activities associated with college life. The physical setting of a campus undergoes evolution over a period of time with

changes and advancement in pedagogy. Various types of campuses respond differently to evolution in learning systems.

2. Need of the Study

A university campus is an environment where students with diverse social and cultural backgrounds live, study and interact. Being significant functional areas of the city, universities with sensible campus design thrive to accomplish both their academic and personal endeavors.

Previously, research and studies have been done about the perception of students regarding the physical development planning of their campuses (Razak, Mustafa, Che-Ani, Abdullah, & Mohd-Nor, 2011). Also, extensive work has been done in the domain of campus legibility (Turk, Sen, & Ozyavuz, 2015). Another study has discussed the major impacts of campus form on university objectives like learning outcomes, sustainability, student satisfaction, and safety. (Hajrasouliha, 2015)

Over the past few decades, campus design strategies have undergone evolution. This change has come in response to many reasons. The evolution of the methods of imparting knowledge in various disciplines has resulted in the development of a new vocabulary of the academic zones within a campus. One common example is the replacement of naturally lit lecture halls by lecture halls totally dependent on artificial light. This case can be considered as a change at the building level. Similarly, further changes can be identified both at micro and macro level.

The establishment of a university campus requires a considerable parcel of land where the university objectives could be achieved. The allocated parcel of land for a university and the location of that allocated land in the city or town also governs campus planning. The campuses established in the past have experienced growth and witnessed development in phases with time. The current study aims to determine the relationship between the city, campus design and social interaction in campuses of higher education in Germany.

3. Methodology

In order to understand the relationship between the city, campus design and social interaction in campuses of higher education, the methodological approach followed in this research is to first study the campus design literature. Common themes are distilled from the literature and specific parameters are considered for the analysis of case studies.

For the purpose of campus planning study, there is a wide range of elements that can be considered. Some of these include age of the institution, location of campus in the city, whether the institute is private or public, area of the campus, configuration of the campus, growth pattern within campus boundaries, scope of expansion, and surrounding.

4. Scope and Limitations

For the purpose of campus planning study, there is a wide range of elements that can be considered. Some of these include age of the institution, location of campus in the city, whether the institute is private or public, area of the campus, configuration of the campus, growth pattern within campus boundaries, scope of expansion, and surrounding.

5. Literature Study

(Hoeger and Christiaanse, 2006) discussed close relationship between campus and the city. Their book presents the case of transformation in the relationship between campus and the city. It discusses the concept of evolution of knowledge cities from the conventional university campus and host city. Apart from the direct contribution in development of city from social, economic, and cultural perspective,

universities were compared with thinking laboratories. It discusses the transformation of universities with an aim to rejuvenate and integrate themselves in the functioning of the host city. In addition, countries in Asia are witnessing increase in number of universities and these developments are leading to an evolution of different campus typologies characterised by innovation and synergies outside the academic context.

Chronological development of campuses was studied by Andrea Deplazes to highlight the potential of turning into a city. In a study with a similar approach, Kees Christiaanse mentioned the role of university campuses in growth and development of urban centres. The cases of Stanford and Silicon Valley were presented as case examples to validate the contribution of university campuses as a catalyst in city growth. Bindels and Lampugnani focused on the significance of spaces of public realm in urban areas. The presence of well-conceived public spaces in terms of connectivity, accessibility, and opportunities for exchange of ideas plays a key role in shaping a campus. Corneil and Parsons commented on the scope of public universities and private institutions to lead a major revitalization in campus and city. Henn, Wenyi and Yamamoto investigated the prospects of achieving a transparent and interactive campus using architecture.

The considered studies mention two contradictory trends. On one hand, the approach of designing campuses in synchronization with the urban setting and surrounding urban fabric is observed. This includes characterization of project elements in tune with the features of the surrounding. Such an approach values the transparency and open spaces for social and cultural exchange. The other school of thought mentions the gated community campuses, which function as self-dependent sub-cities.

Based on the literature review, both standalone and mixed campuses of Germany have been selected for the purpose of case studies. The following section comprises of description and comparison of identified aspects from literature study for different German campuses.

6. Case Studies

The Federal Republic of Germany enjoys a rich economic and cultural status with its efficient system of education. The technical universities have a significant contribution as the largest and most important part of this system. In Germany, the higher education system and research landscape are richly-structured.

TU9 in Germany is the association of leading institutes of Technology. The TU9 universities were founded in the age of industrialisation. An excellent reputation is enjoyed by these universities as they have played an important role in the development of science, engineering and technology. There has been a continuous growth in the number of students, a range of courses and the scientific potential of the universities over a span of almost 200 years.

6.1. RWTH AACHEN UNIVERSITY

RWTH University is located in the city of Aachen, located in the most western part of Germany. On the verge of this city, borders of three countries congregate, which makes this a unique centre for cross border knowledge and this constituency is noted for world-class higher studies in science and engineering. This university was established in the year 1870. It faced destruction during World War. RWTH Aachen University is mixed with the city fabric of Aachen and is spread at different locations of the city. The university contemplates the noble objective of transforming creative culture for the progress of society and innovation. The university is moving ahead on the policy of achieving global challenges and determined to place itself at the apex.

6.2. RUHR UNIVERSITY BOCHUM

The Ruhr University in Bochum was established in 1962. It was a time when the German higher education system was on a path of radical change. Also, it was the first new university to be established in the Federal Republic of Germany. Equal opportunity and democracy, as well as practical applicability

and interdisciplinarity, were taken into consideration by the founders of the Ruhr University. (Bode, Becker, & Klofat, 1995)

The establishment of Bochum University illustrated the transition of university life in Germany. Bochum region witnessed the beginning of remarkable development when the Ruhr University was established. Presently, the highest number of higher education institutions are concentrated in the largest industrial region of Europe, Bochum University being the centre.

The closely-knit configuration of faculties provides for healthy interaction between the scholars. Bochum University does not believe in independent and isolated functioning of the different faculties. The University is a firm believer in the idea of interdisciplinarity. Interdisciplinarity is strongly practiced and followed by the University. Bochum University has proved to be the origin of institutionalised technology transfer. This University has been successful in retaining both the determination to reform as well as the openness for innovative ideas.

6.3. BIELEFELD UNIVERSITY

Established in the year 1969, Bielefeld University is located in Bielefeld in the state of NRW (North-Rhine Westphalia) in Germany. Bielefeld University is located in the North-West part of the city close to a thick forest region. Earlier, Bielefeld was a linen-producing town located close to the Teutoburg forest. It was founded as a merchant town in the year 1214. Presently, the headquarters of Europe's largest social welfare institutions are situated in Bielefeld.

The University was started in the year 1969 with an aim for imparting research objective higher-level education with long term goals in transformation of learning and teaching. The University has contributed significantly to German Educational Restructuring with innovative approaches. In the decade of the 1990s, application-oriented disciplines and faculties of technology were introduced in the University. The University offers a wide range of subjects apart from Medicine through its 13 faculties. The University serves as a learning hub for more than 24,000 students including approximately 2000 international students.

7. Parameters for Assessment of German Campuses

7.1. CULTURAL AND SOCIAL CONTEXT

In early times, a majority of the universities were privileged and only special citizens coming from the noble class were obtaining education. Gradually, universities were made open to all citizens through large expansions in the academic scenario making them socially integrated. In the present context, university has become a part of everyday life. Although, a few institutions are still introvert.

In view of the cultural context of the university campuses, the structural organisation and spatial structures are of the same kind all over the world. However, weather conditions and regional-culture impart them few specific architectural characters, which is due to the traditional architectural styles and aesthetic implications.

7.1.1 RWTH Aachen University

RWTH Aachen University can be broadly zoned into three campuses namely Campus Mitte, Uniklinik and Campus Boulevard. These campuses are located in different parts of the city. Campus Mitte is closely interwoven with the city fabric of Aachen whereas Uniklinik and Campus Boulevard are located in city outskirts. Some of the key features of the university in terms of cultural and social context are:

- The campus doesn't have its own defined boundary in the city. Different faculties of the university are scattered throughout the city but the walkable city of Aachen and its efficient public transport system ensures smooth connectivity between them.

- RWTH Campus coexists with the city fabric and it provides ample opportunities for social interaction and cultural exchange among the scholars.
- The market area, restaurants, shops, cafes, places of leisure activities are in close proximity to the university area and therefore create liveliness on the campus.
- There is a high degree of interaction between the city and the university. The city plays a key role in fulfilling a number of basic needs of the student community.

If the standalone campuses and city campuses are taken into consideration, the recent development in the city campuses is happening close to natural landscape setting. Campus Boulevard is a new development in RWTH Aachen University. In campus boulevard, the existing countryside landscape has not been taken into consideration.

RWTH Aachen is featured with an iconic building known as 'Super-C'. This building exists in a nearby location of the main RWTH building. It is iconic for its specific features and sets the trend of adopting contemporary architectural style standing side by side of Neo-Classicism architectural styled RWTH Main building.

7.1.2 Ruhr University Bochum

Ruhr University Bochum has always lacked in terms of social interaction. People don't really meet each other and make friends in the RUB campus. Mostly, people meet each other in the mess. If RUB is compared with RWTH Aachen campus, then RWTH Aachen being a scattered and city campus provides ample opportunities and locations to people for social interaction.

According to Zaaier (2007) - "Emptiness kills public space. So, it needs to be filled with life and charged with a variety of activities. The surrounding buildings provide this charge. Consequently, public space should always be a little cramped rather than too big, like pubs and kitchens."

Some of the key features of the university in terms of cultural and social context are:

- The Bochum University with its standalone campus is located in the outskirts of the city. This does not give the campus occupants an opportunity to interact with the city.
- The University and the city function individually as separate entities. The University campus exists as an isolated entity in the city and therefore the element of liveliness in the campus goes missing. Particularly, after the academic hours, it has been observed that the campus becomes a no man's land.
- The lack of vibrancy and liveliness in the university campus has resulted in unfortunate consequences. A number of suicidal cases have been reported in the past while becomes an alarming issue.
- For RUB, a designated area with the name Unicentre is located on the other side of the transit line. This place serves the basic needs of university scholars. It accommodates shopping centres, restaurants, shops, and cafes.
- The transit station for the university and mess are some of the few places on the campus with some degree of liveliness which provide opportunity for social interaction and cultural exchange.

7.1.3 Bielefeld University

Some of the key features of the university in terms of cultural and social context are:

- Bielefeld University is very different from RWTH Aachen University in terms of context, configuration of the campus, and opportunities of social interaction.
- It exists as an isolated standalone campus that limits interaction of campus occupants with the city. During the academic hours, the scholars remain confined within the university campus.

- Bielefeld University has got a unique feature of lively central zone which connects different faculty/department buildings of the university. There is a central area known as ‘Uni-Hall’ which connects different faculty/department buildings of the university.
- ‘Uni-Hall’ is accommodated with facilities like shops, restaurants, cafes, banks, exhibition areas, and uni-theatre. One end of the ‘Uni-Hall’ connects to the sports complex of the university.
- A swimming pool also finds a place in this hall. The central zone is well connected with the lecture halls and seminar halls. The library is also accessed through ‘Uni-Hall’.

7.2. ASSESSMENT INDICATORS

The selected case studies are assessed (*Table 1*) on the basis of compliance with indicators including interwoven with city fabric, standalone campus, public spaces for social interaction, interaction with the city, provision of student accommodation within campus, mass attraction quality.

Table 1, Cultural and Social Indicators (*Source: Author*)

S.No.	Aspect	RWTH Aachen University	Bochum University	Bielefeld University
1.	Interwoven with City fabric	✓	X	X
2.	Standalone Campus	X	✓	✓
3.	Public spaces for social interaction	✓	X	✓
4.	Interaction with City	✓	X	X
5.	Provision of Student Accommodation within campus	*✓	X	X
6.	Mass attraction quality	✓	X	X

*Since, RWTH Aachen University campus is interwoven with the city fabric, therefore few options for student accommodation are available in the nearby vicinity of the city campus. (*Table 2*) shows comparative assessment for cultural and social context for the three case studies.

Table 2, Comparative assessment for Cultural & Social Context (*Source: Author*)

S.No.	Aspect	RWTH Aachen University	Bochum University	Bielefeld University
1.	Proximity to student accommodation			
2.	Proximity to market area, restaurants, cafes etc.			
3.	Degree of liveliness in campus			
4.	Proximity to amenities			

High
 Medium
 Low

8. Conclusion

Universities at Aachen, Bochum, and Bielefeld are the only universities in these cities and offer different courses of study in addition to technical courses. A number of cities in Germany are known for the existence of Universities in those cities. Such cities can be called as University cities. The student population in these universities constitutes a significant part of the city population. In case of Aachen, 18.45% population of the city is student population enrolled in RWTH Aachen University. The economy of the cities is also governed by the presence of this student population in the city. The city fulfills a number of basic needs of the student community and the expenditures incurred by the students form a part of the city economy. The city housing is also contributing to a large for the student accommodation, their lodging & boarding, leisure activities and fulfillment of fundamental needs.

It is also significant that German universities are good promoters for the intake of students from foreign countries, which in turn attracts foreign currency and contributes to socio-economic development. In Germany, if the densities of a city and campus are compared, it can be clearly seen that the campus has quite high density of students as compared to the overall density of the city.

Table 3, Population, Area and Population Density (Source: Author)

S.No.	City	Population	Area (sq.km.)	Population Density (persons per sq.km.)
1.	Aachen	2,45,885	160.85	1500
2.	Bochum	3,64,742	145.4	2500
3.	Bielefeld	3,33,090	257.8	1300

Table 4, Comparison of Universities on the basis of Student Strength and Campus Area (Source: Author)

S.No.	University	Student Strength	Campus Area (sq.km.)	Student Density (students per sq.km.)	Available Area per student (in sq.m.)
1.	RWTH Aachen	45,377	1.7	26,470	37.4
2.	Ruhr University Bochum	43,015	1.16	37,081	26.9
3.	Bielefeld University	24,875	0.78	31,891	31.3

9. Learnings for Practitioners and Researchers

- Campus buildings should be planned in such a way that they are having their self-identity so that they do not create any confusion among the users.
- Vehicular traffic should be designed in such a way so that it does not create any kind of sound or air pollutions to the university occupants.
- Faculty blocks should be so placed that they do not form isolated islands and should provide for creating chances of social interaction among the scholars and inter-department faculties.
- Recreational and Public spaces should be so placed so that they are functioning with closer cooperation between university and city.
- A network of paths between University Buildings and free spaces should be designed in such a way, so as to provide a pedestrian approach to any place within 10 minutes or 700 meters.

- Accommodation facility within or outside the campus should be well considered according to the changing socio-economic environment.
- A number of German Universities have tried to distinguish themselves by introducing Iconic buildings and it is unfortunate that they have neglected spaces available between these buildings, which should be well considered while designing a new campus or redesign of any existing campus.
- Empty spaces should be charged with a variety of actions and filled with life, through surrounding buildings and little cramped Public Spaces.
- The consideration of vehicular movement is a key component for the designing of campuses and in order to minimize the private car traffic, universities are well connected with the public-transit network of the city.
- Universities being a big establishment occupies large areas of land, often stands as strong organ of the city and becomes largest employer, should be designed to form a strong link with the urban format so that it could generate a strong base for regional development.

6. References

- Bode, C., Becker, W., & Klofat, R. (1995). *Universities in Germany*. Prestel.
- Dober, R. P. (1996). *Campus Planning*.
- Hajrasouliha, A. H. (2015). 2.6 *The Morphology of the "Well-Designed Campus": Campus Design for a Sustainable and Livable Learning Environment*. Thesis.
- Heitor, M., Blyth, A., & T. , H. (2012). Knowledge and cities by design: Revisiting the concept of university campuses and science parks in modern societies.
- Hoeger, K. (2006). *Campus and the City – Urban Design for the Knowledge Society*.
- Kanvinde, A. P., & Muller, J. H. (1969). *Campus Design in India: Experience of a Developing Nation*.
- Razak, M. A., Mustafa, N., Che-Ani, A., Abdullah, N., & Mohd-Nor, M. (2011). Campus Sustainability: Student's Perception on Campus Physical Development Planning in Malaysia. *Elsevier*, 230-237.
- Stern, R. A. (2010). *On Campus: Architecture, Identity & Community*. Monacelli Press.
- Turk, Y. A., Sen, B., & Ozyavuz, A. (2015). Students Exploration on Campus Legibility. *Elsevier*, 339-347.
- Turner, P. (1984). *Campus: An American Planning Tradition*.
- VanLandingham, S. E. (2013). *A Seat at the Table: Integrating Historic Preservation into Comprehensive Campus Planning*. Thesis.