



A Sustainable and Environmental Design  
Approach for an Architectural Institution - a  
Way Forward

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# **A Sustainable and Environmental Design Approach For an Architectural Institution - A Way forward**

**Abstract** This paper deals with a sustainable and Environmental Design approach for an Architectural Institution . For any kind of Construction or related activity , Natural resources are utilised most . So the concern is to manage the usage of resources in a most proper manner and to reduce its exploitation.

Sustainable campus should be a healthy campus environment, with a successful economy through energy and resource conservation, waste reduction and efficient environmental management. A balance between economic, social and environmental aspects can be provided within a sustainable campus . The importance of culture , material selection , and techniques to attain Sustainability should be learned from the Campus.

Conscious effort should be made to retain the focus of the design to create natural elements not only for aesthetics but also with its utility, heat control, waste management & water recycling system by maintaining a balanced Ecosystem through landscape. Sustainable university campus having a master plan with sound environmental plan & guidelines for its users are compatible with safe environment, biodiversity & ecological balance. This paper focuses on the concept of sustainability in an Architectural campus design with a case study review of the widely used practices for achieving sustainability and mapping the directions towards a sustainable campus.

**Keywords:** Design , Campus , Environmental Design , Sustainable Design

## **1. Design**

Design is the PROCESS of SELECTING and ORGANISING elements or components in order to fulfil a specific purpose. This purpose may be functional or aesthetic, or (frequently) both.

### **ELEMENTS OF DESIGN**

The building blocks of a design (almost similar to the Elements of Art) The elements are components or parts which can be isolated and defined in any visual design or work of art. They are the structure of the work, and can carry a wide variety of messages.

#### **The Elements of Design:**

Point & Line , Direction , Space & Size , Texture , Shape & Form , Colour & Value

### **1.1 Introduction**

The world is developing very fast day by day . As the need of buildings increases the requirement for raw materials also increases, demanding shortage of raw materials. As long as humans are occupying the Earth this

process will continue going and the requirement will increase tremendously. We face an escalating population growth and the concern over having enough resources for development to meet our needs in the present and that of future generations . The consumption of material and energy has increased at an alarming rate over the past two decades, especially in the built environment, Building construction currently consumes between 70-80% of raw materials worldwide. As the consumption increases , the burden being placed on limited resources is increasing.

Most people would probably agree that innovation and technology are essential in our world to progress and make new discoveries that benefit mankind. Yet at the same time, there has been an effort by governments and business enterprise over the years to move toward a more balanced way of growth that is sustainable. This is the cause of sustainable development.

Sustainability involves the interactions and significant relationships among environmental, social and economic parameters. With reference to the building sector, sustainability is about ensuring that a building is environmentally friendly, economically feasible as well as that it provides a healthy and quality indoor environment to its users.

It is very hard to change the lifestyle and way of life of an old generation . The things they followed in their past years will move on as well . The efforts taken to aware them won't be very efficient enough to change their lifestyle .As far as parents are concerned , they will listen to the things their children are putting forward.

Apart from all the other promotions, awareness and other activities in Environmental conservation . A building itself can talk way more than anything . As students are concerned the building which they spent most of their time apart from their home or stay will be their College Campus . The best way to convey the idea of Environmental conservation and Sustainability to a well growing generation and the future generation is through their Campus Design itself.

A building is better described as a process rather than a product. This process involves correlating and complementary technical, environmental and economic parameters. To this regard, the environmental information could be better addressed and more effectively used in the general design process.

The Campus Design influences an individual's life in many possible ways . A person's Character formation happens at the age he pursues his bachelors and masters Degree . The kind of friendships the quality of interactions also influences the same . The quality of space and design in facilitating this process is not at all small .This study attempts to answer questions on whether the new emphasis on sustainability in Campus Design is helping to improve our environment and future generation both externally and internally, affects our health and mind positively.

## **2 History**

## 2.1 Sir J J College of Architecture , University of Mumbai

The Sir JJ School of Art was set up in 1857 as the Bombay School of Art & Industry, thanks to the vision and magnificence of Sir Jamshetjee Jeejeebhoy. In the second half of the 19th century, architectural learning was integrated with an art education that followed the Beaux Arts School of sculptural ornament and architectural detailing. In 1913, one hundred years ago, architecture as a distinct discipline was recognized by the formation of a separate and independent Department of Architecture of the Sir JJ School of Art. Robert Cable was appointed as the first Professor of Architecture and headed the department until 1923. Cable, and his most distinguished successors, Professor Claude Batley (1923-43), Professor C. M. Master (1943-48) and Professor Solomon Reuben (1948-59) took the architectural department into a new modernist phase, making an impact on the city and the country at large with their own architectural practices, while educating several generations of architects who collectively transformed the city of Mumbai and gave a great reputation to the school as the finest architectural school in Asia. In 1952, the department of architecture became a department of the University of Mumbai, and the school became the Sir JJ College of Architecture. In the last hundred years, the college has consistently excelled and has enhanced its reputation by having some very distinguished alumni

including architects Padmashri Achyut Kanvinde and Padmashri Balkrishna Doshi. Most appropriately, in this Centenary Year, Sir J.J. The College of Architecture has been ranked the BEST architecture college in the country according to the independent 2013 Outlook-MDRA Poll (results of the annual survey published in the July 1st 2013 issue). Our college has consistently been ranked in the top 3 architecture colleges in the country ever since the survey began around four years ago, and this is the first time we have topped the list. The University of Mumbai has consistently supported our aims to architectural excellence through the last six decades.

## 3 Case studies

Based on parameters such as

Location and approach to site , plan , circulation , shape of block , courtyard , landscape , material used , services , internal connectivity , lighting and ventilation etc

# SCHOOL OF PLANNING AND ARCHITECTURE, DELHI

**LOCATION AND APPROACH TO THE SITE**

**COVERED AREA ON EACH FLOOR**  
 1<sup>ST</sup> FLOOR - 1824 sq.m  
 2<sup>ND</sup> FLOOR - 1824 sq.m  
 3<sup>RD</sup> FLOOR - 1824 sq.m

**DESCRIPTION OF THE BUILDING**  
 A 3-story building with a central courtyard and a large staircase landing.

**OPEN AREAS**  
 Open areas are provided for the use of students and faculty members.

**GREEN AREAS**  
 Green areas are provided for the use of students and faculty members.

**CIRCULATION**

**SHAPE OF THE BLOCK**

**RECTANGULAR**  
**OCTAGONAL**

**Academic activity takes place here. One side is having Library and other having Studios, STUDIOS, LECTURE ROOMS, STORES. Lecture rooms are crowded and bad natural light.**

**EXTERIOR**  
 Wall - Exposed brick, Plaster on surface  
 Double skin facade (jaali)  
 Floor - Kota stone, Granite stone  
 Sculpture - Tile brick, Stone

**INTERIOR**  
 Wall - Brick wall, plaster  
 Floor - Kota stone, Granite stone  
 Roof - RCC slab

**SPECIAL INTERACTION AREAS**  
**CANTEN**  
**OUTDOOR SITTING AREA**

**SERVICES**  
 Fire safety  
 Electricity  
 Water  
 Pump Room

**HISTORY**

**PRESENT STATUS**

**COURTYARDS**

**TEMPERATURE**  
 (Graph showing temperature fluctuations)

**WIND SPEED AND DIRECTIONS**  
 (Graph showing wind speed and directions)

**THERMAL RATINGS OF MATERIALS**  
 Brick 0.16  
 Glass 0.16  
 Plaster 0.17  
 Stone 1.7

**DESIGN INFERENCES**

THE DEPARTMENT OFFICE AND HOD'S OFFICE ON THE FIRST FLOOR IS THE BETTER POINT IN THE DESIGN .  
 THE HOD CAN HAVE AN EXCELLENT VIEW OF THE MOVEMENT IN THE BUILDING AND GENERALLY ENSURE DISCIPLINE AND ORDER IN IT .

FACULTY MEMBERS ROOM GROUPED TOGETHER .  
 CLOSE TO DEPARTMENT'S OFFICE .  
 NOT IN THE WAY OF PUBLIC FLOW .  
 AS ON FIRST FLOOR , ENSURED GOOD SERVICE FROM THE CANTEN .

DIMENSION OF STAIRCASE LANDING IS SMALL , COMPARED TO THE STANDARDS  
 THE DESIGNER HAVE NOT GIVEN FIRE EXIT IN THIS BUILDING WHICH IS A (G+5 BUILDING )

CORRIDOR WIDTH IS LESS COMPARED TO THE STANDARDS  
 SUFFICIENT PARKING AREA IS NOT PROVIDED IN THE DESIGN

Table 1

# CHANDIGGARH COLLEGE OF ARCHITECTURE

**PROJECT - CCA, CHANDIGARH**  
**ARCHITECT - LE CORBUSIER**  
**SITE AREA - 20,000 SQ.MT. (5 ACRE)**  
**BUILT UP AREA - 13,570 SQ.MT. (INCLUDING BASEMENT)**  
**LOCATION - SECTOR -12, CHANDIGARH**  
**ESTABLISHED - 1964**  
**ACADEMIC AFFILIATION - PUNJAB UNIVERSITY**

**LIBRARY**  
 The library is a two-story building with a central staircase and a large reading area.

**PRINTING LAB - PRINTING LABS**  
 (CONSIDERING PRESS OF ALL THE)

**MODEL ROOM - ROOM**  
 (CONSIDERING PRESS OF ALL THE)

**PHOTOGRAPHY LAB**  
 (CONSIDERING PRESS OF ALL THE)

**LECTURE ROOM - LECTURE ROOM**  
 (CONSIDERING PRESS OF ALL THE)

**STUDIO - THE STUDIO ARE QUITE SPACIOUS AND ARE SEPARATED BY CORRIDORS**

**OPEN SPACES - COURTYARD IS THE ONLY OPEN SPACE IN THE COLLEGE. IT IS A LARGE OPEN SPACE WITH A SHADE TREE. THERE IS A LARGE GARDEN AT THE BACKSIDE OF THE COLLEGE.**

**SERVICES**  
 WATER SUPPLY - WATER IS STORED IN A TANK ON THE ROOF AND DISTRIBUTED TO THE COLLEGE ARE PROVIDED AT THE TWO CORNERS OF THE COURTYARD.

**MATERIAL USED**  
 BRICK HAS BEEN USED AS PRIMARY BUILDING MATERIAL FOR THE ENTIRE COMPLEX WALLS. BRICK ARCHES HAVE BEEN USED FOR OPEN SPACES. BRICK ARCHES HAVE BEEN USED FOR OPEN SPACES. BRICK ARCHES HAVE BEEN USED FOR OPEN SPACES.

**ADVANTAGE**  
 THE BUILDING IS A GOOD EXAMPLE OF LE CORBUSIER'S ARCHITECTURE. IT IS A GOOD EXAMPLE OF LE CORBUSIER'S ARCHITECTURE. IT IS A GOOD EXAMPLE OF LE CORBUSIER'S ARCHITECTURE.

**DISADVANTAGE**  
 THE BUILDING IS A GOOD EXAMPLE OF LE CORBUSIER'S ARCHITECTURE. IT IS A GOOD EXAMPLE OF LE CORBUSIER'S ARCHITECTURE. IT IS A GOOD EXAMPLE OF LE CORBUSIER'S ARCHITECTURE.

**INTERNAL CONNECTIVITY**

**1. Booth**  
**2. Assembly Hall**  
**3. Lecture Hall**  
**4. Studio**  
**5. Waiting Room**  
**6. Corridor Room**  
**7. Principal**  
**8. Research Cell**  
**9. Faculty**  
**10. Library**  
**11. Periodicals**  
**12. Workshop**  
**13. Store**  
**14. Toilet**  
**15. Photography**  
**16. Office**  
**17. Museum**  
**18. Courtyard**  
**19. Art Room**

**ADVANTAGE**  
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Table 2

## CENTRE FOR ENVIRONMENTAL PLANNING AND TECHNOLOGY (CEPT) , AHMEDABAD



CEPT campus is in Gandhinagar, Ahmedabad. Other institutional buildings are the surrounding of the campus. In East Side School of Engineering and Applied Science is located on south side have M.O. Science Institute, I.M. College of Pharmacy. Accessibility to campus is from two sides, no road side have main University road and main entrance is from secondary road on North side.

- Climate: Hot and Semi-arid climate
- Architect: B.V. Doshi
- Total Site Area: 36423.70 sq. m. (9 acres)
- Total built-up: 8000 sq. m. (School of Architecture)
- Construction type: Exposed Brickwork and exposed Concrete









Daylight in Studio



**PLANNING**

- The built form starts with a pair of parallel walls. The basic component of the buildings of the cept is a cluster of four bearing walls, supporting a flat floor slab. The repeated occurrence of parallel wall structures can be seen in the east corner.....
- The overall planning has been done around the central court with built masses on sides and green on one side which gives the campus noise protection.....
- The whole building is very simple and architectural elements are Expression of their functions.....
- The spaces created by volumes and voids are visually exciting.....
- The building has simple horizontal lines and merges beautifully with the site.....
- The building is two-storeyed with a light level basement.....
- The building design incorporates the thermal comfort and Natural ventilation.....

**OBSERVATIONS**

- Simple structure of parallel brick wall and concrete beams and floors that is extendable and easy to maintain.
- An open place with hardly any doors. The feeling of restriction to exchange of ideas and flow scope of reading and learning anywhere.
- More use of interactive and transmission areas like corridors, galleries and courts and foyers throughout the campus.
- Building looking toward makes the environment livelier.
- Corridors is an easy to make all the building assemblies.
- The informal interaction spaces with trees and seating make them relaxing and calm.
- Combined studios at two level effects the environmental positivity and engenuity.

Table 3

From all the above case studies important parameters were taken into consideration for my design .

### 4 Sustainable Landscape

Sustainable Landscape, also known as beneficial landscaping, harnesses aesthetic, economic and environmental benefits through a mixture of varying practices. These Practices include, but are not limited to : using native species instead of annuals and foreign species when planting , planting shade trees and wind breaks, limiting the use of power maintenance equipment, harmful chemicals and fertilisers and recycling green waste to reduce pollution impacts of landscaping. Sustainable landscape can be traditional or contemporary.

### 5 Energy

With regard to Energy , this emphasises that investment in renewable and energy-efficient projects is necessary to reduce the greenhouse gases (GHGs) and the impact on resources caused by hard surfaces due to its consumption of heat gain. Goals include a reduction in GHGs and energy consumption, the expansion of buildings while adhering to the electricity capacity, have a try to at least 50% energy usage from clean renewable sources by 2025

## **6 Pollution Management**

Concerned with the Campus design, pollution is an important topic. Air , Water and Soil Pollution have to be managed . As the campus is a place where thousands of people gather each day , risk of getting polluted will also be high . Various methods which could be followed in order to counter such issues should be found out . Maximum possible Natural ventilation and lighting can be included in design for reducing the number of Air Conditioners in the Campus Which produces a lot of Carbon emission .

mobility without cars or bikes inside campus

In respect of green maintenance, focusing on methods and materials used for greater sustainability includes materials that are more energy and water efficient and more environmentally friendly. Also proper waste management facilities for solid waste and sewage have to be done.

Campuses can implement their trash management strategy through the composting centre program to manage their trash. Integrated trash management and implementing policies related to independent trash management within the campus environment are also parts of campus trash management. Universities can organise public service activities for these programs in cooperation with surrounding communities to use recycled materials

## **Recreation Forestry**

The outdoor spaces on campus support the relationships between people and increase the quality of university life . Flora and fauna should be kept in mind while designing campus areas and stated that on-campus planting work should be done predominantly with the plant found in natural vegetation. Through the recreation forest, the quality of life on the university campus has been increased and a positive contribution has been made to the floral and fauna existence.

## **Conclusion and Recommendation**

Sustainable development involves an effort and mindset in utilising best practices to ensure that our valuable resources are used in the most efficient way possible, that waste is minimised, and that we sustain our human and natural environments now and for future generations. One predominant area to incorporate these principles is in building resource efficient buildings, or green buildings. The Sustainable Campus helps the students to

experience the space more based on natural parameters . Also they get the aid of materials, textures and construction techniques during their campus time itself.

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