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DEPARTMENT OF ARCHITECTURE

THESIS REPORT

ON

SCHOOL OF ARCHITECTURE

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CERTIFICATE

This is to certify that this thesis entitled – **"School of Architecture, Ghorahi, Dang, Nepal"** submitted by Mr. Anil Budha Magar (074/BAE/205) has been examined and it has been declared successful for the partial fulfillment of the academic requirement towards the completion of the degree of Bachelor of Architecture.

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Date: _____

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Abstract

The main aim of this project is to inform the future design of learning spaces, interior arrangement, and building typologies associated with the school of architecture, in order to facilitate the changing pedagogical practices needed to support a mass higher education system with its greater student diversity. Architectural education itself is a student-centered course; learning by doing, project-based learning. Design studios should be seen as both personal and collaborative spaces. Interaction and exchange are integral parts of architectural education. This report examines how architecture schools are closed boxes that can function as integrated communities by balancing their main functions such as learning, socializing, and sharing ideas. One size does not fit all. Therefore, one environment is not suitable for different student merit processes. New learning environments such as technology-integrated immersive individual and group learning environments are important. The main goal is therefore to create a flexible new learning environment that respects student freedom and encourages them to be more creative.

There are many architecture schools, but most lack the right environment to study architecture. In the current situation in Nepal, there are few architecture schools aiming at the same. Architectural education requires a dynamic learning environment, but in most cases the basic space is limited. Therefore, this can be one of the main reasons affecting the overall performance and creative imagination of students. In this way, the "School of Architecture" visualizes different learning spaces according to the needs of students, supports new programs and teaching methods in the changing education system of the 21st century, and ultimately improves architectural education. This project aims to advance our intellectual and scientific understanding of design theory and practice, including decision-making and team management processes, and materials and techniques of production. To train students in the technical and aesthetic dimensions and to understand broader cultural issues related to the contemporary role of design in today's world.

Keywords: Learning spaces, Interior arrangement, integrated community, personal space, collaborative space, student-centric, interaction**,** learning space

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1. Introduction

1.1 Background

Architectural education is a very important tool for development in the context of developing countries like Nepal.

Architecture School is an institution for the study of architecture and its various aspects that offers courses and grant degrees in the field of architecture and teaches students how to approach design, appreciate history and assume the responsibilities of an architect. The mission of the school is to pursue architecture as a professional discipline, which achieves its mission through teaching creative work, and research, through intellectual principles, aesthetic judgment, and technical understanding. The School of Architecture is firmly committed to developing students` core competency and critical thinking in order to achieve design creativity and leadership that enable lasting contributions to our built environment. The curriculum is structured not merely to train students to join the architectural profession, but to educate them in adapting to inevitable future changes to be encountered during their careers. A well-designed space contains cuddles, exalts, and stimulates the persons inside that space. The building itself can be an emblem as a learning idol for the students.

The study of architecture started more than four decades back at Tribhuvan University as three years diploma course. More focused on producing technical manpower than appreciation of architecture itself. Later after the formation of the Institute of Engineering and the successful addition of bachelor's programs in Architectural Engineering, the quest for our Architecture as an intellectual study formally began. Since the start of the start of Bachelors program, department of Architecture under IOE, Central Campus, Pulchowk has been the highest governmental body for teaching architecture. Most of the areas of knowledge that an Architect requires are touched by the five-long years bachelor course, but in-depth further study of various specialized Architectural fields are yet to be started.

The scenario of architecture education in Nepal within 2 decades has a drastic change.

- Number of colleges teaching architecture courses at present in Nepal – 13.
- More than 350 students graduate each year in architecture courses.

The reason behind the increase in attraction toward architecture education in Nepal can be:

- Awareness of differences in other engineering and architecture fields.
- Good employment opportunities after graduation.
- It's fun where students are allowed to explore their creative side.
- Girls are more attracted as physical involvement is very less in this field. Also, the girl's - boys ratio is almost 50:50 in the present context of Nepal in overall architecture colleges.
- After the 2072 earthquake, it has been compulsory that the building should be designed by Architect and structural engineer.

1.2 Problem statement and justification

Current architectural scenarios and public awareness of buildings suggest a need for architectural awareness. Due to poor design, the comfort of the constructed space is low. Hiring an architect is not yet included in the list of most buildings, most of which are small residential buildings. The materials are limited to steel, brick, and concrete, and the building is not very natural. Therefore, a public center that explores the possibilities of better alternative solutions and shows how to build better buildings will be the solution to the building pollution problems that our city is facing.

This thesis can be represented as an experience and evidence-based approach in Nepal. The architecture course is divided into 5 years (10 parts). The first-year courses include fundamental common subjects. The second and third years generally include specific courses in the related discipline. The final year includes professional and application-type courses. But the environment of existing architecture colleges in Nepal is not able to cater to the objectives that the course demands.

The built environment of a school houses the culture developed by the process of knowledge exchange and the society developed by the participants of that process. We can say that the ways in which students learn are influenced by the architecture of the school. So, a school with a culture of exchanging knowledge with society and existing within the natural balance could produce architects more responsible towards society and nature.

This thesis can be represented as an argument about the responsibility of architectural education towards the profession and Nepalese society at large. The study is confined to books only lacking practical experiences. The lack of knowledge and failure to deal with the realities of professional practice, the lack of research on the education practice of architecture, and the gap between research and design on one hand, and education and practice, on the other hand.

We lack appropriate inspiring space within the school system to fully grasp the knowledge of architecture instead those create a sort of mental blockage in the growth of students. Teacher-student relations directly affect student creativity in architecture studies. Problems in teacher and student relationships can be seen due to a lack of interactive spaces.

Similarly, with the rapid development of computer applications in the architectural profession, the need to find a framework to integrate computer applications with the architectural curriculum has increased. But architecture education culture in Nepal is not able to integrate technology as a resource in this rapidly growing digital age due to which we are not able to compete in the international market.

Thus, this project will try to reconceptualize the built environment where architecture is taught and learned as a result creating a properly well-equipped institution and research center providing all the necessary facilities for learning architecture education and help develop various skills for students in the field of architecture as a profession.

1.3 Objectives of the project

The aim of this project is to design a School of Architecture fully dedicated to architectural education and research with more student-oriented informal and interacting spaces along with other amenities and supporting facilities such as a library, recreation, auditorium, and cafeteria.

The objectives of the School of Architecture reflect the view that architectural knowledge extend into the arts, humanities, sciences, and engineering. The objective of the project is based on the following intentions:

- To shape the motivating learning environments to support the educational objectives
- To embrace new technologies as a resource in this digital age
- To provide an appropriate platform, with a better, planned, and adequate open and built space
- To study the impact of inner-enclosed by building and outer-open to air learning and developing the thinking ability and vision for innovation.

1.4 Methodology

The main objective of the thesis is to teach us, combine the existing knowledge with research questions and develop a good design from it. In order to get the right results, it is necessary to follow systematic procedures and methods. For this, data and information from a number of sources will be collected and analyzed and the ones suitable will be incorporated into the design.

Collection of primary data

For this purpose, a case study of an architectural school in Nepal was carried out. The list of the institute for the case study was:

i. Institute of Engineering, Pulchowk, Lalitpur
ii. Kathmandu University

Collection of secondary data

Secondary data collection was done through literature review, document and drawing analysis, and consultation with various personals related to the concerned field. Different components of an architectural school will be studied which are not available through primary data collection. A literature study of studio culture, learning spaces, design process, and the standards will be also done. Research on various topics related to educational institutes will be done through books and websites.

Besides the national case studies, some precedent studies of outstanding buildings related to architectural schools was done. The buildings considered were:

i. Centre of Environmental Planning and Technology, Ahmedabad, India
ii. ii. SMEF's Brick College of Architecture, Pune, India
iii. Harvard Graduate School of Design, Massachusetts, United States

Other various projects were also reviewed for a second case study to better understand the overall functions of the architectural school.

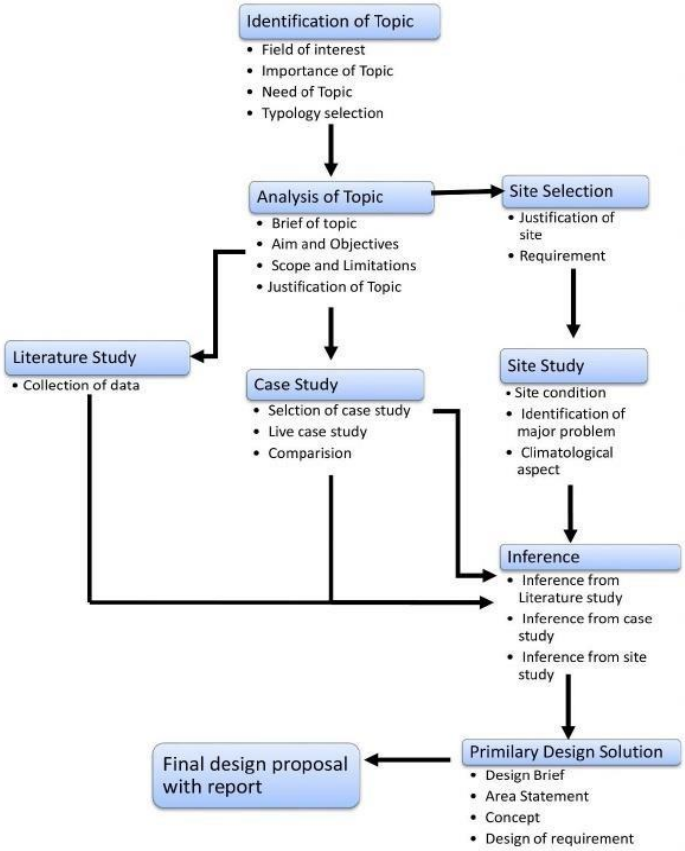


Figure 1: Flow chart diagram of methodology for carrying out the project

The basic process adopted includes the project site identification, case study of similar projects or building situations, and design program formulation.

During the case study, the planning, architectural expression, and functional needs of an architectural school were studied. The possible functions to be incorporated into an architectural school according to the needs of the new program and pedagogies were also studied. From the case study or research, the design concept will be developed.

2. Literature Review

2.1 Architecture

Architecture originates from mere Greek word ἀρχιτέκτων - arkhitekton "architect", from ἀρχι- "chief" and τέκτων "creator, builder, carpenter, mason", after centuries of human evolution, has attained a vastly diverse range of meanings and perceptions. Defining what Architecture is, is as challenging as defining the purpose of human existence. But in general, Architecture is both the process and the product of planning, designing, and constructing buildings or any other structures.

“Architecture is the starting point for anyone who wants to take humanity towards a better future ". **Le Corbusier**

“Architecture is the art and science of making sure that our cities and buildings actually fit with the way we want to live our lives: the process of manifesting our society into our physical world.” **Bjarke Ingles**

“Architecture is an expression of values – the way we build is a reflection of the way we live.” Norman Foster

2.2 School

Schools are the places that covey the meaning and importance of learning. Schools are the communities, not just buildings. The building and site provide the ‘place’ and this is often the image people have when they think of school. But equally the ‘interest’ element is about a common purpose and a commitment to delivering high-quality education and the ‘communion’ is a sense of belonging and identity that as school engenders in all those who work and learn there.

2.3 Architecture School

Architecture School is an institution for the study of architecture and its various aspects that offers courses and grant degrees in the field of architecture and teaches students how to approach design, appreciate history and assume the responsibilities of an architect. The mission of the school is to pursue architecture as a professional discipline, which achieves its mission through teaching creative work, and research, through intellectual principles, aesthetic judgment, and technical understanding.

Functionally, the building acts as a stage for learning, either supporting or limiting the activities of teaching and learning. So, the spatial organization of the institutional activities and rooms of the buildings should reflect the philosophy of the teaching program and the program needs of the institution.

2.4 A critical evolution of spaces for architectural education

There are countless examples of architecture schools that have been designed to specifically reflect and support the architectural ideologies of the school. The typologies and interior arrangement of architectural school buildings can be found to be reflected in the type of architectural education being taught at the time.

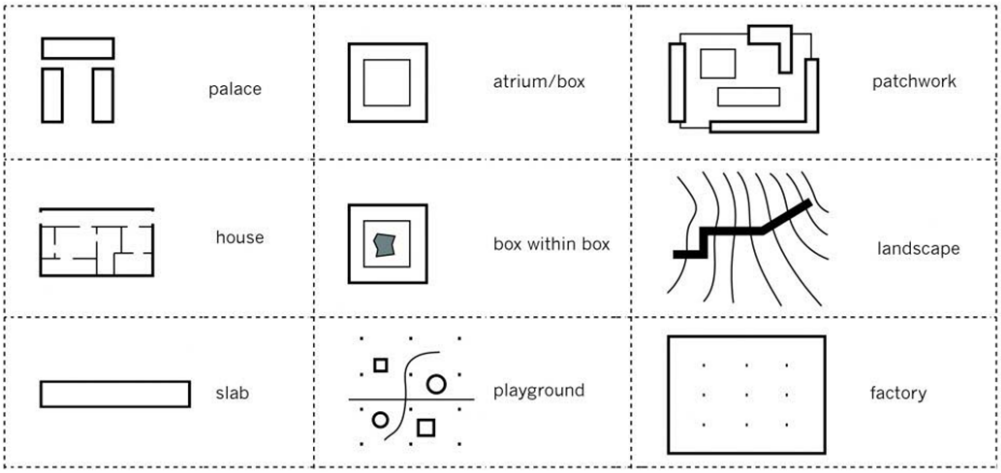


Figure 2: A critical evolution of spaces for architectural education

Source: http://maisonh.nl/2018/01/27/architecture-schools

2.4.1 A concise overview of typologies

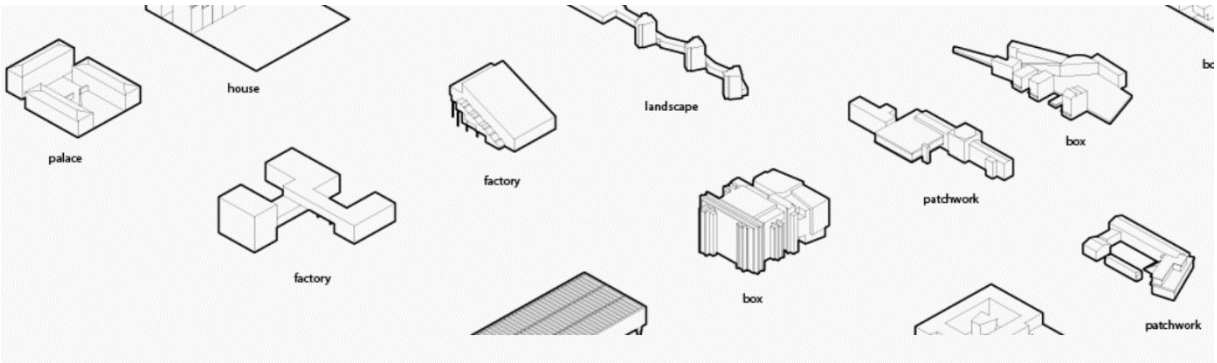


Figure 3: A concise overview of typologies

Society is in a continuing process of transformation, and the learning systems respond to changes associated with this transformation. Four distinct periods, in which a prevailing architectural pedagogy resulted from a broader social-cultural framework that was translated into a type of architecture and/or architectural learning system. The identified four such frameworks and periods: the Renaissance, Industrial Revolution, Post 1960's and Post 1990's.

2.4.2 Renaissance

In the seventeenth century, the national government of France undertook for the first time to foster architecture as one of the fine arts by supporting schools for the education of artists. Education model was called 'Beaux-Arts. The buildings represented the architectural values clearly as a palace for studying exemplary projects. Various other schools around the world, first in Europe, later around the late 19th century also in the United States, were started with this ideology and followed similar building typologies.

2.4.3 Industrial Revolution

All structures and processes in society followed ideas of standardization. Factory-like spaces emerged in which new materials enabled light, open and flexible structures.

2.4.4 Post 1960's

Pivotal change in thinking about architecture, away from the anonymous factory, toward more diversified, socially-oriented, experimental spatial typologies. With the social-cultural change, instead of clear, flexible open spaces, complex networks of smaller, very particular spaces are connected in labyrinthine ways. Or perhaps we can say that it seems the wide-ranging spatial experiments of the post-60's has resulted in two dominant typologies; the 'patchwork 'and the 'box-in-box'.

2.4.5 Post 1990's

In the past two to three decades there has been a global increase in the building of new schools of architecture and again a shift in typologies following changing social value systems.

2.5 Teaching ideology expressed through interior organization

In addition to the architectural typology of the buildings designed for architectural education, the teaching pedagogy is also heavily relying on the interior organization. There are various specific didactic spatial components for architectural education, and these can be designed and interpreted differently according to a prevailing teaching ideology. Below are three basic examples of spatial elements picked from the before-mentioned schools.

2.5.1 Student Arrangement

Type of desk and its arrangement can heavily influence or communicate the educational ideology. For instance, whether the size of a desk allows for drawing, presentation drawings, or building models, or only has room for a laptop determines whether students are encouraged to use a model shop for group work, or instead remain fixed to their own desks.

Whether the desks are individually placed back-to-back (e.g., Harvard's Gund Hall), separated, or grouped together in small groups (Yale) or in an open-plan office style (Cornell), or perhaps assigned to a person throughout for the duration of the program (eg. Harvard GSD), or flexibly

defined on a day-to-day basis (TU Delft), or informally occupied (Strelka) all influence the teaching possibilities. It determines whether a student is encouraged to interact, or to stay put.

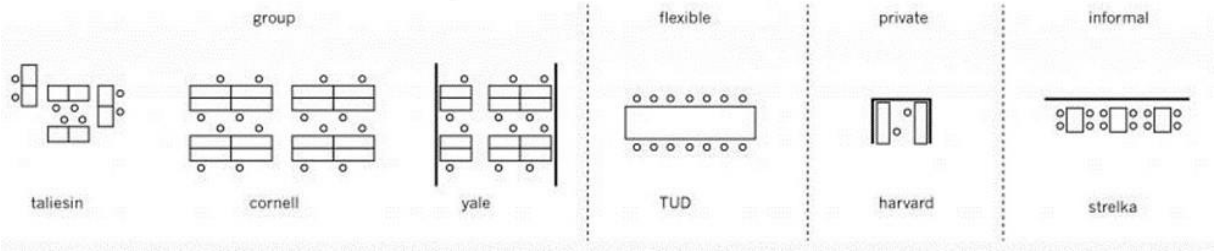


Figure 4: Desk Arrangement

Source: http://maisonh.nl/2018/01/27/architecture-schools

Fig: TUD

Fig: SMEF's Brick School of Architecture, Pune India

Fig: Melbourne School of Design

Fig: Harvard Graduate School of Design

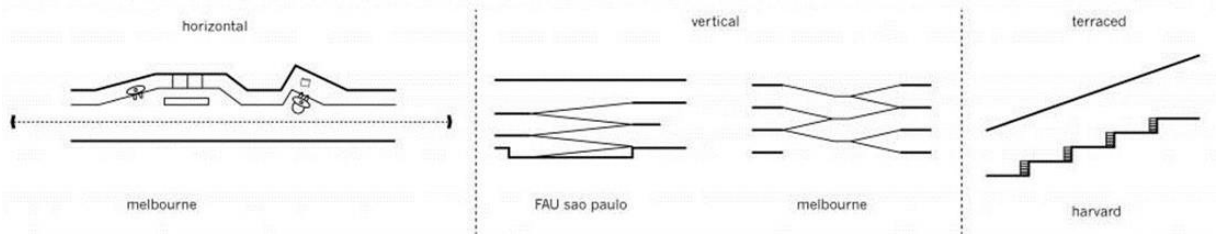
2.5.2 Circulation

All schools also need circulation, like they all need desks. In the same way that a desk communicates a philosophy, so does the circulation influence space for the education of creative disciplines. There is various way the learning system can be expressed in the way the circulation is part of the architectural expression.

Horizontal circulation becomes a place for informal exchange and meetings (like at the Melbourne School of Design

Vertical circulation is designed as a connecting, continuous street instead of using elevators (like at Sao Paolo's FAU).

Stacking of elements as a stepped terrace so that students can look out onto each other's work in progress if they stand up, while still maintaining their individual privacy (Harvard GSD).



Fiaure 5: Circulation arranaement

Source: http://maisonh.nl/2018/01/27/architecture-schools

2.5.3 Crit space

Designs for these reviews broadly fall into two categories; designated review spaces, or flexible review spaces.

At Yale, the crit space is a flexible space conceived as a double-height volume in the center of the floor, called the review hall. It is open from all sides and pours out in the studio spaces with student desks, which can be used for other public activities when there are no reviews taking place.

The studio spaces are actually arranged around this central review space and are connected to the upper mezzanine of studio spaces. These upper spaces become "overlooking, floating slabs which give an opportunity to be together, yet separate; involved yet detached". In Taliesin however, the review space is very differently situated, not very formal in the centre of the attention, but in a separated section, with sofas and lounge chairs that allow for a more informal presentation environment.

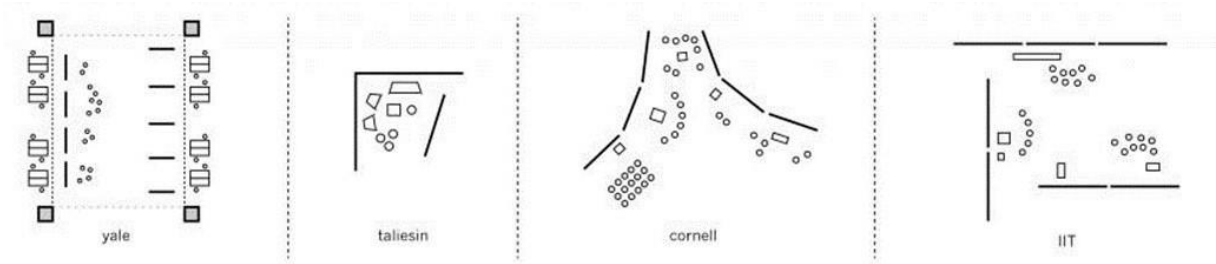


Figure 6: Crit space Arrangement

Source: http://maisonh.nl/2018/01/27/architecture-schools

2.6 Revitalizing a Better Learning Environment

A school is a combination of Students, Teachers, and Learning Environment

Student + Teacher+ Learning Environment= School

Student

A student is primarily a person enrolled in a school or other educational institution who attends classes in a course to attain the appropriate level of mastery of a subject under the guidance of an instructor. A person who is an attentive and systematic observer.

Students' Psychological Requirements

The development of schools reached its climax during an **industrial era**, especially between the late 18th and 19th centuries. But the education that was taught was merely dedicated to students. Students were not learners at that time, instead, they were like a machine, a robot designed to do work later so as to fulfill the need for manpower for development during the industrial era.

Life in the industrial economy was typically viewed as a series of discrete segments: school, work, and retirement. But this thinking is no longer viable as we have entered the era of lifelong learning. Facts taught in school today can be obsolete within a few years.

Education in this century should be such, students are free to choose what they want to study. In fact, schools should be such, students feel like they are free, not bounded by four walls, independent but still responsible for their own actions.

Self-Determination Theory (SDT) describes the socio-context variables that assist and impede human motivation, performance, and development (Decia & Vansteen-Kiste, 2004). These socio-context variable are innate psychological needs.

- ☐ **Autonomy**

When people feel they are the cause of their behavior, not independence or total freedom but rather an internal acceptance of and engagement with one's motivated behavior.

- ☐ **Competence**

When one feels effective in own behavior and taking challenging problems close to self-efficacy. (the ability to do something successfully or efficiently)

- ☐ **Relatedness**

When one feels connected to or understood by others, kin to the need of belongingness, interpersonal as well as group connections. (the state or fact of being related or connected)

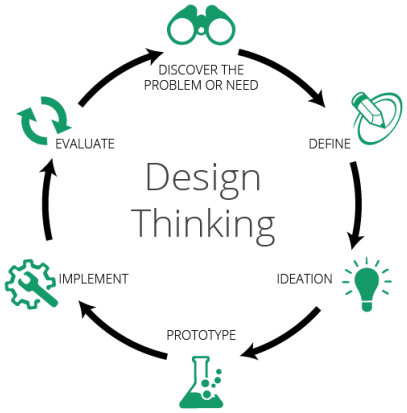


Figure 7: Cycle of Design Thinking

Teacher

A teacher is a person who helps others to acquire knowledge, competences or values. A teacher's professional duties may extend beyond formal teaching. Outside of the classroom teachers may accompany students on field trips, supervise study halls, help with the organization of school functions, and serve as supervisors for extracurricular activities. In some education systems, teachers may have responsibility for student discipline.

2.7 Architecture Studies

Fusing design with critical thinking, architecture schools teach students to have the confidence to put their ideas and their results into the world. Schools challenge students to respond to dynamic cultures and interrogate difficult questions with the aim of producing confident, engaged, and sensitive work. Through design studios, seminars, and lectures, students experience the practice and theory of architecture and encounter the cultural concerns and methodological paradigms that give shape to the discipline.

2.7.1 Teaching pedagogy in architecture

In the design of an architecture school, its teaching pedagogy influence in a great extent. In this context, it’s equally important to understand the relation between student and teacher in an architecture school. Traditional architectural education that was often focused on developing technical skills and design expertise.

New architectural pedagogy emphasizes critical thinking, interdisciplinary collaboration, and a holistic approach to architecture that considers social, cultural, and environmental contexts. It emphasizes the importance of architecture as a social practice, and seeks to prepare students to become socially responsible architects who can address pressing global challenges such as climate change, social inequality, and urbanization.

A. Students-teacher’s relation in an architecture school

Student-tutor relationships have a direct effect on students’ creativity in the design studio. A large percentage of his/her time is spent in the design studio either working on assigned projects or receiving critics from tutors. Considering the amount of time spent between teachers and students, it is important that there be good interactions between them so that both groups can enjoy the time spent together within the learning environment.

Tutors play a very important role in architectural education, particularly in the design studio. This is because of the central role that design plays in architectural education. Within the design studio, students spend more one-on-one time with their tutors than in any other course. However, instances have shown that relationships are not always positive between students and their tutors. Negative student-tutor relationships have the potential to demotivate students and lower their creative abilities from being maximally expressed. (Mohsen Ariani, 2016)

B. Tutoring and the Crit Teaching Method

In architectural education, tutoring can take many different formats. These different formats can be in form of group tutorials, individual tutorials, seminars, workshops, visits to buildings, and 'crits' with invited external practitioners and academics. The predominant teaching method used in schools of design all over the world is the crit teaching format. This method can be approached in two ways. The first involves a one-on-one interactive session between the student and his design tutor during which time the student's design work is presented to the tutor for his assessment, comments, and criticisms. This session might occur several times a week for the duration of the study program.

The second method involves sessions with external jurors who are usually practicing architects or academicians from within or without the institution. Such sessions may take place once or twice within a semester. At these sessions, assessments are made of students' projects and scores are given by the assessors which usually constitute part of the students' final grades. (Mohsen Ariani, 2016)

C. Transformative Pedagogy in Architecture

Transformative pedagogy is defined as an activist pedagogy combining the elements of constructivist and critical pedagogy that empowers students to examine critically their beliefs, values, and knowledge with the goal of developing a reflective knowledge base, an appreciation for multiple perspectives, and a sense of critical consciousness and agency. Practices that foster transformative learning include open spaces for dialogic learning and immersion in authentic learning experiences.

A term that refers to interactional processes and dialogues between educators and students that invigorate the collaborative creation and distribution of power. As a concept, it is based on the fact that the interaction between educators and students reflects and fosters the broader societal pattern. Transformative pedagogy in architecture is about balancing the creative act required for successful design and the social and environmental responsibilities that should be embedded in this act.(Salama, 2009)

D. Architectural Pedagogy in the digital age

Many educators and practitioners have called for a combination of both physical and digital design methods rather than the use of either method separately. The combination of both techniques gives the designer added insights and more ''real" approaches to develop, reconsider and refine any design. It should be actively incorporated into the educational curriculum to prepare the students as they move toward practice.

Computer applications have been used in the profession over the past three decades to enhance existing practices by facilitating the production of vast quantities of drawings with high accuracy and over less time. Digital technologies have been used in architectural schools to challenge the modernizing view of architectural practice. Computer application has affected

both practitioners and students in terms of their skills and the setting of educational and professional culture. Simultaneously, combining traditional design approaches with digital technology is effectively improving architectural practice. Computer application has been used by schools of architecture to transform architectural imagination and architectural practical possibilities.

Incorporating new technology into the learning environments has had three main effects:

(1) It has promoted student-centered learning and led to observable improvements in student work.

(2) It has changed the relationship between students and lecturers as eLearning has taken place.

(3) It links the student's learning to their ethical responsibilities in the world, such as environmental sustainability. (Salama, 1995)

E. Reflection of modern technology on the architectural studio

As a result of the rapid technological developments of the capacity of modern technology, the Design Studio, which is known as the Traditional Design Studio, suffers from many disadvantages that cannot be overcome unless modern technological developments enter the heart of the architectural work. These disadvantages are as follows:

1. Graphics, models and presentation tools, which are used to express design ideas, are constrained and limited compared to the possibilities offered by modern technologies.

2. Traditional drawing tools are no longer flexible enough to help show design ideas in a clear and integrated way. The traditional drawing tools, such as pens, inks, and various geometrical drawings, now stand helpless against the tools and methods provided by the computer and specialized software.

3. The lack of information sources needed by the student or designer to support the design process such as books, magazines, photos and maps, which are not always at hand when needed.

4. Evaluation of projects in the traditional way remains limited or less efficient.

5. It is often difficult to invite referees to discuss student projects, either for distance or for members' preoccupation.

The traditional architectural workshop was directly influenced by these developments and resulted in a revolution in its understanding and physical composition. For example, relying on the use of three-dimensional printing to print accurate three-dimensional engineering models to increase the illustration and give a thumbnail of the project, but in a three-dimensional and contains a lot of fine details. The three-dimensional printing provides relative speed, simplicity and cost-effective solutions by printing models directly from programs such as 3D CAD with the addition and modification of information by designers. There are many architectural departments in the international universities adopted the use of these modern

technologies as an important part of the process of education to increase innovation and improve communication with the labor market. New architectural pedagogy also emphasizes the use of digital technologies such as BIM (Building Information Modeling), 3D printing, and virtual reality to support design exploration, visualization, and communication.

Maximum percent of the computer applications are integrated within the design studio while minimum percent are taught as standalone courses in international architecture schools which is vice-versa to national level architecture schools. This suggests that in order to compete with international architecture status, national architecture schools should integrate technological strategy in their pedagogy from the preparatory years to the final years.

In order to keep up with the technological developments and catch up, the following recommendations can be made:

1) The need to focus on the importance of developing computer-related lectures starting from the first year of architecture students in parallel with architectural design and architectural graphics so that the student will be able to start designing using computers and modern technologies.

2) The need to link most of the theoretical lectures if not all, with computer programs directly related to these lectures.

3) To strive to make design through modern technology an integral part of the teaching of architectural design lectures, the construction of buildings and the history of architecture, and to encourage students to innovate in the field of modern technologies.

4) The need to review the processing of the local architectural studio (Design Studio) so that each studio has a set of modern technologies connected to the Internet and equipped with the necessary programs.

5) Rehabilitation of faculty members so that they be able to deal with these techniques.(Salama, 1995)

2.8 Features of architecture education

- Based on project-based learning
- Complex process that encourages students to develop new ways of seeing, thinking, and doing
- Concerned with the development of new cognitive abilities, values and conceptions
- Rich, varied and interdisciplinary in nature

A. Project Based Learning

- It is the learning process that is applied in architecture education.
- It allows teachers to create tasks whose complexity and openness mimic problems in the real world.
- Students can see the interdisciplinary nature of these tasks, and see that each task may have more than one solution.

- Students have the freedom to choose different strategies and approaches may become more engaged in the learning process, and these students will be more likely to approach other problems with an open mind. (Lyutskanov, 2019)

B. Teaching Design Thinking

"Teaching thinking is not easy because thinking is intangible? – De Bono.

Design thinking is the process of thinking which involves visualization, which is the skill and ability to convert vision to visuals. The elements of Creativity can be nurtured if creative stimulus is introduced and the techniques of problem solving are explained.

2.9 Trends in Learning and Teaching

Approaches to learning in educational settings are changing. Traditional teacher centered models, where good teaching is conceptualized as the passing on of sound academic, practical, or vocational knowledge, are being replaced with student-centered approaches which emphasize the construction of knowledge through shared situations. The shift from an 'instruction paradigm' to a 'learning paradigm' has changed the role of the higher and further education institution from 'a place of instruction' to 'a place to produce learning

2.9.1 Stimulation-Based Learning by Doing:

This architecture aims to have students learn every possible skill through learning by doing. Because the doing of the task is what prepares the student for real life, it is important that the student be able to actively engage in such tasks. Simulations of all kinds can be built. But the designer must understand the situation well enough that the simulations will be accurate portrayals. This can mean, in the case of simulations of people-to-people interactions, having to create complex models of human institutions and human planning and emotional behavior. The Simulation-Based Learning by Doing Architecture is critical when the subject matter to be learned is experiential at heart. Much of natural learning is the accumulation of experience.

2.9.2 Incidental Learning:

Obviously, not everything is fun to learn. In fact, some things are terribly boring to learn. But people do habitually learn a variety of information that is quite dull, without being completely bored by it. Often, they do this by picking up the information "in passing," without intending to learn the information at all. The Incidental Learning Architecture is based on the creation of tasks whose end results are inherently interesting, and which can be used to impart dull information. We have built programs that impart incidental information while engaging the user in a fun and interesting task.

2.9.3 Learning by Reflection:

Sometimes a student doesn't need to be told something, but rather needs to know how to ask about it. It could be that the student has a vague plan he wishes to mull over. Or perhaps the

student has a problem and needs to figure out a way to approach it. Or maybe the student has finished a project and wishes to think back on how he could have done it better. In such cases, a teacher's job is to open the student's eyes to new ways of thinking about his situation, to help the student articulate the situation and generate ways of moving forward. The teacher's job is to muse with the student.

2.9.4 Case-Based Teaching:

This architecture depends upon these two ideas: experts are repositories of cases, and good teachers are good storytellers. The task of this architecture is to tell students exactly what they need to know when they need to know it. When students are learning by doing, they experience knowledge failures, times when they realize that they need new information in order to progress. Such are the times when Case-Based Teaching can provide the knowledge that students need. Because isolated facts are difficult for students to integrate into their memories, useful knowledge is typically best presented in the form of stories.

2.9.5 Learning by Exploring:

The previous architectures deal with the difficult problems of getting students involved in their own learning and letting them learn through performing tasks that they care about. As we've pointed out, when students get involved, they naturally generate questions. And they are ready to learn from those questions. An important method of teaching is to answer a student's questions at the time he generates them, and carry on a conversation with him, answering whatever follow up questions he generates. The Learning by Exploring architecture is intended to provide such answers in a conversational format.

2.10 Major consideration for designing institutional building for architecture education

Any design has its peculiar characteristics defined by the function of the building and other factors. Before designing of the building following factors should be considered:

Architecture of school should be such, it provides value and meaning to its existence. Not only the way the education is taught in school, but the way it’s built. Both exterior and interior, affects the way the students learn in many terms. For evidence, I have shown below some of the major conclusion on school architecture by some of the famous architect and researchers in 20th century.

There is nothing new about the idea that much of what we learn from the architecture of our schools—and other public buildings, for that matter—is a reflection of larger cultural values (Bingler, 1995; David & Weinstein, 1987).

Realizing such importance, many architects have made different approaches to provide meaning through school architecture. For instance, with respect to the very concept ***ONE SIZE DOESN’T FIT ALL***, students learn in different ways. And so more and more we are looking

at how to differentiate learning environments, to create different settings within the schools we create, where learning can take place effectively.

2.10.1 Learning Spaces

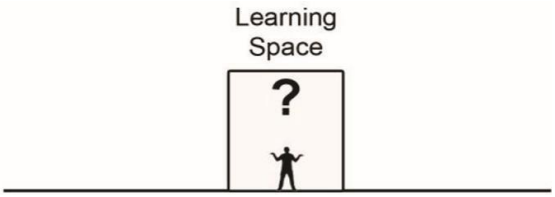


Figure 8: Learning spaces

Source: (Wall, 2016)

"Design is an expression of feeling……. Any creative Act is design."

Learning spaces focuses on how learner expectations influence such spaces, the principles and the activities that facilitate learning, and the role of technology from the perspective of those who create learning environment: faculty, learning technologists, librarians, and administrators. Information technologies have brought unique capabilities to learning spaces, whether stimulating greater interaction through the use of collaborative tools, video conferencing with international experts, or opening virtual worlds for exploration.

The concept of learning space has developed from many fragmented antecedents. The learning space should be 'flexible' to meet learners' sensory and mobility needs and, secondly, designers should adopt built pedagogy as their design philosophy, based on the need to influence individuals' behavior and action through design (Monahan, 2002).

A. Aspects of learning spaces:

- ***Engagement and adaptation*:** how people understand and are affected by their environment, and how they use space and transform it through their use;
- ***Spatial routine*:** those everyday social and spatial practices which affect, and are understood by, others within a community;
- ***Design***: established repertoires of spatial designs and the process and outcome of attempted innovation.

B. Types of learning spaces:

- **Physical learning spaces**: classrooms, studios, laboratories, workshops
- **Virtual learning spaces**: internet, chats, blogs, email
- **Cognitive learning spaces**: relaxation spaces for open-minded thinking
- **Social learning spaces**: sitting spaces, interaction spaces

Learning is the central activity of colleges and universities, sometimes that learning occurs in classrooms (formal learning); other times it results from serendipitous interactions among individuals (informal learning). Space whether physical or virtual can have an impact on

learning. Physical learning spaces cater to either formal or informal learning which includes classrooms, lecture halls, studios, seminars, libraries, hallways, lounges, hostels, etc. these spaces are usually with-in built-up environments it can bring people together; it can encourage exploration, collaboration, and demission. (Wall, 2016)

Or, space can carry an unspoken message of silence and disconnectedness.

Well-designed learning spaces inspire creative, productive, and efficient learning. Developing a realistic, detailed sense of the student experience is an important starting point for the design process. A few trends are worth considering here:

- Classrooms are not the only form of learning space. While the classroom is assumed to be a primary location of learning, data suggest that a majority of student learning activity takes place outside the classroom.
- Social interaction is a growing part of learning. Evaluation methods and performance metrics emphasize individual effort and achievement, but students increasingly are motivated by social interaction with their peers. Pedagogy is shifting to emphasize team activities and collaborative learning.
- Technology is natural. Computer and networking technologies that once might have appeared exotic (pervasive wireless networking, iPod, and smartphones) or transformative are now considered mainstream. While "digital immigrant" faculty may perceive these technologies as a new part of the educational landscape, "digital native" students see them as a natural component of their lives.
- Learning can occur out of sequence. Although lectures, books, articles, and other traditional tools present information in a deliberate, sequential manner, today's students are comfortable with overlapping discussion threads and parallel activities that may span different types of media, devices, and communities. (Wall, 2016)

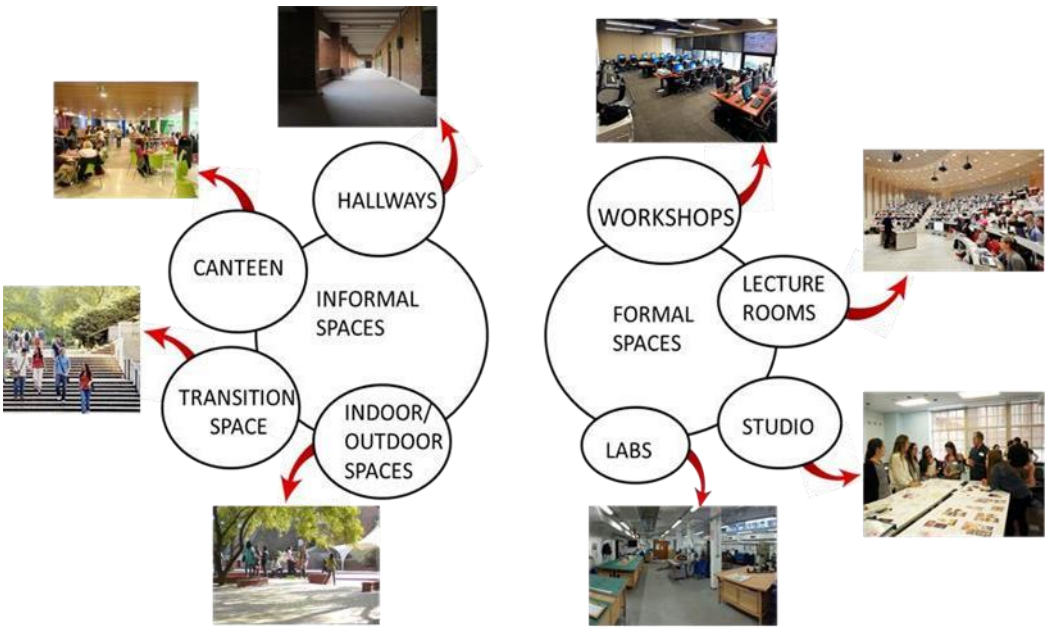


Figure 9: Types of Learning Spaces

In the 19th and 20th centuries, campus design tended to build exclusively for classes instead of individuals. This can be seen in form of the classroom and corridor (cells and bells) school design that assumes all students will be doing the same time using the same resources. But at present confining students within cells and bells and delivering education to them is not much effective. Hence the outdoor environment is equally important and necessary. It can be:

A. Outdoor Public Space

Schools, campuses also need to consider their own public space - indoor and outdoor both works to ensure it is productive, safe, and inviting. The checks are useful indicators of space's effectiveness at supporting a wide range of formal and informal learning activities for teachers and students, and indeed supporting life between classrooms.

B. Indoor Public Space

The spaces between formal learning areas are designed specifically for informal learning; learning from peers, learning by application, and learning a range of highly sought-after 'soft' skills that are increasingly demanded by the business community as well as anyone with a desire for safer neighborhoods.

Interesting things are happening: people you know are walking past, conversations are happening, special events are being set up, or are in progress. There are invitations to participate: art, work is done is on display everywhere to be appreciated. (Wall, 2016)

2.10.2 A new environment for learning

New environments for learning are being designed or reshaped in response to changing pedagogical styles, to incorporate new information technology, and to allow for changing numbers and abilities of learners. Formal teaching spaces for large groups with a 'sage on a stage' are becoming less common than smaller, less formal. Many new models of spaces for learning have emerged over the last few years. Important examples are described and illustrated below:

A. Group teaching/learning spaces

Group teaching is a teaching approach widely applied in many educational programme on an international level. Lecture rooms and classrooms form a large component of the estate in further and higher education institutions, and will continue to dominate in the future. However, the traditional format of these spaces is being transformed to incorporate multiple learning modes. The role of academic teachers is gradually moving from that of 'sage on the stage' to 'guide by the side', while the student is combining the role of quietly reflective

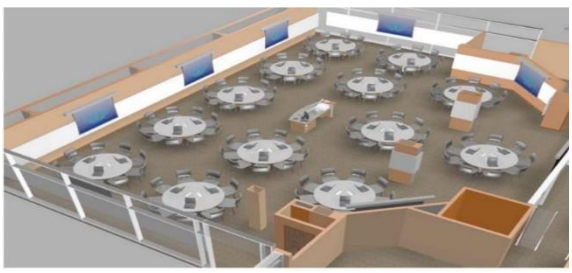


Figure 10: Technology enabled active learning classroom for engineering, MIT, Massachusetts Institute of Technology

absorber of ideas with that of active participant. (Huck, 2016)

B. Simulated environments

Active modes, learning by doing, take place in simulated environments where learners can be taught safely and prepared for 'real world' environments. Disciplines such as engineering, which were formerly learnt on the job through an apprenticeship system, are increasingly being taught first in an academic environment. This has created a demand for more simulated environments in universities. (Huck, 2016)

Figure 11: Tsinghua University –Graduate Lab

C. Immersive environments

Immersive environments are those where virtual representations play an important role in drawing learners into contact with complex information. The information may come in real time from another location, or from prepared sources. They are analogous to television newsrooms, large entertainment venues with huge screens showing parallel events and 'HIVES' (highly interactive virtual environments) used by the petrochemical and mining industries. Typical immersive environments in education are relatively small spaces for ten to twenty people, with several large, possibly curved, screens for projecting information so that occupants are literally surrounded by the data. (Frank, 2005)

Figure 12: Customized Immersive media environment

Source: (Frank, 2005)

D. Peer-to-peer social learning spaces

Spaces that facilitate peer-to-peer learning, and the positive effect of being in a learning group that is part of a learning community, are of growing importance in many colleges and universities. Seminar rooms have traditionally contained the 'group conversation' form of learning. They are being overtaken by more informal gathering places for social learning, 'a physical relaxation of the academic 'institution' … with a 'soft' zone of informal area for sitting, informal teaching and flexible seminar spaces. For instance, group rooms in libraries and learning resource centers designed for collaborative working and talking, rather than the traditional library silence for solo work. (Frank, 2005)

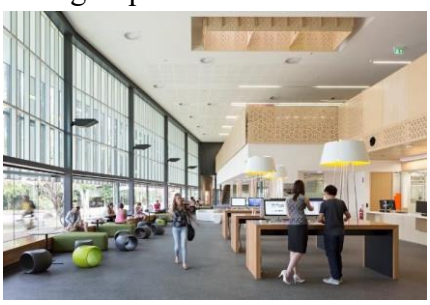


Figure 13: Student hub, JCU, Education Central

Source: (Frank, 2005)

E. Learning clusters

Learning clusters are groups of learning spaces designed for different learning modes. Learning clusters have come into being since research highlighted the benefits of using multiple learning modes to reinforce understanding. Traditional clusters include large group learning spaces and small seminar (or 'syndicate') rooms. Newer clusters incorporate interactive and group learning spaces, social learning spaces as well as more traditional lecture halls or classrooms, albeit with enhanced technology. In these spaces, some intersecting areas have been created for multiple learning modes to be used simultaneously. (Frank, 2005)

F. Individual learning spaces

Effective learning usually involves time in active, solo study and writing or creation mode. The spaces in which this occurs are typically in library areas, computer rooms and study bedrooms. Some people are capable of concentrating in many other environments, but they are the exception. The main changes to these traditional spaces are the introduction of more computing technology (or mobile telephony serving the same purpose), and attention to better ergonomic and environmental conditions. (Frank, 2005)

Figure 14: Individual learning spaces

2.10.3 Quality of space

A well-proportioned classroom which has appropriate storage, with just the right amount of display, is flooded with natural light, has good acoustics, no glare, good air quality, a comfortable temperature, sufficient space to accommodate a range of activities for the right number of students will improve educational outcomes. They recognize that the quality of space is one important way to set them apart.

Figure 15: Studio spaces at Jacobs Institute

Source: (Vaughan, 2000)

Many factors contribute to raising educational attainment in schools with great teaching being the most critical. Yet the research evidence also shows that good learning environments play their part, supporting staff and students to give their best. The quality of space is more important than its simple provision. (Vaughan, 2000)

2.10.4 Different Planning Typologies

The spatial organization of schools typically responds to teaching pedagogy, student demographics and site restraints, however, most schools exhibit characteristics of one or more of five basic planning typologies:

2.10.4.1 **SPINE/STREET**

Major school functions are situated along a central linear space (simplifies wayfinding and reduces secondary circulation). The spine/street is an active, inhabited space - a building focal point rather than a simple conduit. Situating the main entrance at one end establishes a strong axis which is often expressed in the massing of the building. High ceilings and clerestory windows for natural light and ventilation, as well as careful selection of materials and furnishings creates a welcoming, desirable "heart" of the campus.

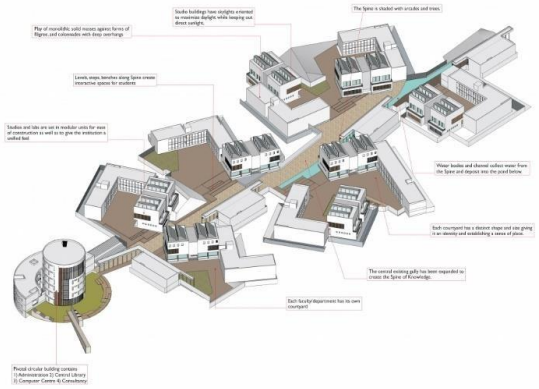


Figure 16: Street access and connecting

2.10.4.2 **CITY/TOWN**

The urban/city layout is reinterpreted as a loose composition of forms within a matrix of open, flexible social spaces. Classrooms are informally located around the library and "town hall" (main 01 gathering space). the resultant "plazas", "streets", and "parks" create flexible, studentscaled learning and instructional spaces; common in primary schools where the familiarity of the city/town fabric instills a sense of community and society.

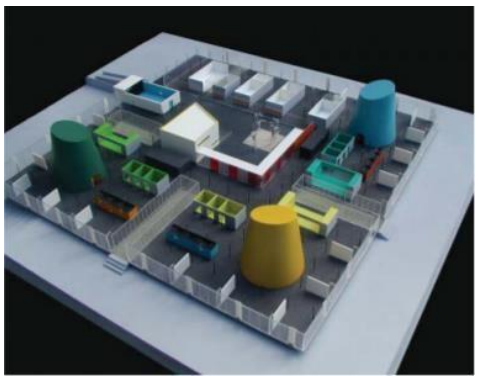


Figure 17: Urban planning of institute

2.10.4.3 **ATRIUM/OFFICE**

Modelled after the "typical" office environment, this scheme is best suited to large multi-storey high schools. A full height atrium serves as the main organizational hub, bringing daylight into deep floorplates and creating a unified, central gathering and circulation node. Open floor plans utilize glazed partitions to access light and views, and to define classroom spaces.

Figure 18: Collaborative learning in atrium space

2.10.4.4 **STRAWBERRY/LEARNING CLUSTER**

Classrooms, support, and flexible spaces are clustered into smaller groups ("strawberries") and connected by a central core providing circulation, social and shared spaces. schools are divided into less intimidating faculties and may specialize in particular subjects or simply foster closer student/staff relationships. The core may include most or all of the characteristics of the Spine/ Street typology (also

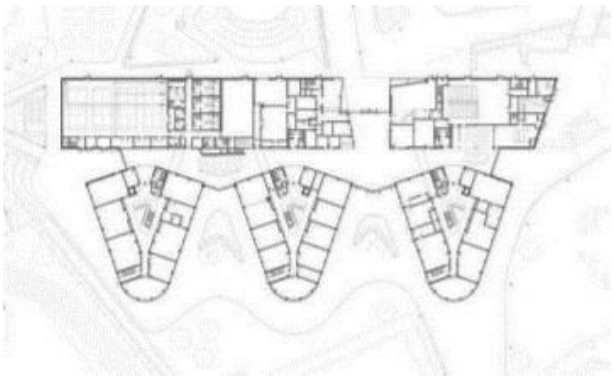


Figure 19: Learning cluster designing of Bristol referred to as "Strawberry/ Spine"). Metropolitan College, Bristol, UK

2.10.4.5 **COURTYARD**

Providing security, visual focus, and a sheltered microclimate, courtyards vary in size and shape while offering flexibility for year-round activities. Provision of a courtyard may increase the amount of building envelope and circulation space required (especially if corridors are singleloaded), however benefits include better access to natural light, views, ventilation and more pleasant interior spaces

Figure 20: Courtyard design of National

2.11 Some architectural consideration

2.11.1 Sustainability

Few sustainable features are adopted in the building for creating environmentally responsible and resource efficient throughout a building's life-cycle. This practice expands and complements the classical building design concerns of economy, utility, durability, and comfort. Although new technologies are constantly being developed to complement current practices in creating greener structures, the common objective is that green buildings are designed to reduce the overall impact of the built environment on human health and the natural environment by:

- Efficiently using energy, water, and other resources
- Protecting occupant health and improving employee productivity
- Reducing waste, pollution and environmental degradation

A. Rain water harvesting

Rainwater harvesting is a free, simple, efficient, and ecologically friendly method of water collection. Rainwater can be collected at the ground level or at the top level of the terrace for this function.The technique not only saves water for the city, but it also reduces the risk of polluting discharges from sewerage systems into surface waters as a result of storm water overflows. It is a set of tools and methods used for collecting, storing and utilizing the rainwater that falls on or near our land. Rainwater can be collected from rooftops, sidewalks and other surface areas.

One can use rainwater to drink or wash in or to water your landscaping and garden.

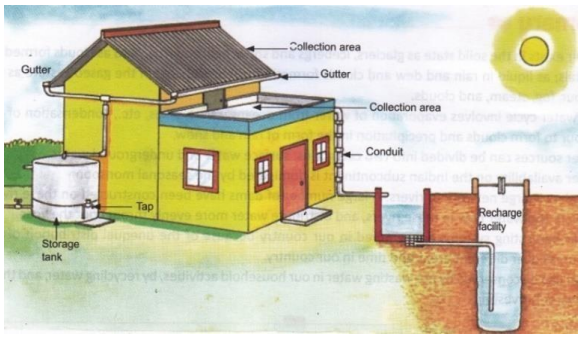


Figure 21: Rain water harvesting

Thumb rule

Rain water catchment area = length of roof x half of slope height + length of gutter

Rainwater harvesting potential = catchment area x runoff Coeff. of roofing material x annual rainfall of the area in m.

B. Ground water recharge

Ground water recharge is a process where water moves downward from the surface to the ground. This process occurs below the plant roots to the water table surface. Recharge occurs both naturally and through anthropogenic process, where rain water is routed through the process. This is done in the design through permeable pavements. It is a method of paving vehicle and pedestrian pathways to enable infiltration of storm water runoff. Permeable pavement surfaces typically include pervious concrete, porous asphalt, paving stones and interlocking pavers. The goal is to control storm water at the source, reduce runoff and improve water quality by filtering pollutants in the subsurface layers.

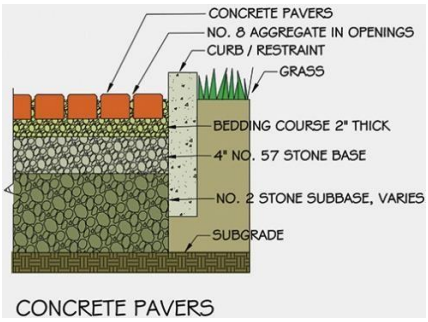


Figure 22: Ground water recharge

Figure 23: Permeable surface

C. Creating a microclimate

The presence of courtyard in the blocks helps in maintaining cool air with regular air flow. As we go from top to bottom, cold air settles down in the ground and hot air moves upward. This regular flow of air helps to create a livable space in the building. A courtyard enhances air circulation through a principle of stack effect (air movement driven by buoyancy). After the air passes through the interiors, it heats up and starts rising.

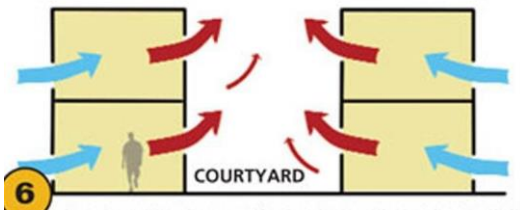


Figure 24: Courtyard effect

D. Orientation

"In buildings with a south aspect, the sun's rays penetrate into the porticos in winter, but in the summer the path of the sun is right over our heads and above the roof, so that there is shade. If, then, this is the best arrangement, we should build the south side loftier to get the winter sun and the north side lower to keep out the winter winds." (Oblinger, 2005)

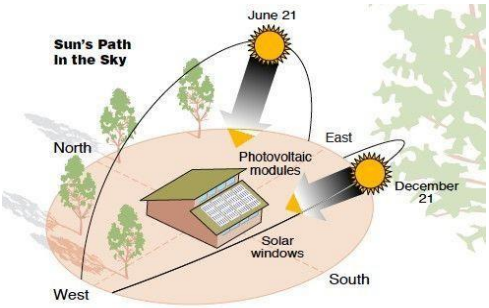


Figure 25: Solar orientation

Source:(Oblinger,2005)

2.11.2 Universal design approach

A. Minimize Distances Traveled

Students with physical disabilities may find it difficult to travel between spaces in the classroom. To minimize travel distances for students with disabilities, ensure there is ample open space between workstations that allows ease of access to all areas of the classroom. A horseshoe-shaped workstation, for example, might be insufficient for students with physical disabilities, as it requires taking long detours around the classroom.

B. Make the Whole Classroom Accessible

Mobility for students with disabilities goes beyond just getting to the classroom door. Placing them near the door or in a separate space might seem convenient, but it isolates them from their peers and learning materials. Students with disabilities should be able to move around the classroom and participate in all activities. All pathways, desks, and workstations should be accessible, and clutter on the floor should be minimized to avoid blocking movement for students using aids or wheelchairs. It's important to ensure that all students keep their belongings stored neatly at all times.

C. Make All Materials Accessible

It is not always possible to place all materials at accessible heights and locations. However, I focus on placing the most commonly utilized classroom materials in the most accessible spaces. Whenever possible, I aim to make all regularly utilized materials accessible for students with physical disabilities. While reach may be the primary concern when thinking about accessibility, it is not the only one. I have had several students with limited fine motor skills, for example. A solution here is to place all commonly used materials in drawers with large, easy-to-grasp handles.

D. Make Accommodations for Guests with Physical Disabilities

Often, teachers only consider the needs of students in their class. A teacher may only actively think about accessibility when they learn they will have a child with a disability in their class for the year.

However, many important classroom guests may also have physical mobility requirements. Parents with disabilities have as much right as any other parent to access the classroom. Teachers in the school with physical disabilities may also need to access your classroom from time to time. Being prepared for these possibilities before the guest arrives makes the guest feel more welcome within the space. It also prevents situations in which people with physical disabilities are made to feel like an inconvenience. (Brown, 2005)

2.12 Building Function and Component study

School of Architecture as the topic itself explains will be designed as an institution for the architectural studies. The school is proposed for bachelor program with the accommodation facilities for students. The school is designed for 48 students per year. Taking into the considerations the course followed today for architectural studies in Nepal and adaptation of modern-day facility and technology of learning, teaching and exposing the works, and other supplementing activities. Following requirements has been drawn:

- Academic block
- Administration Block
- Exhibition Cum Resource Center
- Cafeteria
- Library
- Accommodation Block
- Recreational Hall
- Auditorium

2.12.1 Lecture Hall

The simplest possible way of teaching area is preferrable, meaning a large, open rectangular area. Any classroom with more than 7 rows must be tiered/ sloped. Adequate clearance for wheelchair turnaround to be provided between the fixed teaching stations and walls. Optimum number of wheelchair accessible seating aeras to be provide and to be located in convenient locations as much as possible based on the room layout.

Avoid the following:

Chamfering of walls (angled walls) around teaching area as it complicates an area that may need movable equipment or be reconfigured.

Lecture halls in a trapezoid shape (in order to have the room shape conform to the vision cone) as they reduce the width of the teaching area.

Depth of Teaching area should be greater than the width of the projected image and to exceed the following minimum depths.

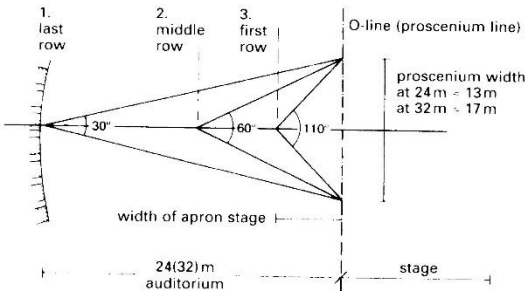


Figure 27: Viewing angle for students

Figure 26: Lecture Hall

Sitting arrangement determines the shape and size of the classroom. The arrangement depends upon the subject, number of students and teaching method. Classrooms are expected to deliver flexibility in variety of ways.

Seating arrangement in the classrooms should provide all students with good view of the board, ready access both to the seats and the board on the wall. It is desirable to have front wall longer than the side walls. Lecture hall are design for daily class lecture or the lecture from visiting professors.

Amount of space per student for seating in comfort is 70x65cm, and on average 60x80-55x75cm. 0.6 m2 needed per student including all spaces in larger lecture theatres under the most cramped conditions, in smaller lecture theatres and in average comfort is 0.8-0.95 m2. The angle of elevation from the eye to the upper part of the object on the screen or chalkboard should not exceed 30 degrees.

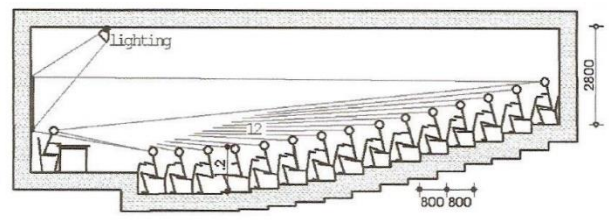


Figure 28: Standard Lecture Theater Shape

Lecture style rooms:

Room Capacity	Minimum depth of teaching area
25	8′ (2.4m)
50	10′ (3m)
120	11′ 6″ (3.5m)
250	13′ (4m)
500	18′ (5.5m)

Lecture hall for the school should can be designed in the form of:

a. Assembly Room

To combine large groups for professions lecture should be stepped in nature and provided with tablets or desk chairs for visual efficiency. Space required per student= 1.2 sq.ft.

b. Small Room

For seminar. Conferences, informal discussions provided with movable tables and chair. Arm chair may be used. Space required per student = 1.5 sq.ft.

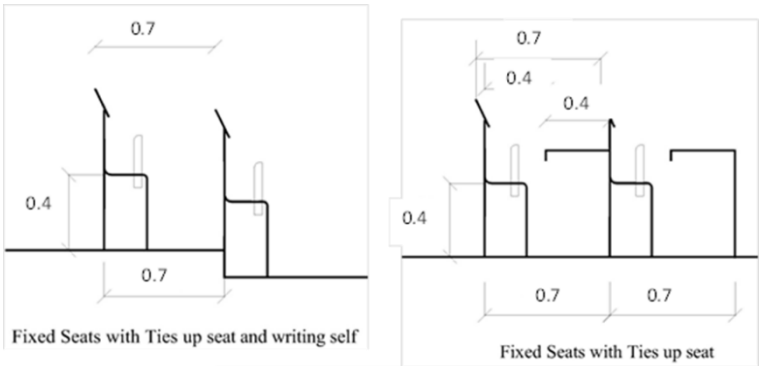


Figure 29: Minimum sitting dimension

2.12.2 Design studio

The design studio is the main educational elements used in architecture school and is particularly grueling. The studio is the place where students, spend most of their time talking about their design, talking to other students, etc. It should be an exciting place to be and to work where new project are created, completed or work in progress so that the students are encourage to compare creativity and increase their quality.

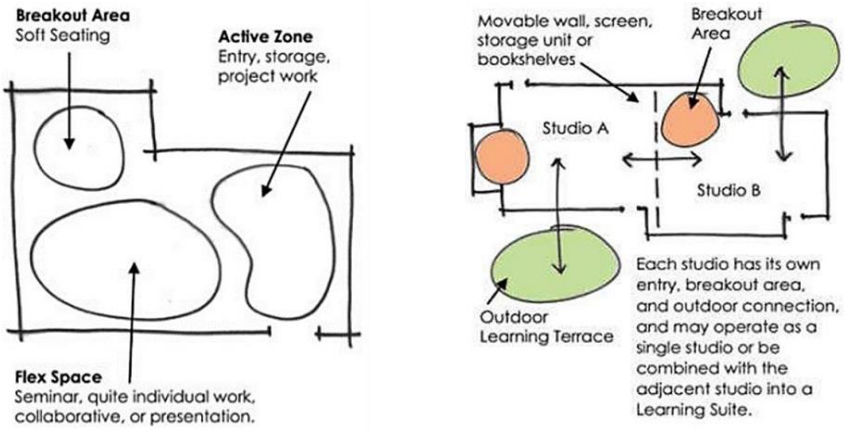


Figure 30: Model layout of Design Studio

Factors to be consider on Design studio

A. Peaceful Environment

Architecture is the combination of art and science. As artist the architecture also need a peaceful environment for better concentration. The design studio should be away from the noise generate from outside and inside of the design studio.

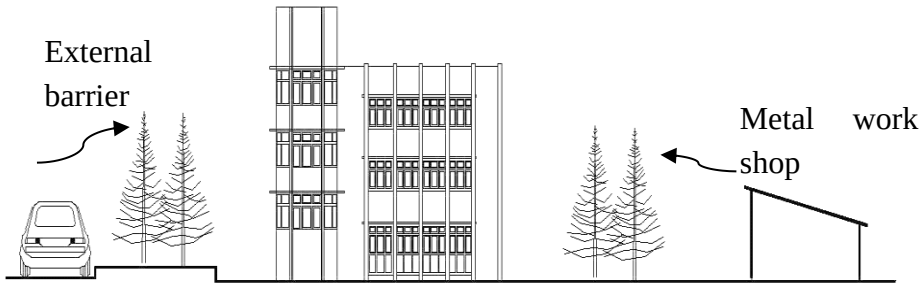


Figure: Exterior and Interior Noise Barrier

B. Space Arrangement

Space like studio should be an intersecting and intersecting as far as possible. It is not preferred if these areas are bounded by isolated blocks. There should be interlinks between theses spaces and they should be intersecting too. Beside that the references books and the models should be included together with equipment for copying drawings and documents, although such may be centralized. The studio as a space for architecture may be shown in figure.

C. Feeling of freedom

Architecture may get exhausted and tiered by fully covered dark and congested room with narrow corridors. There should be sufficient roomy corridor aisles. Largely airy room with high ceiling and transitional areas like courtyard or sky light lit space are well appreciated in design studio. Indoor and outdoor spaces should be linked as far as possible.

Each space requires 3.8-4.8 m2

D. Abundant working and circulation space

Unobstructed working and circulation spaces are demanded in studios. Architecture is the interacting platform there should be plenty of working area in the studios as people can move around easily. Besides that, plenty of circulation area is also need for the safe and efficient movement.

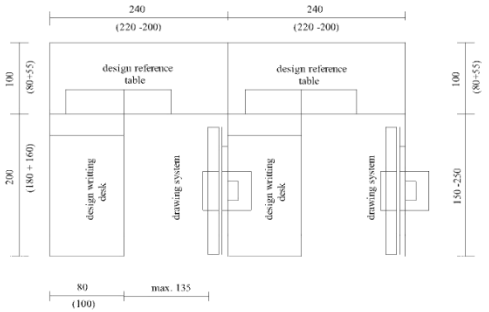


Figure 31:Work Space Plan

E. Abundant store area

In design studio, store area is an important as other working. There are lots of tools and raw materials like paper, model, and colors etc. which need a secured space to be used for future. Besides that, there are prepared drawings and model that may need a storage area. So, there should be plenty of stores and lockers room distributed all over the design studio. Store area for both the finished and in progress may be planned adjoining each studio.

F. Lighting

Natural light is more preferrable than artificial light in design studio. Studio must have good natural daylight, with north or east aspect. Roof lighting is also preferred. The north facing studio is preferred to achieve best even daylight. Artificial lighting is also important in the absence of daylight, in the detail works. Lighting appliances should be chosen such that there is no glare. The window on the side should have a sill height of about 3'.

2.12.3 Exhibition and jury area

Architecture is only one platform where education is done through interaction, observation and discussion. There should be the abundant space in design studio for displaying the creativity so that the interaction may take frequently among the students as well teachers. The exhibition areas should be easily visible and should accommodate sufficient number of people. In order to introduce the social activities, it is preferred to surround the exhibition area by courtyard.

There should be two type of exhibition one permanent and temporary exhibition.

- Permanent exhibition should display the work of previous academic year.
- It might be a room or a large space
- Exhibition area should be easily accessible to the visitors
- Temporary exhibition area should be place near workshop and studio
- The common jury area should be provided near to studios so that during jury it will be easily accessible to all.

Exhibition most of the times are held in galleries associated with the art facilities. The galleries must be designed in such a way that the lobby and entrance area direct the visitors to the gallery. It further helps the visitor to identify a starting point for viewing the displays.

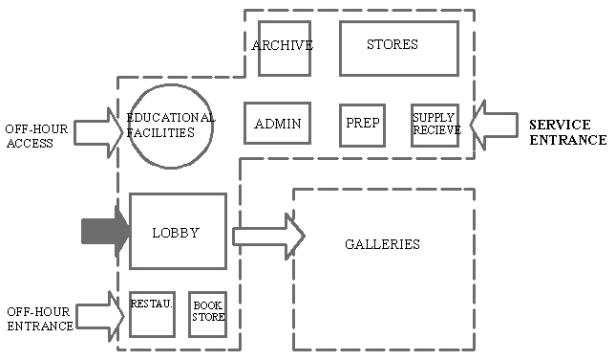


Figure 32: Functional diagram of Exhibition Space

General guidelines for planning all sorts of exhibitions can be summed up as:

- Visitors should be correctly oriented inside the exhibition area.
- Viewers should be able to move through the exhibit without being forced to walk past objects they have already seen.
- Adequate space should be provided for visitors to move at different speeds. The circulation space should also allow the visitor to take a quick look at the exhibits so that they can decide which ones to examine in detail.
- A viewer tends to turn clockwise upon entering the exhibit area. Circulation pattern should be designed with this in mind.

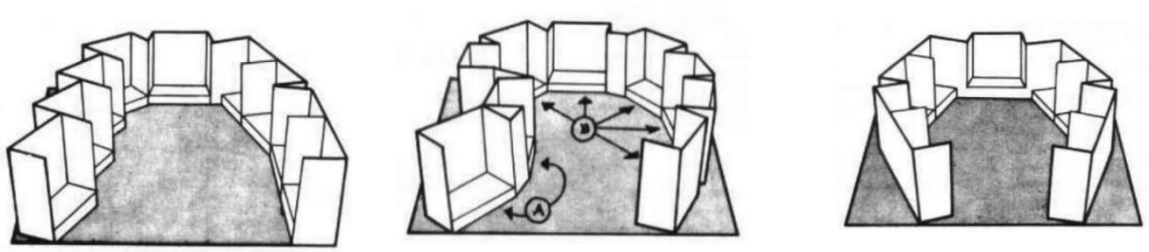


Figure 33: Possible Galley Arrangement

2.12.4 Art studios:

Studios for painting and sculpture require large areas must have good natural daylight with hi-level windows equal to at least 25-33% of the floor area and with north and east aspect. Roof lights may provide supportive light.

Art studio should have unique and large store area. It also required lots of blank wall spaces for display and storage cabinet. It needs a large area to accommodate the donkeys for each student all around the display piece. Artificial lights may provide supportive light.

Easel= 2.1mx1.0m

Donkey chair= 1.2mx0.75m

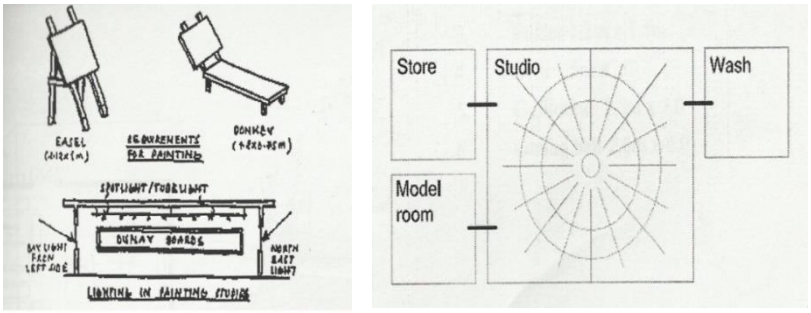


Figure 34: Furniture for art studio and typical space connectivity

2.12.5 Wood Workshop

Wood workshop needs a large machine so it requires to be placed in ground floor or basement level. There should be frequent and safety flow between the students while working. The floor should be finished with non-slippery materials. Workshop technician should be able to survey whole area from particularly glazed office. The locker for each student should be provided if necessary.

The store room should be provided next to the workshop with proper heat and humidity control.

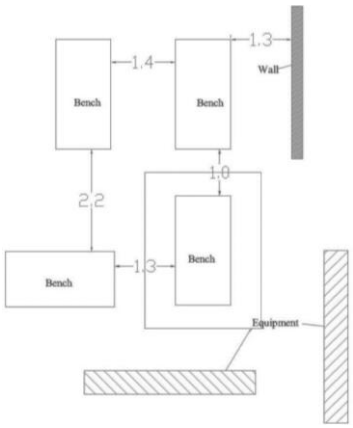


Figure 35: Wood working Space

2.12.6 Administration area

The administration space on the college premises is the controlling center. It also acts as a contact point for parents, students, and faculty members. Here the institutional records are kept and recorded, budgets are established, books are kept and students are counseled.

- The administration area must have common facilities that are shared by all office staff and principal and non-teaching staff.
- It should be accessible to all the workers in the administration area and visitors can access the reception area directly.
- Cashier space and locker should be isolated and not accessible to all accept the office.

The planning of the administration section should have efficient working practices and good internal communication.

- **Staffroom –** 7-9m^2 per person (individual 10m^2 minimum)

Additional spaces – Computer –2m^2

- **File storage** --- File cabinet –6-8m^2 per 1000 files

Box Files – 3m^2 per 100 files

Chief and other head of section---18 – 30 m^2

- **Meeting hall** -- minimum 30m^2 and it should be located on peace full zone.
- **Photocopy room** – 8- 10m^2

Additional space --- collecting –2m, binding –2m^2, Lamination--- 2m^2

2.12.7 Rest Room

Sanitary requirement will vary from place to place. The following are the general guide.

Gents' restroom

WCs – minimum 3 (up to 50 males) , then 1 for each additional 50

Urinals – minimum 3 (up to 50 males) , then 1 for each additional 50

Wash basin – minimum 1 for each WC plus for each urinal

Ladies' restroom

WCs – minimum 9 for 140 ladies

Wash basin—3 for 140 ladies, then add 1 for each addition

2.12.8 Auditorium

Seating Capacity

The seating capacity should be derived from the visual and acoustic limits for a particular kind of performance and the form of auditorium to stage relationship. In the case of teaching theatres and drama studios, seating capacity is of secondary importance. The main purpose is to provide the drama student with the feeling of an audience and seating for between 100 and 300 is usually sufficient.

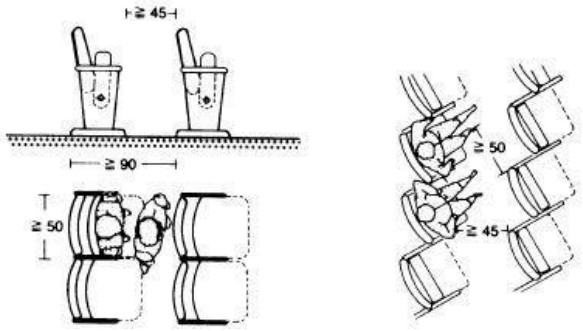


Figure 2-1: Auditorium Seating

The seating capacity is not the only measure of the size of a theatre. The size of the stage, the production facilities to support it and the scale on which the public areas are provided may have more effect. As a rough guide and to define terms, the following definitions are adopted.

- Very large: 1500 or more seats
- Large: 900-1500 seats
- Medium: 500-900 seats
- Small: under 500 seats

Design Criteria

- Stage height ranges from 800 to 1500 mm
- Eye level when seated is usually taken as 750 - 1120 mm above the floor measured through the central line at each row.
- Vertical distance between the average viewer's eyes and top of head is minimum 75mm.
- Maximum vertical angle of elevated view from nearest seats to avoid physical discomfort is 30 degrees.
- The vertical angle down from steepest balcony to avoid vertigo should not exceed 35 degrees.
- Maximum number of seats normally ranges from 16-25 depending upon the location, number and size of side aisles.

- There should be one exit door 800 mm-1000 mm (min) per every 150 seats as emergency prerequisite.
- The slope of the aisles should be around 1: 8.
- Deep overhanging balconies should be avoided., if balconies have to be used then either a flying balcony, a recessed one or one complying with standard proportions avoiding sound shadows should be used.
- Seating arrangement, row spacing seating capacity should adhere to standard norms.
- The dimensions of steps, landing and the limits to the steepness of inclines are also specified in detail in the standards.
- The risers of steps in the aisles must be uniform unless they are separated by a wide tread.
- No steps are allowed to cross the aisles; they must be illuminated at all times with 5 Lux.
- To make the steps more distinctive, nosing should be in a contrasting color and provided with step light.
- The ceiling requirements must satisfy acoustic requirements, lighting requirements, air-conditioning requirements, stage requirements, fire control requirements and aesthetical requirements.

Acoustic in an Auditorium

For acoustical analysis of an auditorium the importance must be given to the size of audiences and furnishings of the room. Seats, occupants and furnishing also add to the absorption of the room and thus affect the reverberation time. The absorption by the seats is computed per seat. The same method is used in calculating the absorption of audience.

Following points are considered for good acoustics in an auditorium.

Reverberation time:

If concert music is an important part of the program of use, the maximum desirable reverberation time of the hall would be something like 2 second at mid frequencies. The required volume of the hall will then be uniquely determined by the absorption provided by the audience and performers.

For musical and speech events, a less reverberant environment is required as little as 1.4 second. This range of reverberation time can be achieved with large areas of retractable draperies. The reverberant time can only be decreased by adjustable devices but cannot be increased beyond the upper limit set by the volume and the sound absorbing audience.

Seating:

Seating should be arranged in a manner that the audience is as near the stage as possible. For this diverging sidewall are preferred. Elevated seating is effective in absorbing sound and the angle of elevation should be less than 8 degrees. Carpeted aisles, carpeted floor and heavy upholstered chair helps in preventing objectionable reflection and suppress noise by tapping of feet.

Balcony:

Depth of balcony recess should not be more than two times the height of opening. Reverberation time of balcony recesses should be same as that of the main auditorium. Balcony soffit should be made reflective. By tilting the concave surface of the balcony front downwards, the reflections can be utilized to increase the sound level.

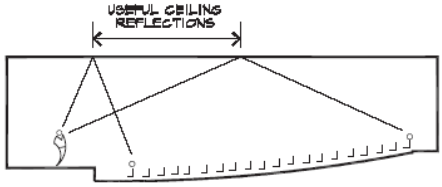
Orchestra:

An orchestra or a chorus cannot be performed and the usual stage houses full of sound absorbing scenery and draperies. So, the enclosure for the stage must be made of heavy, sound reflecting material (plywood, steel, etc.). It cannot be light painted canvas and it must be so arranged that it can be put in place and taken down with a minimum of effort.

Ceilings:

Ceiling in an auditorium should be reflective, thus highly reflective materials should be used for ceiling purposes. Depending upon the floor plan ratio, the ceiling height provided should be one third of the width of the room. The junction between the ceiling and rear wall should be avoided; instead, a splay should be made in between the ceiling and the wall.

Layout of floor plan:



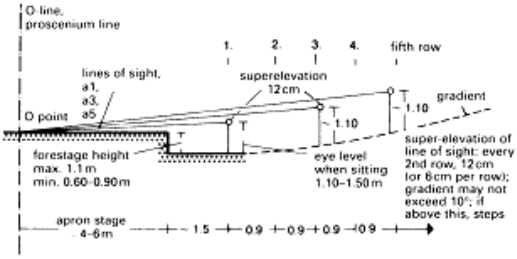
Floor plans with the ratio of length to width 2:1 is preferred than with ratio of 1:1. Circular and elliptical floor plans give rise to non-uniform distribution of sound and echoes. Acoustical condition in these plans can be improved by the addition of convex diffusing surfaces, which greatly reduce the focusing and creeping effects.

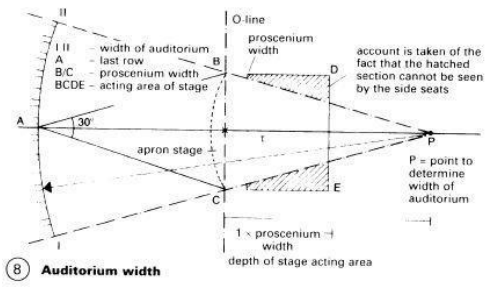
Walls:

Sidewalls should be able to direct sound to the rare wall. Care should be taken at side walls not be parallel but should be diverging or splayed as they result in proper diffusion of sound and also avoids flitter echoes. Concave surface should be avoided, as they are the sources of echoes. This surface should be treated with highly absorptive material and broken to distribute the sound uniformly.

Stage:

The stage floor should be raised to an extent, that it provides good sight lines from all the seats. The stage should have approximately the same reverberation time as the auditorium.





8 **Auditorium width**

2.12.9 Library

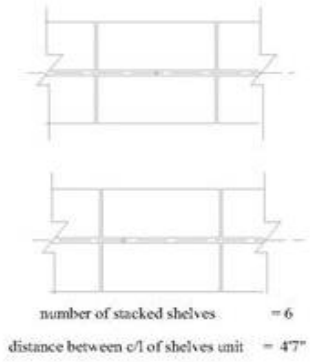
Purpose:

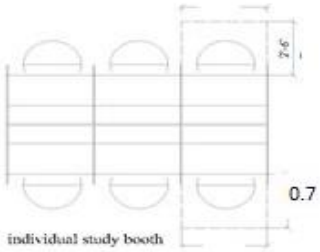
Information center for lectures, further research, and leisure and used by student and teacher both including books and magazines, research materials, lending facilities, reading, and workplaces.

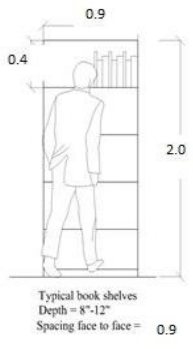
- Reading area is permanently lit with the daylight.
- Reference area should be accessible to the librarian and under his. her supervision
- Students and faculty should refer to the data.
- Cloakroom should be outside the library.
- Storage and achieves shall be accessible to the librarian only and for student and faculty in the special case.
- Audio-visual information area should be provided separately.
- Digital library should be placed separately.

Table 1: Space requirement for college library/information Centre

Sl.No.	Space for different areas	Basis	Area (m^2)
1	Stack Room for 10,000 volumes	100 Volumes / m^2	100
2	Reading Room for 50 readers	3.3 m^2 / Reader	165
3	Librarian and two Senior Professionals	15 m^2 / Person	45
4	Other Professional Staff (27)	9 m^2 / Person	243
5	Office: #Administrative officer #Other Staff (22)	15 m^2 / Person 9 m^2 / Person	15 198
6	Library Counter		30
7	At Service Point (15)	5 m^2 / Person	75
8	Seminar Room		20
9	Committee Room		20
10	Visitors Room		15
	Total :		**926**
	Additional Space for Passage, etc. (Approximately 40% of space estimated)		**370**
	Total space required		**1296**







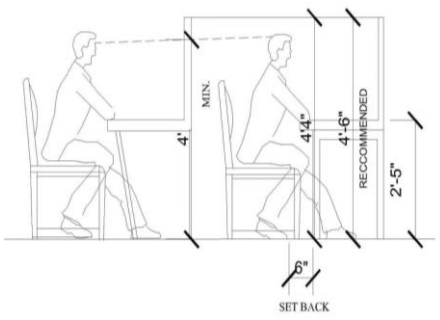


Figure 36: Seating in Library

Lighting in Library

Lighting is one of the main aspects of library design. The use of natural lighting is more preferable. The light in a library must be adequate for user to see a particular task, usually reading a book or text on the computer screen. If properly and carefully designed, day lighting techniques can reduce electric energy demand for lighting.

Lighting intensity in different parts of library is as follows:

Newspaper and magazines reading section = 200 lux

Technical section, Reading table in lending area = 400 lux

Reading area, circulation counter, binding = 600 lux

Close book stores =100 lux

Day lighting can be predominantly used in library by two means:

- Day light apertures through roof
- Day light apertures through wall

2.12.10 Cafeteria

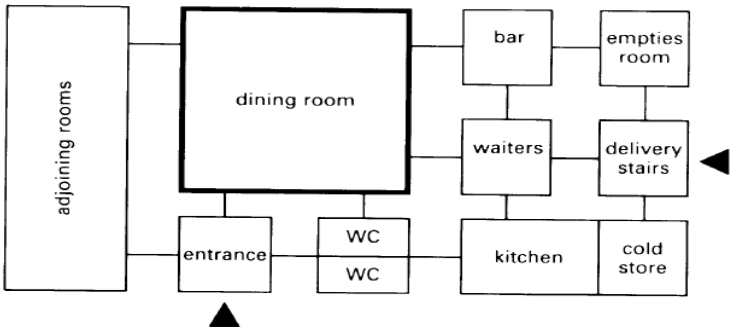


Figure 37: Typical Functional Layout of Cafeteria

Design Consideration for Cafeteria

- Dining area: 60% of total area of cafeteria
- Kitchen, Storage & Preparation area: 40-50% of total area of cafeteria
- Dining area per seat: 1.5-2.15m^2.
- Kitchen area per seat: 0.4-0.6m^2.
- Minimum width of service aisle 0.9-1.35m.
- Waiter station: 1 per 20-30 seats.
- Lighting in kitchen: 215 lux (minimum)
- Variety of seating arrangement.
- Access for guest should not be confused with service entry
- Floors and walls: durable and easy to clean.
- Sound absorbing ceiling.

- Cashier should be near to exit.
- Ambience can be created through decoration, lighting,
- Creating smaller more intimate spaces, level differences, etc.
- Kitchen area is divided into dry and wash-up areas.
- Kitchen and wash-up are preferably at the same level as dining space.
- Good natural ventilation to the kitchen.
- Other requirements include customer and staff toilets, office space,
- Food storage including refrigerator and deep freeze, boiler room, etc.

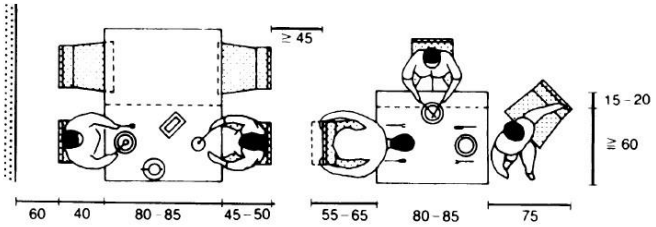


Figure 38: Cafeteria Furniture Layout and Dimensions

Table 2: Standard Dimension for Cafeteria

Main aisles	Min 2 m wide
Intermediate aisles	Min 0.9 m wide
Side aisles	Min 1.2 m wide

Floor area and ceiling height relation according to design Standard:

Floor area	Ceiling height
<=50 sq m	2.5 m
>50 sq m	2.75
>100 sq m	>=3 m

Dining floor area	Walkway width
Up to 100 sq m	>=1.1 m
Up to 250 sq m	>=1.3 m
Up to 500 sq m	>=1.65 m
Up to 1000 sq m	>=1.8 m
Over 1000 sq m	>=2.1 m

Customer places	Men (WC)	Women (WC)	urinal
50	1	3	2
50-200	2	5	3
200-400	3	8	6

Minimum width of escape route – 1m per 150 people

2.12.11 Badminton Court

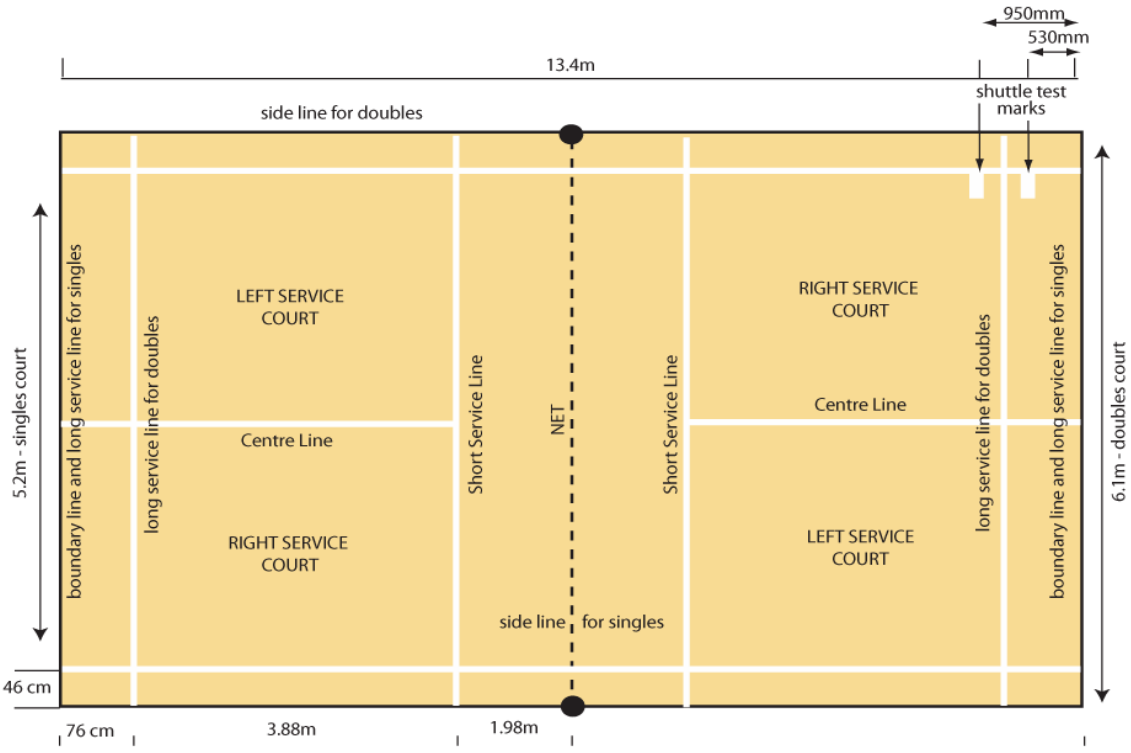


Figure 2-1: Badminton Court

Dimensions

The court is a rectangle and can be used for both singles and doubles. The court size for singles is 13.4m x 5.18m (playing area = 69.41m^2 including boundary lines) and 13.4m x 6.1m (playing area = 81.74m^2 including boundary lines). The lines are 40mm wide and colored white or yellow. It is desirable to have wooden sprung floor together with approved non-slip court mats.

Space about Court:

There is at least 2m clear space surrounding all the outer lines of the courts. There is also a minimum requirement of 2m between any two courts marked out side by side.

Posts and Nets

Posts are 1.55m in height from the surface of the court. The net is 760mm in depth and a minimum of 6.1m wide. The top of the net from the surface of the court is 1.524m at the center of the court and 1.55m over the sidelines for doubles. There is no gap between the end of the net and post. If necessary, the full depth of the net at the ends is tied to the post.

Space over court

The minimum height from the floor over the full court for international competition is 12m. Club standard play is 9.14m. The required height is entirely free of all obstructions and light fittings over the area of the court.

Background and Lighting

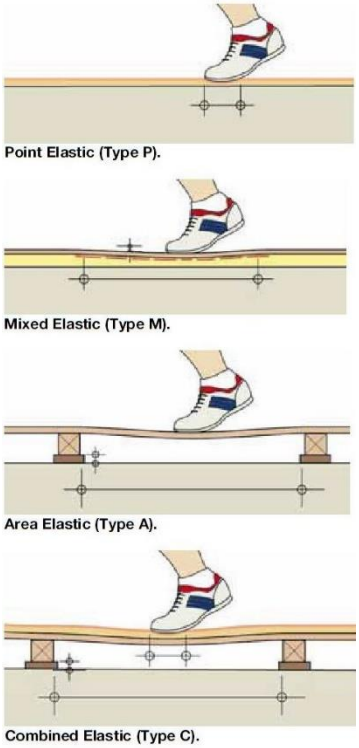
To avoid difficulty in sighting the shuttle, the background behind the ends of the court is not to be colored white.The minimum recommended lighting level is 1000 lux to provide even light over the court area. Lighting is not to be directly over or behind the playing area but positioned along the sides of the court. All sources of daylight or sunlight behind or along the sides of the courts are to be eliminated.

Flooring

The sport performance qualities required of the floor surface vary from sport to sport and relate to the interaction of the ball and the player to the surface. All the sports require the surface to be sufficiently flat, level and consistent so that play is unaffected by variables in the floor. For the sports, the degree of friction between the player's shoes and the surface needs to be high enough to prevent slipping, but not so high as to restrict foot movement either in a continuous direction or when turning, or to controlled sliding of the foot that is required in some sports.

Wood

Mats



In Situ Polymeric

Figure 39: Different Flooring Material for Sports Hall

2.12.12 **Basketball**

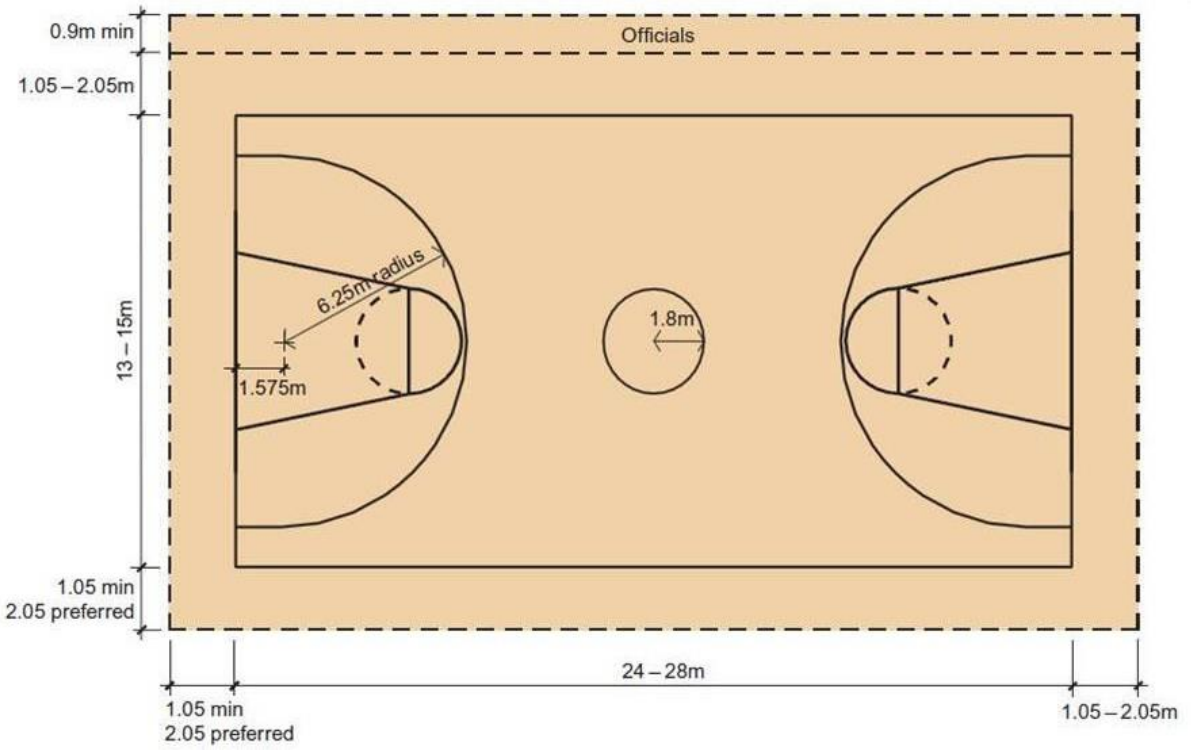


Figure: Basketball Court

Court Dimensions

The playing court is a flat, hard surface free from obstructions with dimensions of 28m long by 15m wide, measured from the inside edge of the boundary line. The height of the ceiling or the lowest obstruction above the playing floor is at least 7m.

Lines

All lines are drawn in the same color (preferably white), 5cm in width and clearly visible.

Boundary Lines

The playing area is limited by the boundary line, consisting of end-lines and side-lines. These lines are not part of the playing court. The minimum space around the court for run-off is 2m. Any obstruction, including seated team bench personnel, must be at least 2m from the playing court.

2.12.13 Table Tanis

The table is 2.74m (9.0 ft.) long, 1.525m (5.0 ft.) wide, and 76cm (2.5 ft.) high with any continuous material so long as the table yields a uniform bounce of about 23cm (9.1 inch) when a standard ball is dropped onto it from a height of 30cm (11.8 inch).

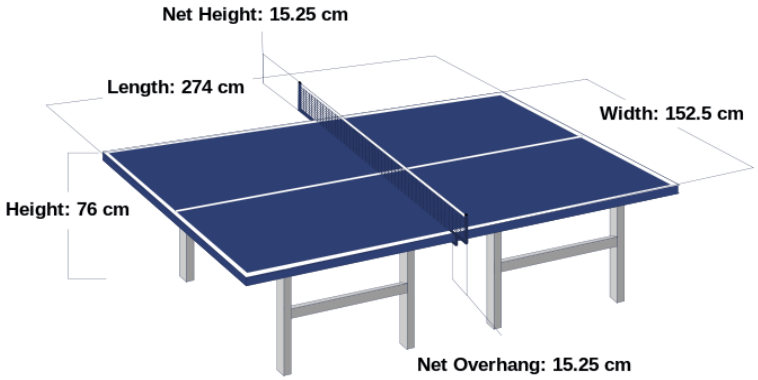


Figure : Table Tennis

The table or playing surface is uniformly dark colored and matte, divided into two halves by a net at 15.25 cm (6.0 inch) in height. The International Table Tennis Federation (ITTF) approves only wooden table or their derivate. Concrete table with a steel net or a solid concrete partition are sometimes available in outside public spaces, such as parks.

2.12.14 Parking

General Requirements

- Sufficient parking spaces are to be provided by enforcement of parking regulations and future plans for a parking structure.
- Convenient connections are to be provided from parking lots to pedestrian walkways and adjacent buildings.
- Landscaping is to be provided at on-grade lots to mitigate heat and glare, see landscaping section.
- Incorporate buffer areas around parking lots with tree massing to decrease visual impact and clutter and glare and provide shade, screen walls, berms (designed and planted to contour with the surroundings to appear natural), lighting and site furniture
- The type, size and shape of a turning and parking place in a road depend on the road use in that particular area and the size of the vehicles.

Space requirements

- 90^o parking = approx. 20 m^2
- 45^0 /60^oparking = approx. 23m^2
- 45^o/60^o oblique spaces, easy entry/exit to parking
- Space, for one way traffic 90^0 entry/exit to parking
- Space, for two-way traffic Parking space 2.3 needs small parking

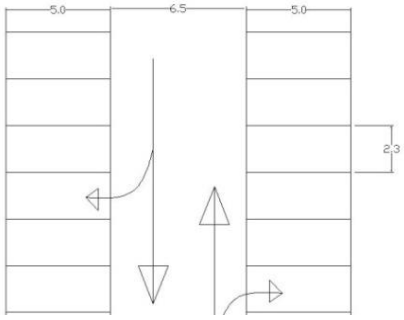


Fig 2.20 90º Parking

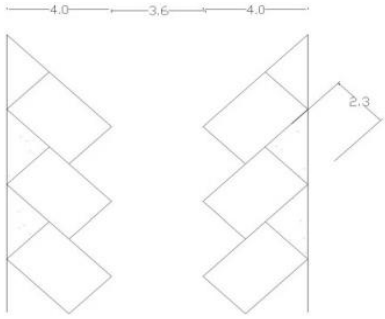


Fig 2.21 60º Oblique Parking

Turning Radius

Turning radius required for different vehicles are:

Table 3: Turning radius

Types of vehicles	Length (m)	Width (m)	Height(m)	Turning radius (m)
Motor cycle	2.20	0.70	1.00	1.00
Car (standard)	4.70	1.75	1.50	5.00
Bus (standard)	11.40	2.50	3.30	6.50

2.13 Inferences form literature review

The major inferences drawn from the literature review are as follows:

- Understanding the pedagogy in architecture studies
- Understanding the different aspects on learning spaces.
- Role of environment for developing creativity.
- Taxonomy of spaces according to student's learning requirements.
- Alignment of pedagogy with present learning process for design of spaces in institutional context.
- Model for the designing architectural school for interactive learning environments.

The above inferences also assist in the formation of framework for case studies.

3. Case study

3.1 Institute of Engineering, Pulchowk Campus

3.1.1 General Information

Building Type: Campus
Location: Pulchowk, Lalitpur
Total land area: 500 Ropanis
Constructed: 1984 A.D.
Programs: BE, B.Arch, and different Master's Programs

Figure 40: Architecture block, Pulchowk Campus

3.1.2 Surrounding context

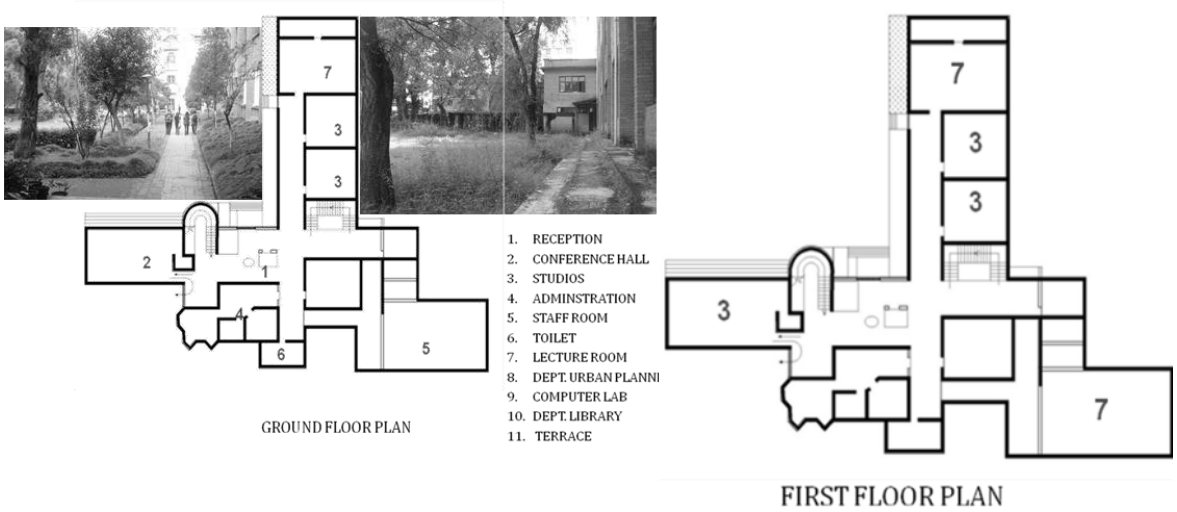
The campus spreads over 500 ropanies of land and is located south of Kathmandu valley at Pulchowk, Lalitpur. Institute of Engineering (IOE) was established in 1972 A.D. under Tribhuvan University (TU). In 1984, it started to offer a bachelor's in civil engineering. The five years Bachelor Level in architecture was initiated from 2052 BS. At present, it runs M. Sc. Course in Urban Planning, Energy Efficient Building, and Ph.D. course too. Since it is an engineering college, other faculties are also carried out in different building complexes. It is easily accessible from anywhere in the city and the considerable seclusion of the college premise makes it free from urban congestion also vegetation and setback areas act as buffers to screen noise from the street. Sloping of the land divides the campus area as Eastern: plays area and dormitory and Western: completely academic area.

3.1.3 Ideologies on which the institute has been designed

The zoning is done to maintain seclusion and privacy to some extent in each block. The whole campus premises are divided into two parts (east and west) by the main road of Patan running in the north-south direction.

The area is large, including all the facilities regarding the institutional requirements, and is divided into academic, administration, recreational and residential. In the academic area: the central place is occupied by the library, computer resource center, and other departments are placed around it except the architecture department which is a little separate. Open spaces are provided in front of each department for students for gathering and interact. Central administration is located in an old Neo-classical building, at Anand Niketan which is segregated from other academic buildings. However, department administration is placed in the department itself.

3.1.4 Department of Architecture and Urban Planning



The architecture and urban planning department in E- block is in L- shape on the southwest corner of the site. The building divides the open space into two parts i.e., eastern and western part. The front yard of the building (western part) is used for various purposes like playing, gathering and sometime the external classes like free hand sketching etc. This type of loosed space around the building has provided advantageous for students for interaction.

3.1.5 Architectural Expression

- Use of vertical bands and horizontal openings, louvers.
- Circular staircase acts as the focal point and breaks the monotony of the façade.
- Brick façade and historic context.
- Simple row-column desk arrangement in lecture rooms.
- Central foyer and corridor along with two stairs create breakout space in the building.

3.1.6 Interactive Teacher-Student Spaces

1. Green space (social interaction)
2. Lobbies or corridors (informal space)
3. Design studio (formal space)

Figure 41: Exterior and Interior Noise Barrier, IOE

Table 4: Summary of the components in department of architecture

SUMMARY OF THE COMPONENTS IN DEPARTMENT OF ARCHITECTURE		
S.N.	**COMPONENTS**	**AREA (SQ.M.)**
1	Design studio	100
2	Lecture room	74
3	Conference room	100
4	Photography lab	88 (With dark room and buffer space)
5	Administration	
	a. HOD office	40
	b. Waiting space	30
	c. Deputy HOD	30
	d. Non-teaching staff	25
	e. Staff room	120
6	Department library	120
7	Art and Graphic studio	70

3.1.7 Inferences

- Basic requirement for designing architecture school
- Importance of sufficient informal and formal interactive spaces
- Need for universal and gender equity design.

3.2 Kathmandu University

Program: Arts, Science, Engineering, Architecture, Medical, Management, Law

Established: 1991 AD

Built-up Area: 46,846 sq.m.

Location: Dhulikhel, Kavre

Building Type: Campus Type

Objectives:

- To make study about Auditorium and Library block
- Study as per design and material aspect of the building

Figure 42: Kathmandu University

3.2.1 Introduction

It is located in a mountainous landscape in dhulikhel Municipality about 30 km east of Kathmandu having round-the-year pleasant climate and panoramic Himalayan Views. KU had a very modest start from a rented building at Tangal, Kathmandu. Now, it has able to create a built-up space of 46,846 sq.m. Within a period of 21 years, KU has built not only reasonable infrastructure, but also established a track record of academic excellence. At present, the University offers various undergraduate, graduate and postgraduate programs in science, engineering, Architecture, medicine, management, education, arts, pharmacy, environment, music, human & natural resources, information technology and biotechnology, through School of Science, School of Management, School of Engineering, School of Medical Sciences, School of Education and School of Arts. In addition to 3,695 students studying in its constituent campuses & 7500 students are in its affiliated colleges.

3.2.2 Planning Analysis

The area is large, including all the facilities regarding the institutional requirements, is divided as academic, administration, recreational and residential. KU's master plan is unique because it is a living plan, to be revisited in the future and adjusted as needed, rather than repeating the planning process. This level of flexibility is achieved by focusing on 11 planning principles that embody KU's historic excellence and ambitions for the future, as well as the university's values and priorities. The result is a plan that physically embodies KU's strategic plan, Bold Aspirations through three broad physical concepts-Student Success, Campus Life; Academic Communities; and Sustainable Land Use & Growth Patterns.

3.2.3 Component Study

Central Open Space

It simply is an open space used for playground or sitting and as interactive spaces. The space is a courtyard connecting Library, Administrative and the auditorium block. The perimeter consists of covered passage for access towards each connected block.

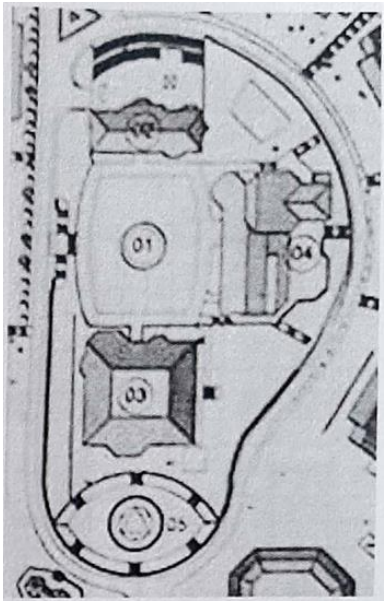


Figure 43: Covered passage, connects three blocks

Block number: 01= Administrative Block

Total Built-up Area: 2400 sq.m, construction date:1999 AD

Architectural feature: No strong architectural feature. The facade has brick on below and RCC towards the top with a sloped roof. The plinth of the building itself is above 18 feet from the ground.

Figure: Administrative Block

Block number: 02= Library

Ground floor mainly consists of reading area, control and lending area, VIP seating, cloak room, washroom, pantry plus store.

Second floor consists of reading, book stacking area, office, meeting room, auditorium and computer lab.

Third floor is for faculty room and computer lab. It has lighting being brought from top and sides.

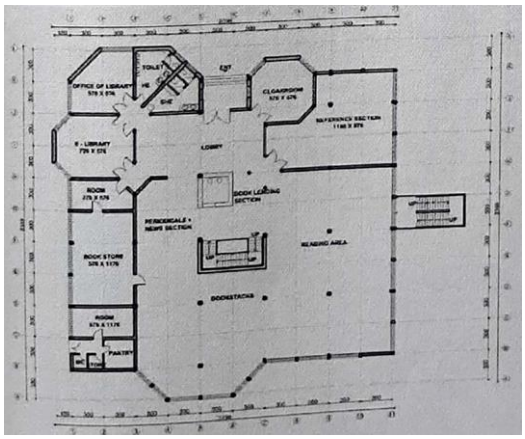


Figure: Ground Floor Plan

Figure: Central Staircase as a design element

Block number: 03= Auditorium

Auditorium capacity: 275

Construction date: April 1996

Stage: 876x750 at 2'4" height

Main auditorium: 1476x1464

Mini auditorium: 876x876

Lobby:120 sq.m

Changing room/store is below the main stage of size 772x768

Area per person:1.25 sq.m.

Width of row: 3'

Width of aisle: 3'

Figure 44: Interior of main auditorium

Figure 45: Projections in wall for proper sound diffusion as well as lighting system

Features:

- The height of the stage ceiling gives the required reverberation and spaciousness.

- Sound and light control rooms at the rear of the audience.
- The cables are laid on the floor and received at the other end at the side of the stages where there are lights and PA systems.
- Cavity resonator with the cardboard cladding and louvered panels type composite absorbents are used for the sound absorption in walls and ceilings for proper sound diffusion

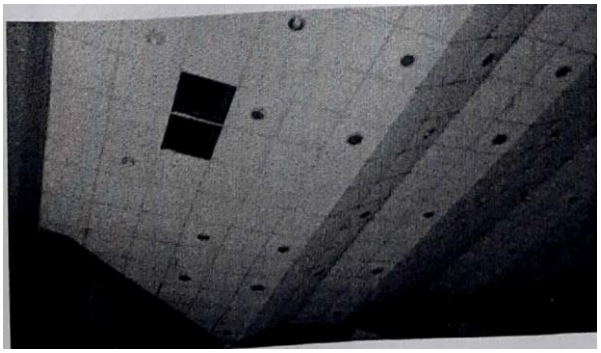


Figure 47: Gypsum board finish stepped ceiling

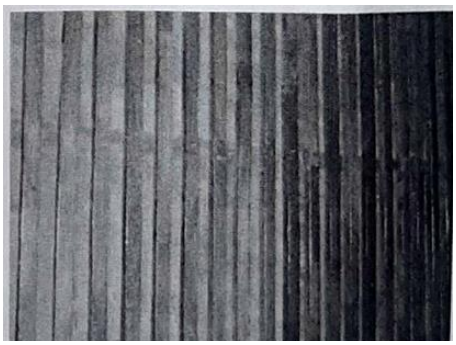


Figure 46: Louvered panels composite type absorbent

3.3 Centre of Environmental Planning and Technology

3.3.1 General Information

Building Type: Campus

Climate: Hot, humid and dry with moderate rainfall

Location: Ahmedabad, India

Total land area: 6 acres

Constructed: 1962 A.D. with the help of Ahmadabad Education Society (A.E.S)

Architect: Ar. B.V. Doshi

Figure 48: CEPT Building

Source: shiksha.com

The campus houses: -

- School of architecture (1962)
- School of planning (1972)
- Institute of building technology and science (1982)
- School of interior designing (1991)

3.3.2 Surrounding context

The campus is located in the Ahmedabad institutional area surrounded by various other institutes of Ahmadabad educational society & Gujarat University. It is supported by various commercial places adjacent to the C.E.P.T. campus. It includes markets, commercial shops, residences, and other public spaces like sports complexes, hospitals, parks, etc. 120 ft. wide road approach road parallel to the ring road connects the campus with the rest of the city, with an upcoming metro rail and B.R.T.S. corridor project to upkeep with the inflating population & traffic density. It has well-maintained roads, footpaths & modern bus stops, signage board and the lush green surroundings give a soothing urban experience to the user. The vacant land adjacent to institutes for future expansion of the campuses keeps the massing of the built spaces low.

3.3.3 Ideologies on which the institute has been designed

The architect of the project Ar. B.V. Doshi together with other concerned people developed a philosophy. The salient features of which are stated below-

- Interaction between various disciplines nourishes education directly or indirectly our concept of life is affected by it.
- Creation of physical environment due to its existence guides a lot of our physical activities
- Any institution (educational) must promote this kind of atmosphere and should be full of generous invitations and free from inhibitions.
- The classroom sense must be all over outside as well as inside the built structure.
- There should be no feeling of restriction to exchanging ideas
- Participation of even the public should be invited

3.3.4 Planning and Circulation

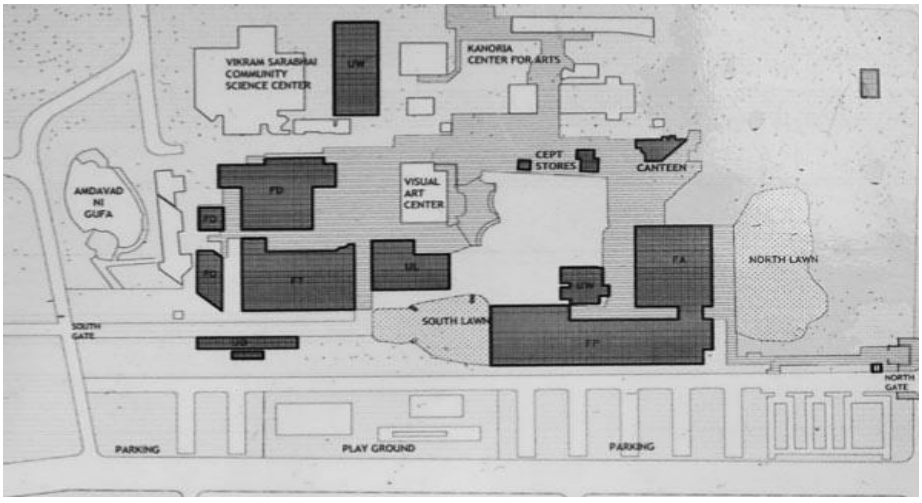


Figure 49: CEPT Campus Masterplan

The overall planning of the campus has been on the concept of a central courtyard with built masses on 3 sides and a dense green belt on the 4th side which gives the necessary protection from the vehicular traffic on the university main road.

The courtyard and the basement circulation have been designed as open and on a very large scale whereas the circulation inside the building is very restricted as the available area has been used for maximum utilization of space and compactness of design.

3.3.5 Features:

- The school building is set back 100 ft. from the road and shielded by trees to create a serene atmosphere inside the campus and is hardly visible from the main road.
- Emphasis on open flexible spaces with hardly any doors.
- Creation of a proper working environment facilitating faculty and students to have free scope to learn and teach anywhere.
- Exposed local materials for low cost, easy expansion, and maintenance.
- The design is intended to be close to nature and experiment the designing skills, play with levels, etc. Since the land was earlier a brick kiln, the site was undulated and gave the opportunity to play with levels.

3.3.5.1 Central courtyard:

The central court is a combination of paved and unpaved areas, shaded by trees in certain areas. All entrances are linked to the courtyard by pedestrian pathways. Cultural activities, reading, games, meetings, etc. all happen here. Hence the courtyard is an area of heavy circulation and interaction.

3.3.5.2 Basement:

The basement has been designed as a multifunctional space. It is a very active space of the campus as on one side of it are the rising contours that protect it from the road thereby helping it create its own environment and on the other side are the combination of steps leading to another active space of the campus i.e., the central courtyard. Thus, the north and south walls have been avoided. Numerous activities are performed here like cultural programs, fests, exhibitions, indoor games, etc.

3.3.5.3 Canteen:

The canteen is on the corner of the axis of the studio block. There are external built-in seats that encourage discussions and which over the years have evolved into the most active vibrant part of the entire campus. Both students and faculty sit around this space and chat. This space is a true reflection of the spirit and culture on the campus with a great atmosphere of interaction, informal discussions, and learning.

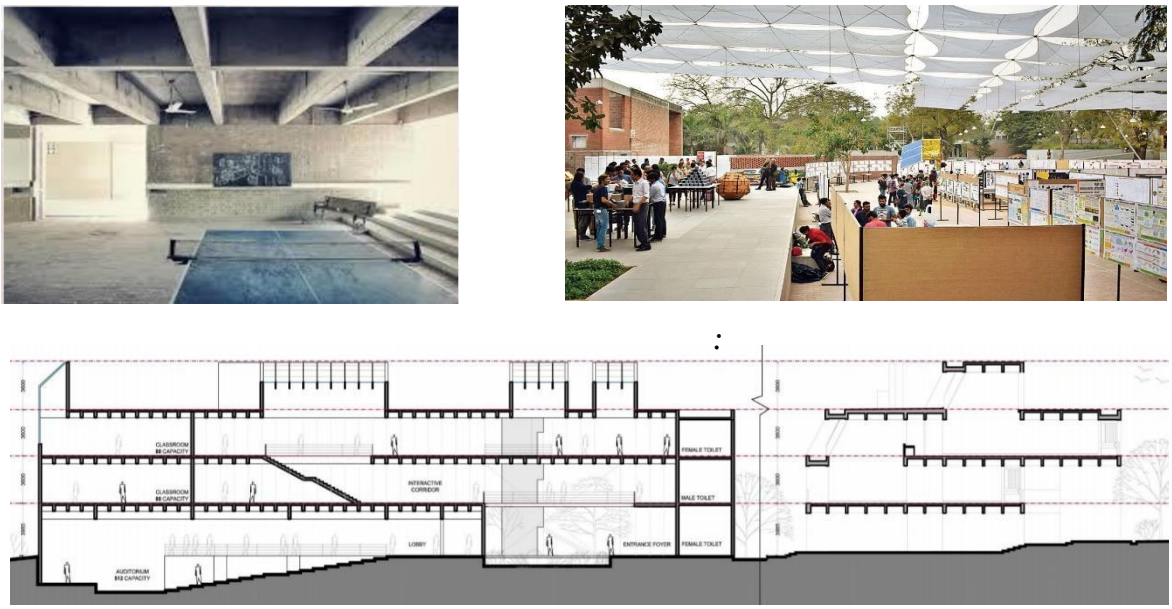


Figure 50: Section of the classroom, CEPT

Source: https://issuu.com/abhishekadne

3.3.5.4 **Studios:**

The building is oriented along the E-W axis with openings on N-S and thick walls are provided on the east and west to keep off the hot sun The design studios are designed in a manner of factory with north-south axis as each studio receives sufficient natural light from the north and breeze penetration is facilitated from the south side. The duplex section of the studio has been designed for easy communication between two studios and the surrounding space but at the same time are at some time audio-visual disturbing too. The space undemanding forms an image of a lobby which is very disturbing considering its other uses.

The studios have large openings which open into the greenery outside. There are common interaction zones between the studios of different years.

Theory classes for architecture students are held in this space. The flexible furniture helps in several, seating configuration and attract students from other areas. Climatic comforts have been achieved by shade but the lack of audio and visual privacy makes this space a bit "unfit for the stated use.

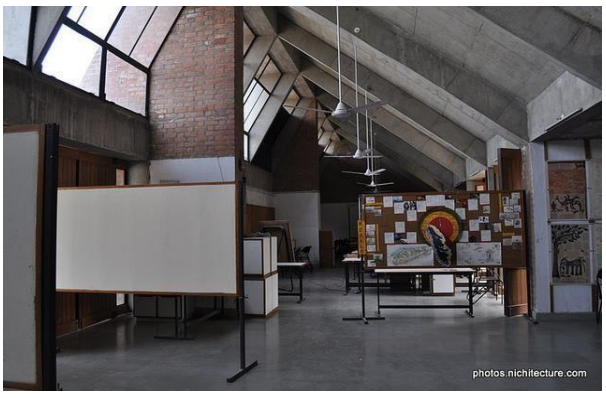


Figure 51: Design studio, CEPT

Source: https://issuu.com/abhishekadne

The circular Kota stone-raised floor and moreover the variation in flooring materials make the space symbolic of a cultural dance area. The audience sits on the steps and creates an environment of free interaction. The plaza in this block is one of the most active places on the campus.

Festivals space becomes the most active one during the festivals and as it symbolizes invitation and informality various other activities such as exhibitions, workshops, jam sessions, quizzes, etc. demand the use of this space.

Figure 52: Raised platform and multifunctional use of spaces, CEPT

Source: https://issuu.com/abhishekadne

1.1.1.1 **Landscape:**

The campus is full of neem trees, which were planted over the years since the initial phase makes the hot Ahmedabad climate cooler. The trees provide the perpetual changing pattern of light and shade. There are many interconnecting pathways with brick paving and terracotta tiling. There are also small plants within the building and plotted plants at places. The steps in fact become external activity hubs with students using the levels for reading, organizing informal discussions, performances, or even simply lazing around.

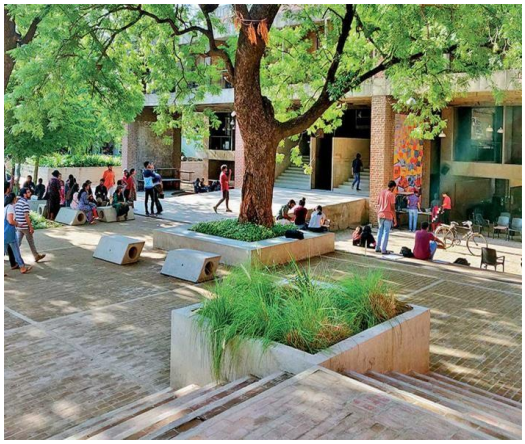


Figure 53: Landscape at CEPT

3.3.5.5 Indoor circulation:

The circulation within the building is very complicated with lots of level changes and staircases at different levels. The corridors are less and short in length. All the places within are visually interconnected.

3.3.5.6 Outdoor Circulation:

The circulation within the campus is pedestrianized. Vehicular access is restricted along the periphery of the campus. There are a lot of trees within the enclosed spaces from where all the buildings are accessed which provide ample shade and comfort.

3.3.5.7 Ventilation:

The parallel walls, form an open tube of space that is predominantly aligned North-South, effectively closing off the east and west sides. The north side is heightened to allow more north light in while the south side is kept low to shield from the harsh direct radiation. This results in a configuration with a double-height north side and a single-height south side. Such differences in heights in sections lead to a combined volume, emphasizing the directionality set out by the parallel walls in plans.

3.3.6 Inferences

- Simple structure of parallel brick walls, concrete beams & floors that is extendable & easy to maintain.
- An open place with hardly any doors. No feeling of restriction to the exchange of ideas & free scope of teaching & learning anywhere.
- More use of interaction & transition areas like corridors, galleries & courts & foyers throughout the campus.
- Structural obstruction-free ground makes the spaces multi-functional & active zone on campus.
- Building looking inward makes the environment livelier.
- Circulation is so easy to make all buildings easily accessible.
- The informal interaction spaces with trees and seating make them relaxing and calm.
- Combined studios at two levels affect the environment positively and negatively.
- The informal interaction spaces with trees & seating make them relaxing & calm.

3.3.7 Demerits

- The loose soil in the central courtyard is unpleasant to walk on and makes the atmosphere very dusty.
- Even though the entry to the school of architecture is spacious and well ventilated, it is too dark in the daytime also.
- There is no ramp at the entrance making it difficult for physically challenged people to enter the building.
- In many places spiral stairs are used widely and are uncomfortable for daily use,
- Studios in the southern part of the building have the problem of glare because of sunlight.

3.4 SMEF's Brick college of Architecture

3.4.1 General Information

Climate: Hot and Semi-arid climate

Architect: Ar. Girish Doshi, Navkaar Architects

Total site area: 36421.70 sq. m. (9 acres)
Total Built-up: 1100 sq. m.

Construction type: Exposed brickwork and exposed concrete

Figure 54: SMEF's Brick college of Architecture

3.4.2 Background

Brick College of Architecture is in Undri area on the outskirts of Pune city. It was established in the year this school of architecture is a model for the pupils to peek into the myriad world of architecture. For a student who spends nearly one-third of the day m the institution over a period of five years, the design of the institution itself is bound to make an impact on his/her mind. The School of Architecture is part of a 9-acre integrated design campus that will later house other schools of design as well, to foster inter-disciplinary design thoughts and processes.

3.4.3 Climate

Pune has a hot semi-arid climate bordering tropical wet and dry (Aw) with average temperatures ranging between 19 to 33 "C (66 to 91 °F). Pune experiences three seasons: summer, monsoon, and winter. Even during the hottest months, the nights are usually cool due to Pune's high altitude.

Response to climate: As the building is planned m the hot and semi-and region the planning is inspired from local wada architecture the spaces are planned around an open central court which create courtyard effect which keeps the building cool and provide ample of light require for the studios and for rainy season the gutters are provided, and the rain water is collected in water body courts.

3.4.4 Site and Surrounding

The area is developing as a residential part and the surrounding of the site mainly consist of residential high- rise apartments. The area in present day is barren land and is in developing condition with ongoing constructions and roads.

Figure 55: Location map

The site of Brick College of Architecture. has land for future expansion the site is at the hill foot thus

has a slope from rear side to front side the building is aligned in North South axis with major and site entry from west side and minor road on the north side.

3.4.5 Impact of Building on surrounding:

As the building is in outskirt of Pune city it creates sound environment for study purpose and the surrounding is non-congested area and development is not that much the building does not create any special impact on the surrounding and the architecture of the building contrast the existing housing buildings and compliments the mountain and natural surroundings of the site, due to exposed material and mountain like form.

3.4.6 Concept and Planning

Concept:

The planning of Brick College of Architecture is inspired from old Hindu temple design. The design also draws its concept from vernacular architecture of Old Pune city, in making contemporary interpenetration of the courtyard Wada typology.

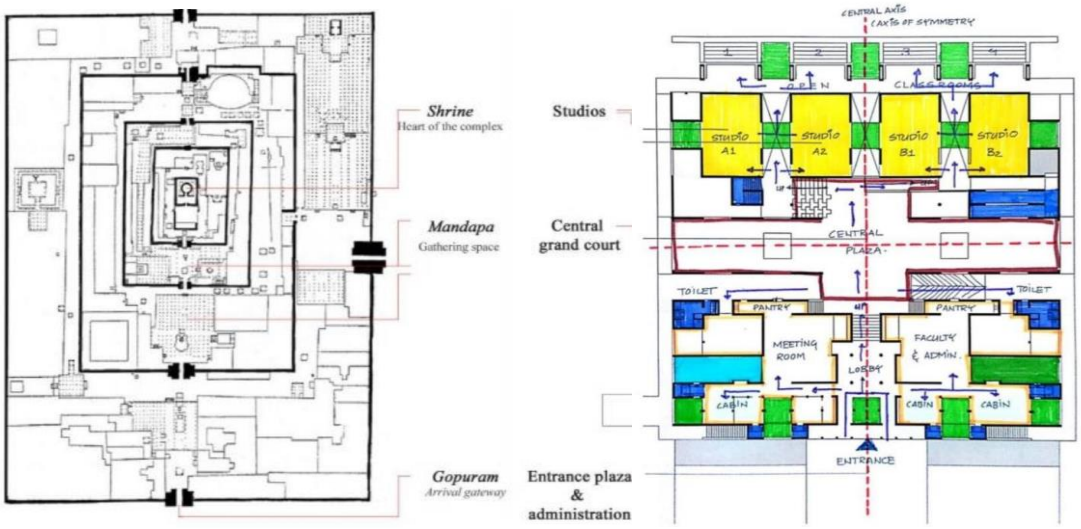


Figure 56: Concept and planning

Source: https://issuu.com/abhishekadne

Planning:

The planning of the College is Symmetrical along the central axis with spaces planned around the central court having semi open, closed and open spaces. We enter the entrance plaza and then we proceed to Entrance court. Admin is attached on the both side of the entrance court with attach open courts and water bodies to take the light to the office spaces, later we proceed to the central plaza i.e. the open courtyard the services like toilets and staircase and ramps are placed at the four comers of the open court, this court has adjacent court in east and west direction which are the workshop spaces (semi-open).

3.4.7 Studio:

Studios are placed along the central courtyard. Every studio has its individual model storage. The studios are well lit and naturally ventilated. Studios have provision for expansion and physical connectivity with outdoor. Maximum day light is received through the large opening.

The studios are placed on the south side of the site which is the hottest part as sun path in Pune is east to west via south direction. Large projections are provided on the south wall thus prevent the bright sunlight from south to enter in the studio also the look over bridge act as another chajja which prevent the bright sunlight from south direction.

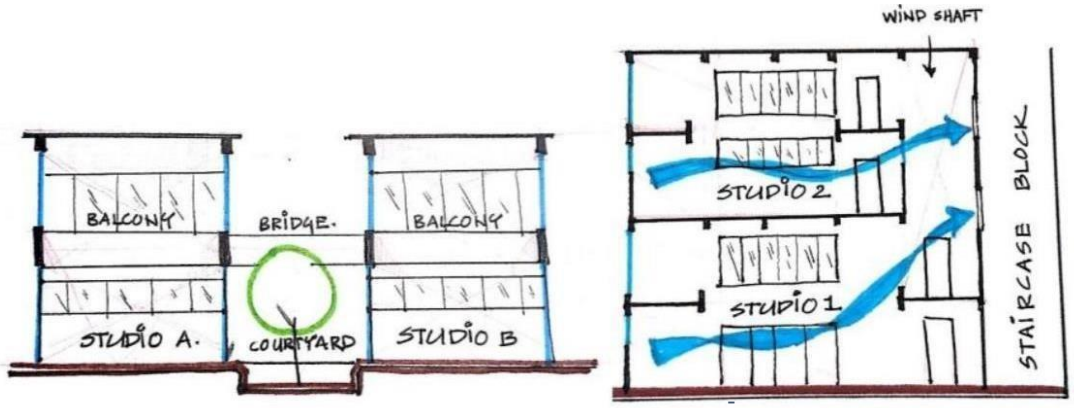


Figure 57: Section through studio

Source: https://issuu.com/abhishekadne

All the studios are connected to each other with continuous bridge passing through all the studio actions as look over bridge for faculty the external wall to exhaust the hot air outside, the structure creates the stack effect which eliminates the hot air and intake the cool air.

A small courtyard is places in between two adjacent studios this courtyard gives light to the studios having large opening and act as interacting spaces between two studios, also, open classrooms are provided at the backside of each studio.

3.4.8 Circulation:

The main circulation is along the symmetrical axis and branches to the respective spaces, the circulation here is axial, the circulation path is open court and intermediate spaces there is no corridor in the building all the spaces are connected to each other with the intermediate semi open spaces.

3.4.9 Landscape:

Site of Brick College of Architecture has natural landscape with local available trees and some of the landscaping areas are under construction, they include Amphitheatre, *Gyaan-Kund*. Kund of knowledge basically design for open class discussion, other elements are

fountains in entrance plaza, intermediate courtyards the adjoining figures shows the Gyaan Kund and Entrance court similar to this most of the landscape element are proposed on site present on side with deciduous trees.

3.4.10 Structure

The roof of the structure is sloping and is of pure slab structure basically inspired to merge the site background i.e. the mountains in the back of the building this sloping slabs are casted on site and are design to wash off the rain water off the structure.

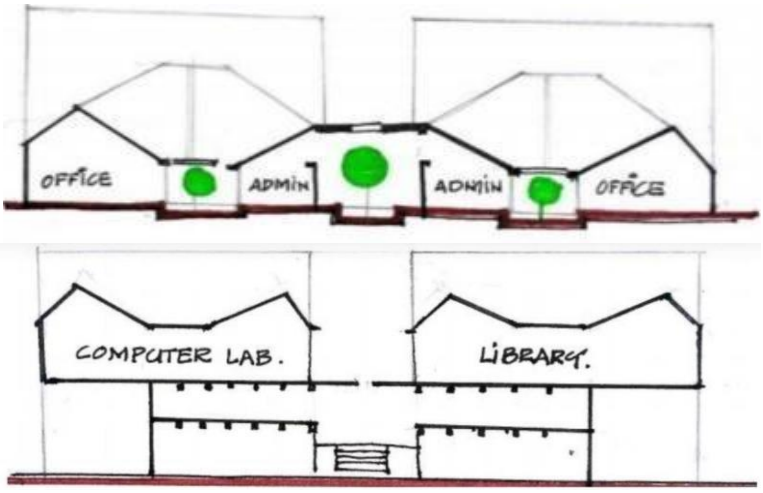


Figure 58: Section through building

Source: https://issuu.com/abhishekadne

These sloping roofs are supported on the columns and heavy beams supported on the wall and columns. The roof of central court has a longitudinal cut off along the central symmetrical axis which is supported on the four major columns in the entrance plaza. The inverted slab is provided in the entrance court to get the clear space, the structural system of the building is regular R.C.C. frame structure with equally spanned beams covering the long span of the structure.

3.4.11 Inference

- The structure is constructed by using and experimenting new form through structural concrete.
- The open spaces are used in many purposes like cultural activity, interactive spaces, open studios and central plaza.
- Plenty of light and ventilation in studios and office spaces taken from intermediate courtyard attach to office spaces.
- The open and closed spaces are connected to each other both visually and physically to create sound environment for study purpose.

3.5 Harvard Graduate School of Design (GSD)

Harvard University is the oldest institution of higher learning in the United States, dating back to its founding in 1636, but it would take exactly 300 years for the formation of the Graduation School of Design (GSD). In 1972 the school moved into its current Gund Hall, designed by Australian architect John Andrews, a graduate of the GSD. Gund Hall's Brutalist architecture is lifted high on round columns along Quincy Street, from which it descends ziggurat-like for five stories to the east.

3.5.1 General Information

Architect: John Andrew

Structural Engineers: Le Mes Associates

Estd: 1874

Location: Massachusetts, Unite States

Building Type: Campus Type

Figure 59: GSD

Source: goggle

3.5.2 Architectural Concept

The whole complex was designed to allow students and departments to work together, without obvious separations. The idea was to get rid of the notion that there hasn't been any communication between the departments and promote interaction.

The basic section: The initial assumption was that studio spaces for both architects and planners should be on the same level as each other and with supporting facilities such as libraries and offices: a horizontal circulation system.

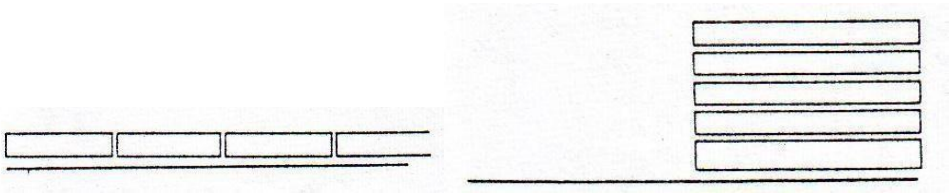


Figure 60: Conceptual section

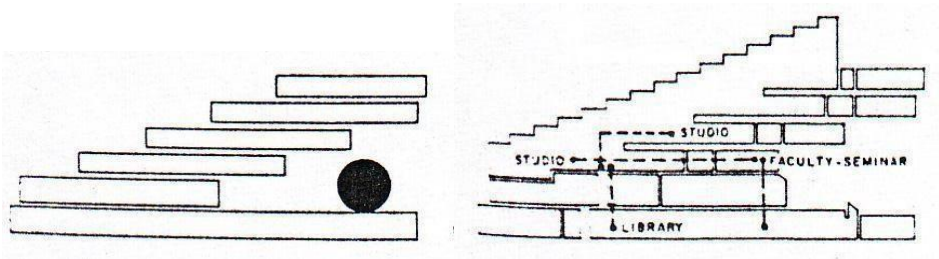


Figure 61: Section at concept level

This required too large an area for the specified site. Stacking the studios vertically fits the site but circulation and communication between floors is unsatisfactory.

A staggered configuration of studios provides relatively efficient circulation, and better general communication between levels can be achieved.

The configuration of studios provides for maximum inter-floor contact both physically and visually. On three levels, half of the studio space is arranged under the level above to allow students the choice of working within the large open space or in the more intimate space under the overhanging level above.

3.5.3 Movement and interior spaces:

Major campus circulation passes under the building adjacent to an exterior area which has the potential of becoming an outdoor exhibit area. The formal main entrance is replaced by several points; entry to a general circulation exhibition area from which access is open to the main elements of the building and to the courtyard. The outdoor terrace on each studio is a connecting point between student and faculty areas. Office and research spaces may expand to the east, as required by the program.

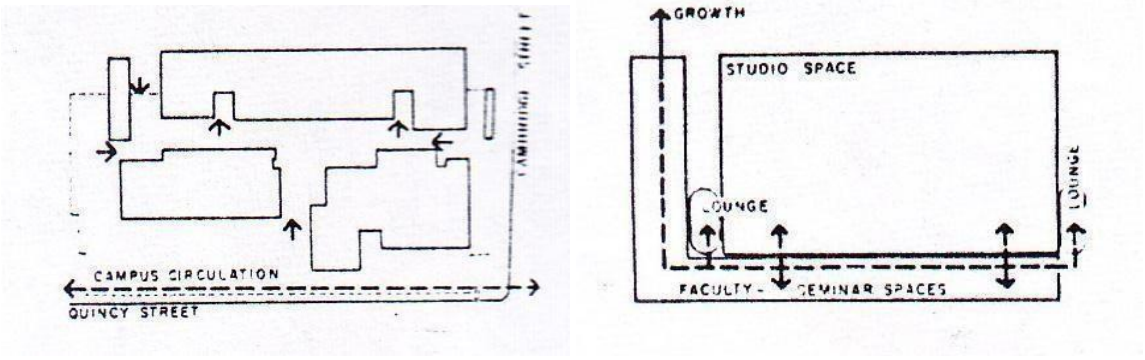


Figure 62: Movement and interior spaces

Source: https://www.slideshare.net/AbhijeetRoy

3.5.4 Light and view:

Direct daylight is admitted from the stepped overhead window of the truss system, and there is a view of the ground and surrounding environment from the upper studios through windows near their same level. There are views from the rear areas of the studio down to the courtyards under the studio.

The mechanical room in the basement handles the special area tower in the building such as the lecture hall, library, and workshops. Within the building, circulating from studio to studio takes place on open interior stairways, within the main central space of the stepped roof. The studio space is designed to accommodate the optimum number of approximately 350 students.

3.5.5 Design Studio

The building is designed as one large studio, on five stepped levels where as many as 500 students can work at a time. There are smaller personal work areas for each student which increases the interaction among the students working on different projects in different years.

The clear-span glazed roof open studios give a sense of community and togetherness. Movable partitions and tables provide flexibility among spaces. The stepped nature of the studio is meant to separate the different years of study, but each studio overlooks the next one

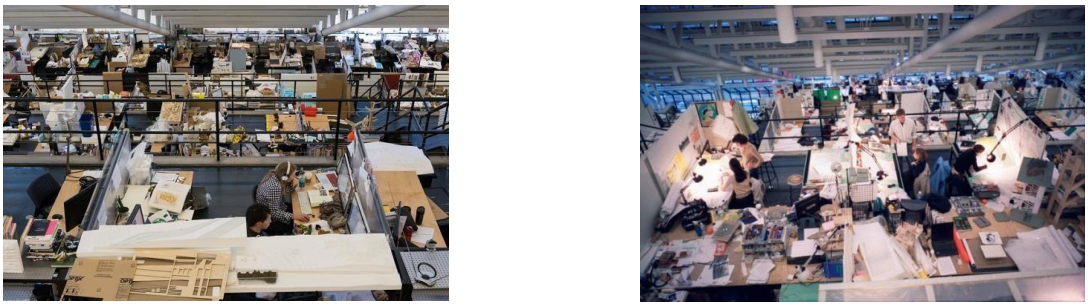


Figure 64: Large stepped studio ' Harvard Graduate School Of Design'

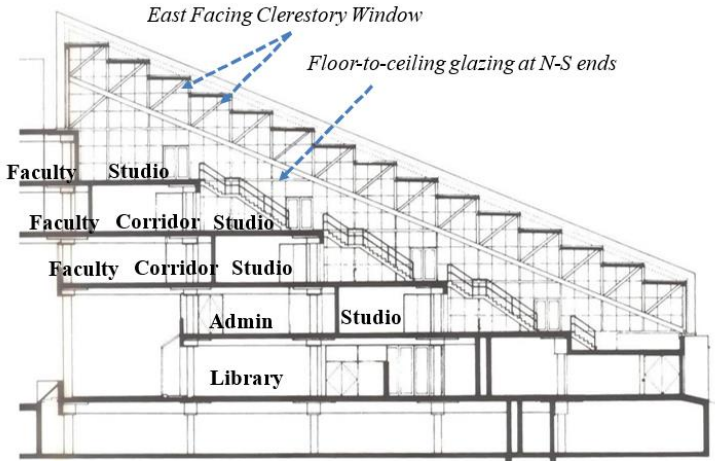


Figure 63 : Section of studio at GSD

3.5.6 Lobby

The axis of the main lobby is stretched along with the north and south links of all three entries. About 12 feet wide lobby on the first floor, sidewall portrayed as a display gallery of student projects, abstract presentations, etc. is among one of the learning spaces in GSD. The huge circulation received from the flow of the building is used as exhibiting space.

Figure 65: Lobby as Display Area

3.5.7 Auditorium

The auditorium accommodates the myriad lectures and symposia at the GSD. It can be set up as “half Piper," but for larger events seating on the floor beyond the retractable screen transforms it to "full Piper." The placement of the auditorium is immediate to the lobby internally and opens to the exterior as well.

Figure 66: Auditorium, GSD

3.5.8 Workshops:

It is located in the basements and comprises wood and metal workshops.

Wood Workshops

The woodwork shop is extensively used to build scaled models and full-sized prototypes. It supplies most of the necessary tools and equipment for executing projects using woods or other materials such as certain types of plastic or foam.

Metal Workshops

The meta shop has tools for basic metal works including MIG welding and gas welding.

Project Room

It is a space designed to meet the needs of individuals or entire studios for creating larger models for construction. The use of materials such as plaster or concrete is supported and encouraged in this space rather than in the design studio.

Teaching Room

Located between the wood shop and the project room, this is the space where classes can use for hand-on work.

3.5.9 Library

The library is located on two levels of Gund Hall. It currently holds more than 280,000 volumes and pamphlets, 220,000 slides, maps, plans, microforms and other audiovisual material. It serves the faculty and students of the GSD, members of the great Harvard Community, alumni, visiting scholars and design professionals. The library includes the Office for Library Information Systems and Instructional Technology, which facilitate the use of courseware tools by faculty and students in support of instruction at the GSD.

Figure 67: Interior

3.5.10 Design Features

- For its own students, the building gathers all studies into one open integrated environment.
- The organization of the building is simple. Faculty and seminar rooms wrap around the sides of the studios with a lounge and terrace common to both.
- The structure of the building is in R.C.C., 25 feet grid. The building is a grand system of structure, services, and light.
- The building as a whole set an example for a new kind of communication in education.

3.5.11 Inference

- ✓ Huge circulation receiving flow from the whole building at G.F. used as exhibition space.
- ✓ Laboratories are on the basement level.
- ✓ Book stacking below open well-lit reading area.
- ✓ Studio as personal space.
- ✓ Flexibility in planning: Can turn into a large stepped hall.
- ✓ Circulation is used as transition and separation.

3.6 CULC, Georgia tech

Designed by: AR. Bohlin Cywinski Jackson

The five-story, 222,000-square-foot Clough Undergraduate Learning Commons (known as Clough or CULC). Named in honor of former Institute President G. Wayne Clough, it opened in 2011.

Figure 68: CULC

The building serves as an interdisciplinary facility to encourage collaboration and technologically enhanced teaching and learning. This building is not partial to any one field of study. It is filled with study spaces of many different sizes, offices, and labs/ classrooms. The building is consistently activated and serves for the study of different types of learning spaces in this project.

The spaces within the CULC are understood as a network that strikes a balance between social and academic spatial relations.

Objective: Understanding the unique typology of learning spaces: *Clough Undergraduate Learning Commons, Georgia Tech*

3.6.1 Taxonomy of spaces:

Certain approaches to the analysis of different spaces where student gather and socialize.

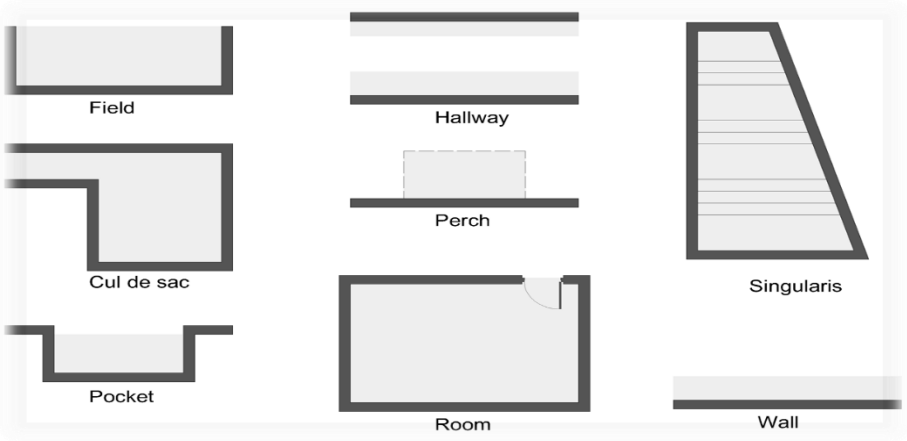
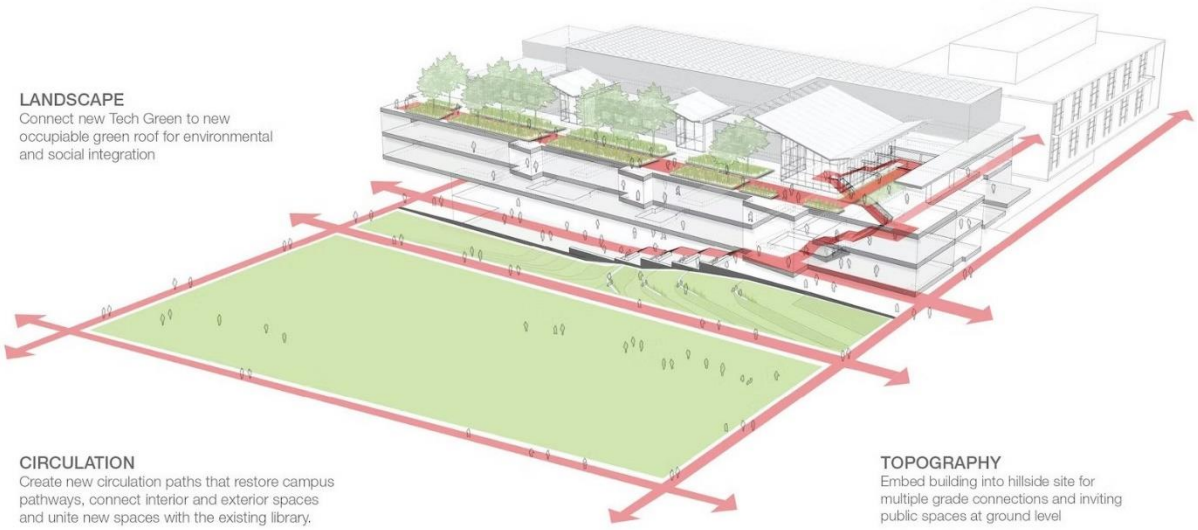


Figure 69:Taxonomy of spaces



Source: CULC, Georgia tech, arch daily

Figure 70: CULC, Stairs used as a reading area

Figure 71: CULC, Interactive mezzanine floor

3.6.2 Inferences

- ✓ Analysis the types of spaces used by students in learning environments.
- ✓ Understanding the psychology behind the interaction among the students.

3.7 Ed Roberts Campus, Berkeley, United States

Architects: Leddy Maytum Stacy Architects

Location: Burbank, California, USA

Located at a fully accessible transit hub, the Ed Roberts Campus is a national and international model dedicated to disability rights and universal access. A highly accessible, centralized place where the disabled can access services such as vocational training, education, housing and benefits assistance, and fitness and health support.

Figure 72: Ed Roberts Campus, Universal Design Concept

The two-story building includes offices, exhibition space, community meeting rooms, a childcare center for children with disabilities, a fitness center, job training facilities, and a café. At the heart of the building is a monumental helical ramp to the second floor, prominently placed behind the glazed facade facing the main entry plaza. Other Universal Design features include seven-foot-wide corridors to facilitate wheelchair use, automatic doors and hands-free building system controls, restrooms that meet a range of abilities, oversized elevators with special controls for wheelchair riders, and an easy-to-navigate wayfinding system aided by acoustical landmarks, high-contrast interior finishes, and colored and textured flooring.

Figure 73: Monumental helical ramp

The facility also has numerous sustainable design elements, including exterior shading, operable windows for natural ventilation, energy-efficient mechanical and lighting systems, and the use of recycled, sustainably harvested, and rapidly renewable materials.

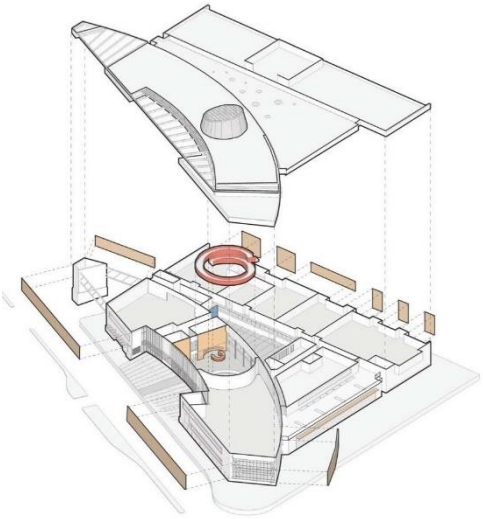


Figure 74: Exploded diagram

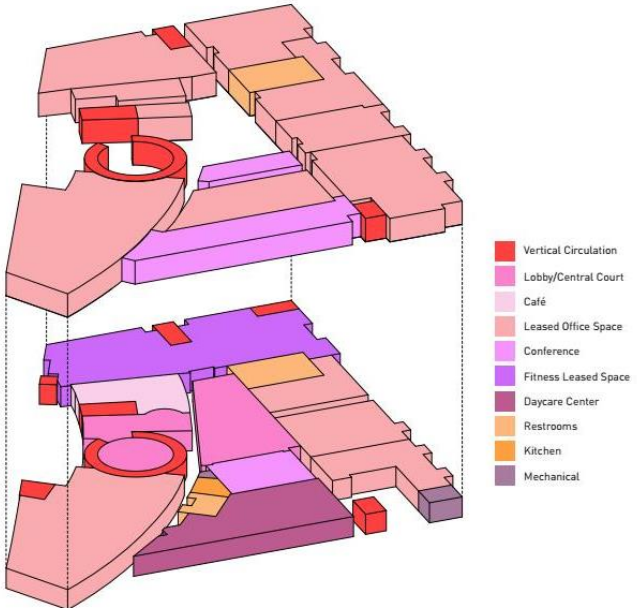


Figure 75: Form and Program Assemblies

Source: Ed Roberts Campus, arch daily

3.8 Umeå School of architecture

Architects: Henning Larsen Architects

Location: Umeå, Sweden

Project area: 5,000 sqm

Project year: 2007 – 2010

Figure 76: Umea School of architecture

Umea school of Architecture has a unique location by Umea River. With its interior landscape of open floor plans and sculpturally shaped stairs, the building has a strong artistic expression. As a growth center for future architecture, the main function of the building is to provide the framework for inspiration and innovation. From the outside, the building has a cubic expression with its larch facades and square windows placed in a vibrant, rhythmic sequence on all sides. The interior space of the building is designed as a dynamic sequence of stairs and split, open floor levels where abstract, white boxes hang freely from the ceiling filtering the light coming in through the high skylights.

Figure 77: Collaborative studio in UMEA

Source: arch daily

One of the key objectives has been to create a bright and open study environment where everyone is part of the same room – only separated by the split levels and glass walls of the teaching rooms. This design supports the opportunities for mutual inspiration and the close exchange of knowledge and ideas.

In contrast to the dynamic atrium, the drawing rooms placed along the facades of the building in a strict and regular sequence of columns and beams have a simple and rational design. The varied pattern of windows not only creates a strong visual effect – it also generously lets the light flow into the building and offers a breathtaking view of the river.

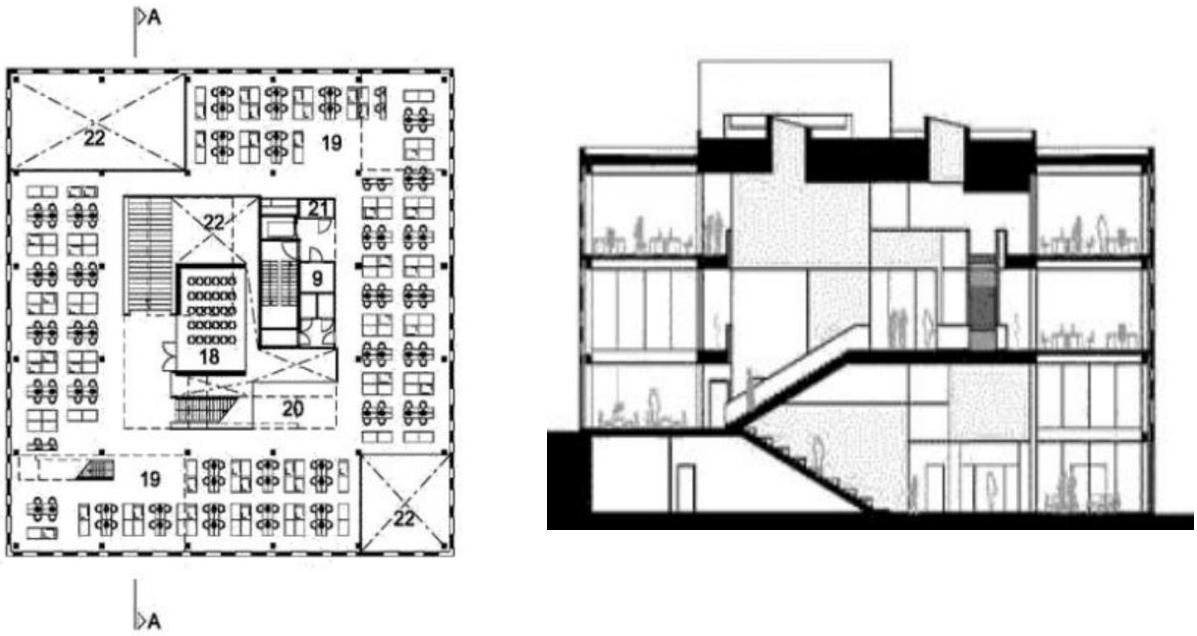


Fig: LVl 2 and Section at A-A

Source: arch daily

3.8.1 Sustainability and materials

Local sustainable materials have been used for the school of architecture. The exterior facing is larch wood and, on the inside local birch wood creates a contrast to the light walls and contributes to achieve good acoustics. The concrete floor gives an industrial and robust expression.

The energy reduction of 50% has been achieved that the façade consists of wood with window holes instead of glass only by energy calculations and daylight simulations. Ventilation, lighting and heating functions are ingeniously integrated in the bearing structure. The air comes in under the floor and is transported to the roof via the columns and beams where it is circulated round the building via perforated pipes.

3.8.2 Inferences

- New perspective of architecture design studio
- Bright and open study environment where everyone is part of the same room
- Only separated by the split levels and glass walls of the teaching rooms.
- This design supports the opportunities for mutual inspiration and the close exchange of knowledge and ideas.

4. Site Information

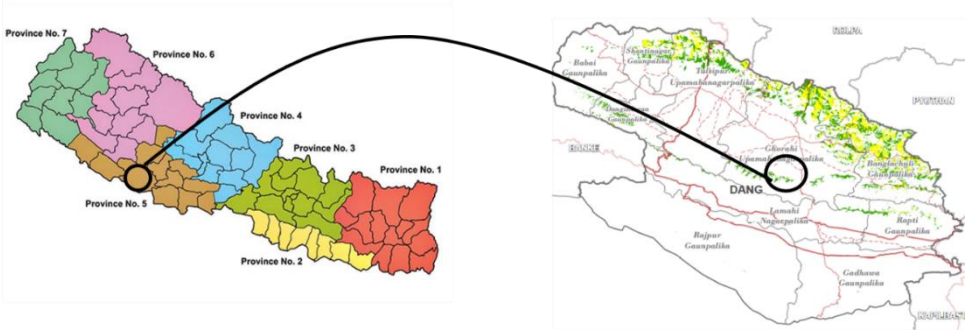


Figure 78: Geographical location of site

4.1 About Dang

- Inner Terai of midwestern Nepal in Lumbini Province.
- The second-largest valley in Asia is surrounded by Sivalik Hills and Mahabharata Range.
- Ghorahi is the seventh-largest city and the largest sub-metropolitan city in Nepal and capital of Lumbini Province.
- Archeologically important due to the discoveries of ancient fossils of apes and early humans.
- Center of Sanskrit language in Nepal and is home to Nepal's second-oldest university, Nepal Sanskrit University as well as Rapti Academy of Health Sciences (RAHS)

Schools that are planning and running Diploma in Arch. and B.Arch.

Fig: Rapti Engineering College

Fig: Shree Surya Binayak Madhyamik Vidhyalaya

Fig: Sanskrit University

Fig: Sahid Smirti Aawasiya Madhyamik Vidhyalaya

Fig: Sahid Krishna Sen Ichhuk Polytechnic Institute

Fig: IOE, TU

4.2 Site selection and justification

Mahendra Multiple Campus's Vacant Area

Figure: Arial View of Proposed Site

The proposed site is within the premises of existing Mahendra Multiple Campus, Ghorahi, Dang District.

Justification to site

- The site lies in an institutional zone and the surrounding consists of other academic and research institutions.
- This is the real site proposed by IOE for establishing of new engineering campus in province 5, dang.
- A scenically attractive area for study and other leisure activities.
- Less vehicular traffic and noise area.
- The district is considered the center of the Sanskrit language in Nepal and is home to Nepal's second-oldest university, Nepal Sanskrit University which is the only Sanskrit university in the country as well as Rapti Academy of Health Sciences (RAHS)

4.3 Site description

Location: Bharatpur, Dang (Province 5)
Plot: 27980 sq.m (55 ropanies)
Topography: Plainland
Access: Approximately 1.24 km from Ghorahi Chowk connected with the proposed 12 m wide road
Zone: Institutional zone

Ownership: Tribhuvan University- IOE Ghorahi Campus

The geographical position of the site according to google earth is:
Latitude: 28.0000° N
Longitude: 82.4753° E
The altitude of the site is 700 m from sea level.

Orientation
Main axis in the North West – South East direction.

Present use of the site
Football ground and vacant land

Approaches to the site
Very clear and remarkable access, close to **12 m wide road** and people **can feel the essence of site & building** while traveling in that road.

Vegetation / Ecology
Large trees, shrubs, herbs, and bushes.

Climatic Data
The climate is classified as warm and temperate, Humid and subtropical. The summers here have a good deal of rainfall, while the winters have very little. This climate is considered to be Cwa according to the Köppen-Geiger climate classification.
• Hottest: April-June (30 to 40°C)
• Coldest: Dec- Feb (5to 9°C)
(Source: Meteorological Department, Nepal)
Wind Direction

The wind rose for dang shows how many hours per year the wind blows from the indicated direction. The Chart clarifies the direction of wind and the speed of wind annually.

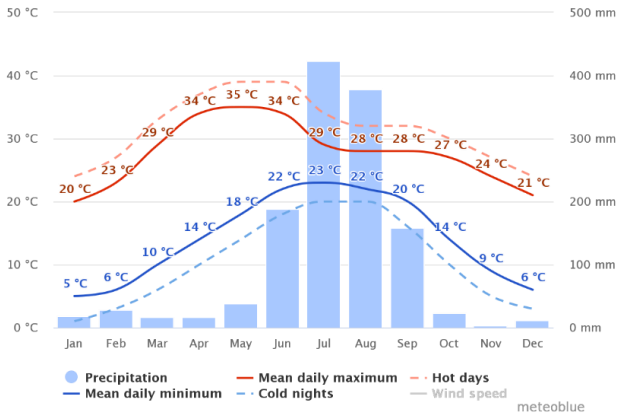


Figure 80: Temperature and Rainfall Chart

Source: Metablue

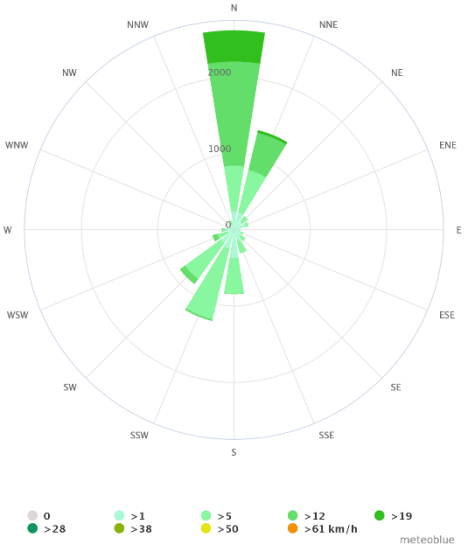


Figure 79: Windrose Diagram

Utilities and services

Electricity and communication:

The electricity line is taken from the National Grid of Nepal Electricity Authority, available in the front of the road while communication facilities like telephone, mobiles are available.

Water supply and sanitation:

The facility of water supplies is taken from the line of Nepal Water Supply Corporation, but due to its inconstant service, the center may use groundwater to meet its demand. The existing sewerage line can be utilized for sanitation. Storm water drainage and sewerage: Sewerage line is present in all sides of the road touching the site.

Site Surrounding

- Eastern side > Mahendra multiple campuses
- Western side> Temporarily Army barrack
- Northern side> Residential
- Southern side> Residential

Fig: Proposed Site, Ghorahi Dang

4.4 Existing Site Pictures

Figure: Proposed Site

Figure: Mahendra Multiple Campus

Figure: Existing Indoor sports hall in site

Figure: Nearby Government school

Figure: East 12m wide road

Figure: South 12m wide road

Figure: North 8m wide road

4.5 Bye laws

Site lies in an institutional and residential area.
FAR: 2.5
ROW: 6m
Built up area: 40%
Set back: 3m
Minimum parking spaces: 15%
Zone: Institutional Zone

4.6 SWOT Analysis

Strength

- Easy access
- Proper infrastructure available
- Institutional and residential area
- Good View
- Quiet and no pollution

Weakness

- Not defined drainage

Opportunity

- Supportive education and learning environment
- Collaboration of indoor sports hall with other institution
- Possibility of expansion
- Developed as landmark of the area
- Residential subzone around the site can impart residential facilities for students.

Threats

- Vehicular noise and traffic problem may occur in future as site is access by three sides road
- Need proper buffer due to settlement outgrowth and nearby Army barrek

5. Program Formulation

Administration	Proposed Area	Design standard	Case study
Reception	10 m^2		
Waiting	20 m^2	2m^2 per person x 10 person	30 m^2 - IOE
HOD'S & DHOD'S Office (2 units@30 &30m^2)	60 m^2	18 m^2 to 40m^2	
Accounts	20m^2		
Examination/ registration	30 m^2		
Teacher's cubical 10 units@10	100 m^2		
Meeting cap.25	50 m^2	2 m^2per person	2.m^2per person - KU
Staff Common, 10 nos. @ 5 m^2	50 m^2		
Store	25 m^2		
Total	**365 m^2**		

TOTAL STAFF= 24(1:10, Faculty: Student) +10(NON-TEACHING STAFF) = 34.

U.G. ARCHITECTURE= 5 YEARS, ANNUAL INTAKE= 48 STUDENTS, TOTAL INTAKE= 240.

Academic	Proposed area	Design standard	Case study	Remarks
Design studio (6@150)	900 m^2	3.5 m^2 per space	3.4 m^2per space- IOE 2.2 m^2per space-KEC	Taking 5 m² per space (considering accessibility for wheelchair user) for 24 students +30 m² for critique space and others for display

Academic	**Proposed area**	**Design standard**	**Case study**	**Remarks**
Lecture room (3@100 m2)	300 m^2 (1.5 per person)	1-2m^2per person	2.8 m^2 per person-IOE 0.7 m^2per person-KEC	25 m^2 addition for teaching space
Lecture Hall (90 cap.)	170 m^2 (1.5 per person)			35 m^2 addition for teaching space
Informal Interactive Lounge (Breakout spaces)	Around 600-800 m^2			
Isolated Learning Space	Around 230-300 m^2			
Thesis Work Studio	Around 185-200 m^2			
Computer Lab cap.48	120 m^2			
Store	40 m^2			
Total	2830 m^2			

Library	**Proposed area**	**Design standard**	**Case study-KU**	**Remarks**
Lobby	50 m^2		65 m^2	
Baggage area	20 m^2			
Lending	20 m^2		18 m^2	
Book stacking	180 m^2		207 m^2	
Reading area	150 m^2	2-2.5 m^2 per person	216 m^2	
Office	40 m^2		36 m^2	
Digital Library	100 m^2		100 m^2	
Reference section	90 m^2		90 m^2	
Book Maintenance	45 m^2		45 m^2	
Discussion room	45 m^2		100 m^2	

Library	**Proposed area**	**Design standard**	**Case study-KU**	**Remarks**
Store	40 m^2		40 m^2	
Washroom	50 m^2			
Total	**850** m^2			

Auditorium Capacity= 250

Auditorium Block	**Proposed Area**
Foyer	115 m^2
Info Center/Reception	20 m^2
Main Auditorium	230m^2
Stage	70 m^2
Rehearsal/ waiting	45 m^2
Green Room (2 @ 32 m^2)	64 m^2
Sound/ Control room	15 m^2
Equipment Store	25 m^2
Office	15 m^2
Washroom	80 m^2
Total	**680** m^2

Cafeteria	**Proposed area**	**Standard**	**Case study-KU**	**Remarks**
Seating	143 m^2 for 30% of 340	1.1-1.4 m^2per diner	297 m^2 for 245	
Service	40 m^2		50 m^2	
Storage	30 m^2		35 m^2	
Preparation	30 m^2		36 m^2	
Staff	20 m^2		20 m^2	
Cooking	40 m^2		40 m^2	
Dishwashing	25 m^2		27 m^2	
Counter	12 m^2		12 m^2	
Executive dining hall	30 m^2		36 m^2	

Cafeteria	Proposed area	Standard	Case study-KU	Remarks
Total	**370 m^2**			

Lab & Workshop	Proposed area	Design standard	Case-study-IOE	Remarks
Info center/lobby	32 m^2		32 m^2- IOE	
Surveying & Carpentry Control Office (2@40)	80 m^2		1 Office of 32 m^2- IOE	
Surveying & Carpentry Material store (2@30)	60 m^2		Internal 28 m^2 Adjacent 120 m^2	
Surveying & Carpentry Work station (2@96)	192 m^2 (4 per person)	3.5-5 m^2per person	132 m^2 for 24 students	
Building Science	50 m^2			
Building Materials	50 m^2			
Test lab	50 m^2		50 m^2	
Restroom	20 m^2			
Total	**534** m^2			

Exhibition Area	Area per space	Number	Individual Area	Total Area
Art studio				
1. Class	3.5 m^2	1	140 m^2	140 m^2
2. Gallery		1	50 m^2	50 m^2
3. Store		1	30 m^2	30 m^2
Exhibition space				300 m^2
Office		1	20 m^2	20 m^2
TOTAL				540m^2

Photography Lab	Proposed Area
Class(cap.24)	35 m^2

Photography Lab	**Proposed Area**
B/W Lab	22 m^2
Color Lab	22 m^2
Display/store	25 m^2
TOTAL	**104** m^2

Students Centre	**Number**	**Total Area**
Student center	1	80m^2
Stationery store	1	100 m^2
Consultancy Station	1	120 m^2
Nursing Room	1	40 m^2
TOTAL AREA		340m^2

Services	**Proposed Area**
Water pump room	30 m^2
Sewage water treatment plant	50 m^2
Server room	30 m^2
Electrical room	20 m^2
Generator room	100 m^2
TOTAL AREA	**230** m^2

Indoor Sports Hall	**Proposed Area**
Office	30 m^2
Hall	700 m^2
Store	100m^2

Indoor Sports Hall	**Proposed Area**
Lobby	150 m^2
Changing / Wash Room	65 m^2
TOTAL AREA	**1045** m^2

Hostel (cap:100- 42% of 240)	**Proposed Area**
Entry + Guard	36 m^2
Office	24 m^2
Common Room	80m^2
Room (27@ 20 m^2	540 m^2
Store Room	24 m^2
Rest Room	110 m^2
TOTAL AREA	**815*2=1630** m^2

DESCRIPTION	**AREA**	**PERCENTAGE**	**Remarks**
Total Area	27980 SQ.M	100 %	
Built Up Area	8956 SQ.M	32 %	
Circulation 25% of built-up area	2239 SQ.M	8 %	
Total Built Up Area	11195 SQ.M	40%	

Parking	2-wheeler area	4-wheeler area	No. of 2 wheel	No. of 4 wheel	Total Parking (Area)	Remarks
Student	1 SQ.M	6 SQ.M	120	5	150 m^2	
Staff	1 SQ.M	6 SQ.M	20	10	80 m^2	
Visitors Parking	1 SQ.M	6 SQ.M	20	10	80 m^2	
Total			**160**	**25**	**310** m^2	
Special case: Min. no. reqd. accessible parking spaces					Parking area for 3 number of the vehicle (differently-abled)	Parking facility i.e., 160-185 no. of vehicles

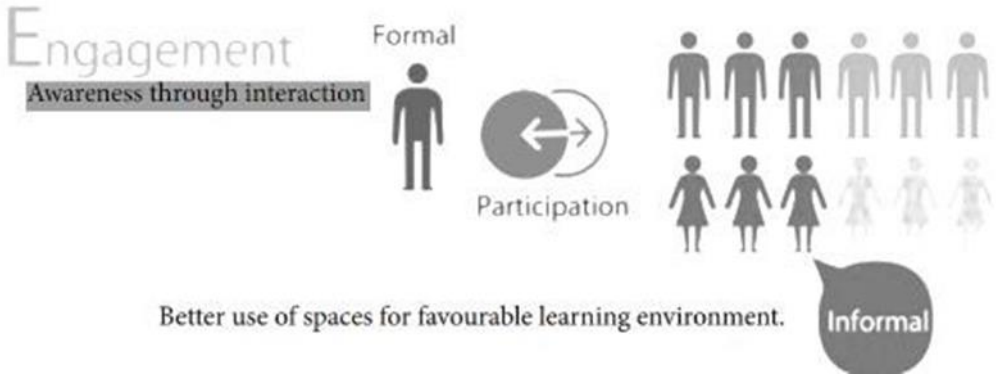
6. Concept and Design Development

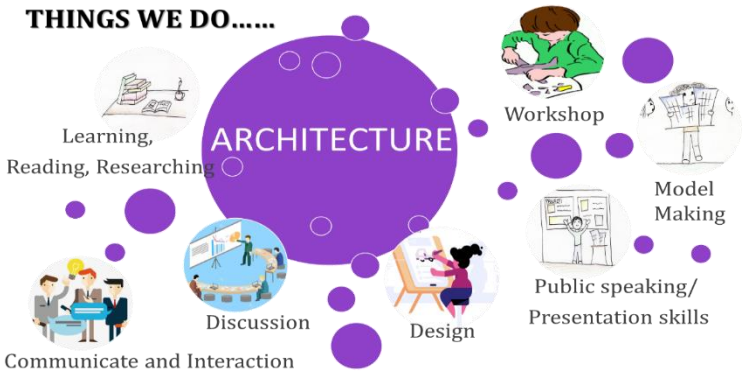
6.1 Point of Departure

Architecture education itself is a student centric course; learning by doing, Project based learning. Design studio should be perceived as both personal and collaborative space. Interaction and exchange which forms a very important part of architectural education should be considered in the design. One size doesn't fit all. One environment is not suitable for learning process for different student. New learning environment such as immersive, individual, group learning environment with integration of technology is important. Thus, the design is mainly focused on creating flexible new learning environment.

6.2 Theoretical Framework

The community at Architectural School is active and friendly. It aids in the development of values, knowledge, skills, and practices necessary to produce better environments and architecture that are in tune with people and their cultures, physical worlds, and ecological systems. It serves as a common forum for artists, architects, and students from a variety of academic disciplines to engage in debates, exchange ideas, and communicate with one another.





Nothing in the new educational model restricts learning to something that can only take place in a classroom. One learning environment is not appropriate for all activities, just as one teacher cannot teach every subject. The design must support the new manner of learning and correspond to the educational model in order to establish a new school concept.

In addition, David Thornburg's teaching approach was used in the design of the classroom and teaching areas. The primary goal of this effort was to include the idea of CAMPFIRE, WATERING HOLE, CAVE, and LIFE into the instructional paradigm of architectural thinking.

CAMPFIRE	WATERING HOLE	CAVE	LIFE
			
A place for a community of learners to sit together, listen to each other and learn from storytellers	A place for learning from peers in small groups	An area to be alone and independent without interruption or distraction	Reflecting ideas and knowledge in real life

6.3 Planning Concept

The two primary considerations in the design of any educational institution are the learning process and student movement. The architectural school is a center for numerous functions and activities, and students are constantly moving between several learning rooms at once. Learning the process through which architecture is conceived and finding the best solution to specific problem so planning approached in such a way that it helps to create the flow of different stages of architecture.

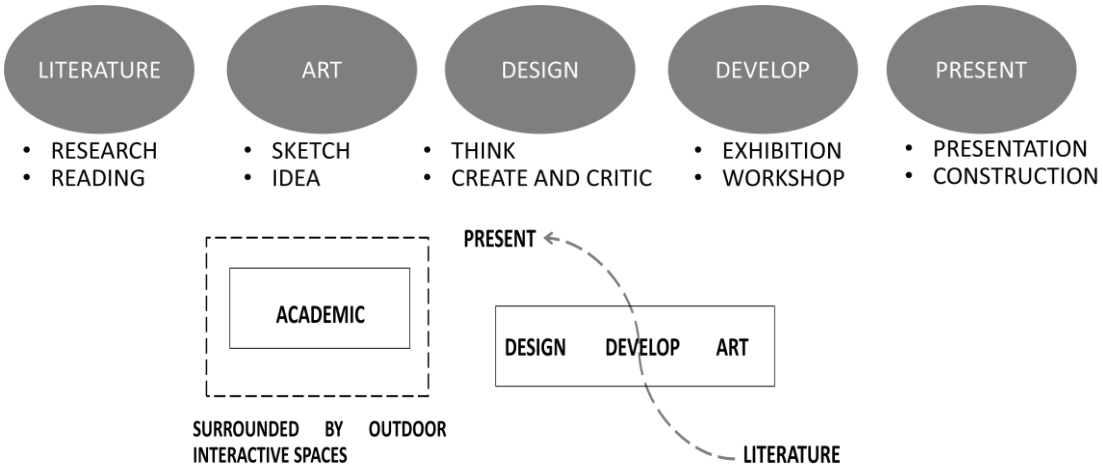
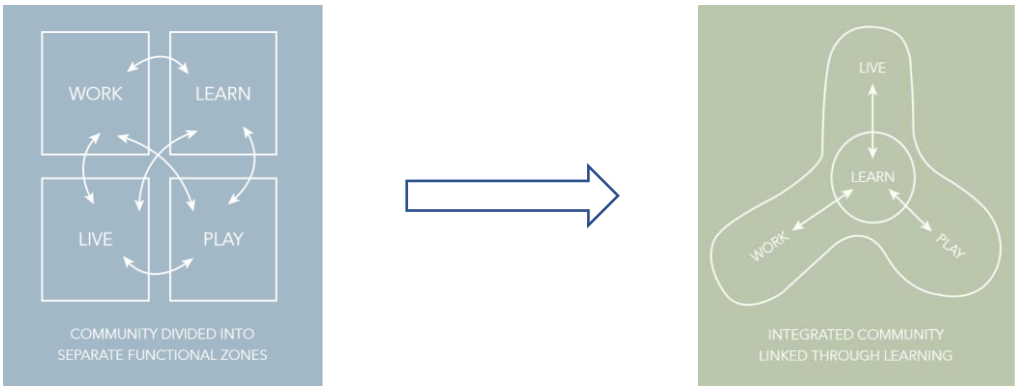


Figure 81: Flow of different stages of architecture

The primary purpose, which is to provide a space for learning, socializing, and idea exchanging, will therefore be carried out by the architectural school. In order to support the learning activities, socially interactive places with adaptable learning environments are designed where the various learning process functions are not segregated but rather linked.



With this starting point, I developed the design concept of "Puzzle of Mass and Voids"- combines all the factors into a whole. Development of the project with all the pieces on the table.

Why Puzzles?

Architecture is also an art that starts with a Puzzle.

Just like in puzzle art, there are a certain set of rules to complete the task and find the end result. In architecture, there are also certain techniques and methods to get the final product which can differ as per project nature just like the nature/ level of difficulties in puzzles.

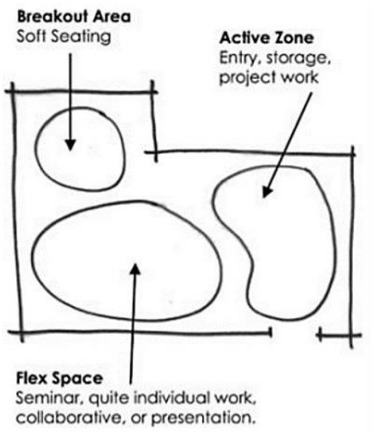
6.4 Design Approach

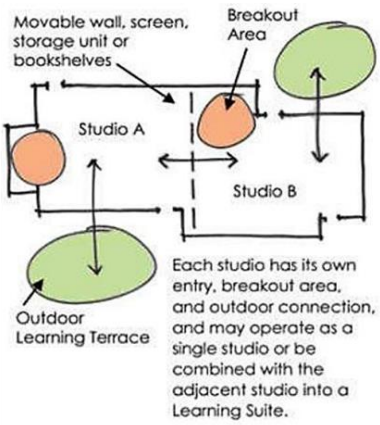
6.4.1 Approach 1: Student centric environment

Basically, two aspects have been considered while creating student centric environment.

a. Flexibility:

Respecting the student liberty throughout the built environment through various nature of formal and informal spaces. Thus, design studio which is the core part of architecture school have been designed in similar way. Learning staircase and mezzanine space in each studio creates the opportunity for personal and collaborative activity.





Design Studios consists of 4 diffs. Spaces

1. Active Space
2. Critic / Display space
3. Break out space
4. Flex space

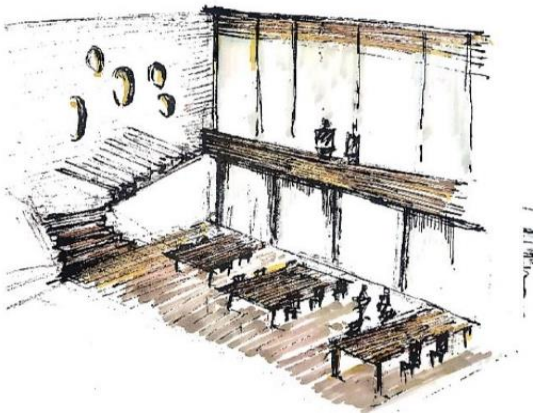


Figure 83: Conceptual interior 3d view of studio with mezzanine space

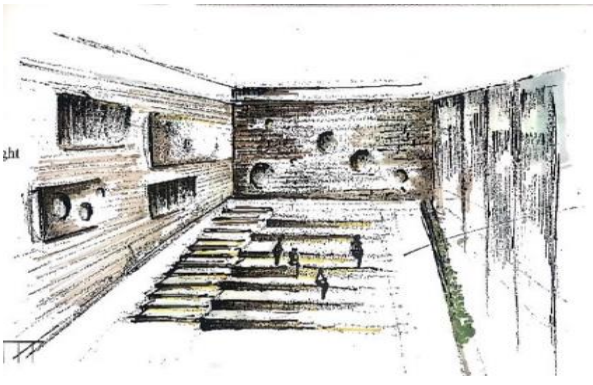


Figure 83: Informal seating space in the learning staircase of lobby

b. Interaction:

Interaction among different years of student plays a vital role. Juniors need the guidance of senior in every level. Thus, planning has been done as per this need.

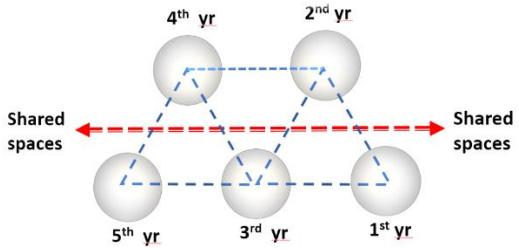


Figure 84: Conceptual diagram showing the relation between different years in architecture school

6.4.2 Approach 2: Universal Design

a) Ramp as a façade element is placed on the front side of the building for vertical continuing circulation and symbolism of inclusive design in architecture school.
b) Corridors and class rooms with sufficient circulation space regarding differently abled people.
c) Nursing station, changing room and infirmary have been planned to minimize the travel distance among these services.

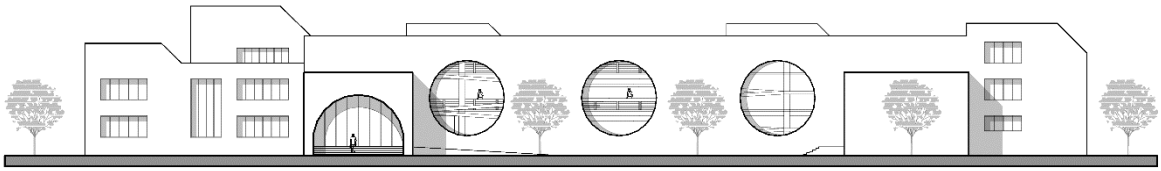


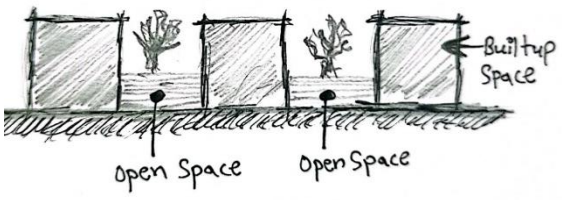
Figure 85: Academic Block front facade

6.4.3 Approach 3: Environment Friendly

1. Aligning the building in the N-S axis to get maximum diffused light for studios.

2. Enough daylight and ventilation maintain through double height void across the building.

3. Balance between open space (Void) and Built space (Mass) which helps students more blending with nature.



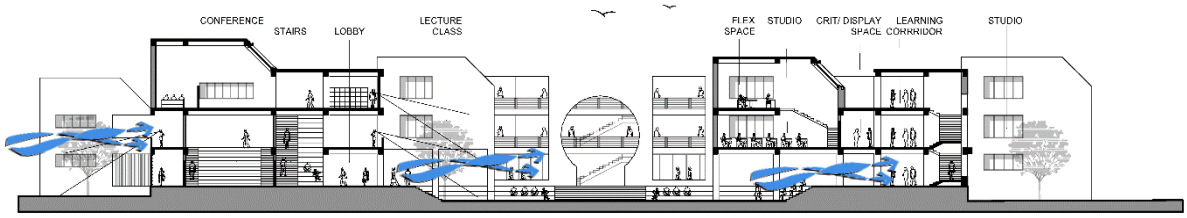


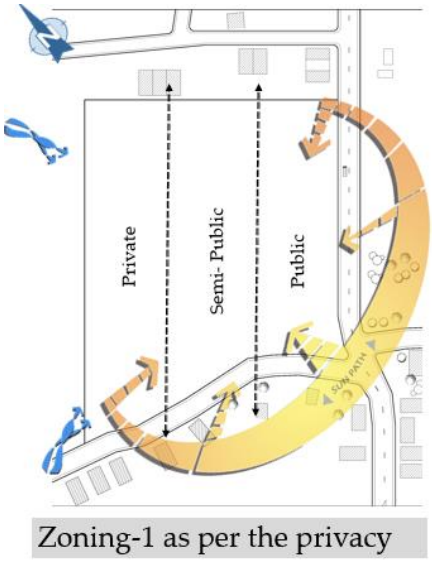
Figure 86: Airflow from south to north in central court and other pocket court

6.5 Zoning

Zoning of the programs plays an important role in the project. Thus, zoning is carefully done to support the planning concept and develop the proper flow of user in the site.

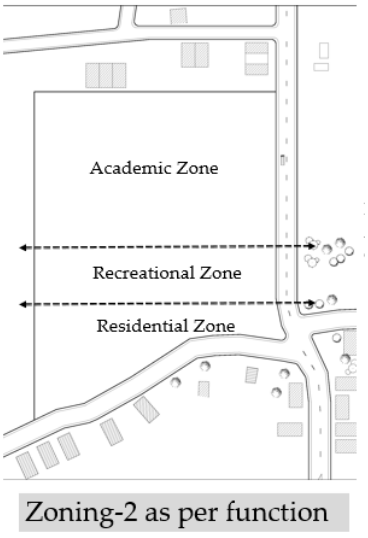
Step 1: Zoning of the site has been done emphasizing the privacy priority of the spaces including the transition spaces of different functions. Main entrance is placed in the eastern side and secondary entrance/ service entry in the southern side of the site.

Step 2: Whole site has been divided into 3 different Zones; Academic, Recreational and Residential. Academic blocks have been placed in northern side to take advantages of natural northern light along with shaded/ cooled northern landscape and peaceful environment comparatively to the southern side. While recreational zone placed at the mid zone as a transition and shared open spaces between academic and residential blocks. Residential/ Dormitory blocks is placed at the southern part considering privacy.



Zoning-1 as per the privacy

Step 1



Zoning-2 as per function

Step 2

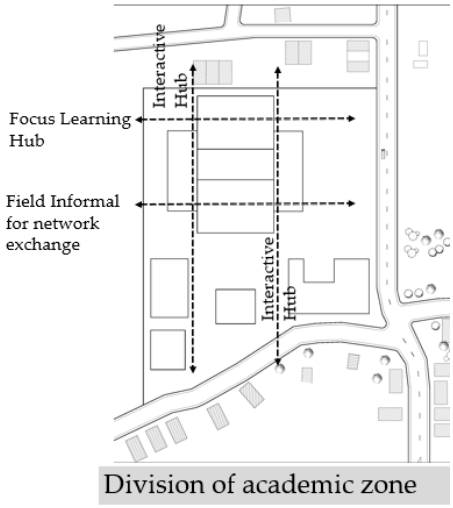
Step 3: Further Academic zone is divided into three different hubs.

a. **Interactive Learning:** Library, Exhibition, Labs, Workshops
b. **Field informal for network exchange:** Teacher's room, Admin, Counselling room, Lecture Hall, Teacher-student discussion area
c. **Focused Learning:** Design studio and Art Studio

Recreational zone consists of sports hall, cafeteria and auditorium well connected with entrance plaza and construction yard.

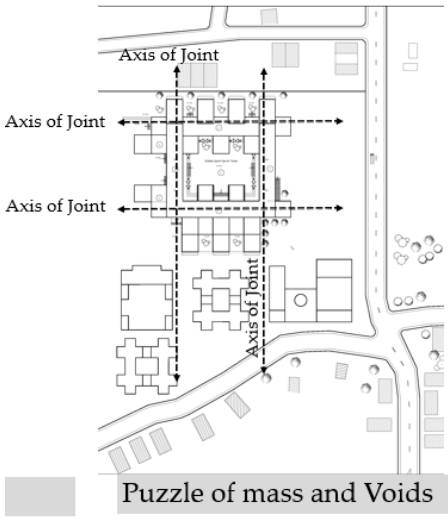
Residential zone consists of male and female dormitory units along with shared open spaces in front of the entrance. Dormitories are connected with other blocks and open spaces following the extended interactive learning hub axis on both sides.

Step 4: Following the planning concept of engagement through the shared spaces and their proximity considering the movement of the students and learning process, a networking of mass and voids is created focusing on multiuse use of spaces.



Division of academic zone

Step 3



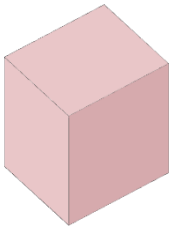
Puzzle of mass and Voids

Step 4

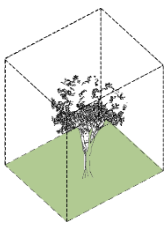
6.6 Form Development

The form was approached in such a way that it should reflect the meaning of architecture school. The form was inspired by the pieces of puzzles which reflect the design process in architecture thinking. The playful connection of Mass and voids with the circulation which acts as a joint of puzzle which creates a networking of pieces.

Elements of Puzzle?



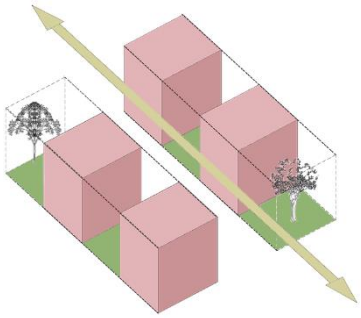
Mass



Void

Joint

Puzzle of Mass and Voids- Different activities are performed in those pieces which creates an environment where learning is at maximum. In architecture, a Joint symbolizes a place where multiple elements come together and present ideas.



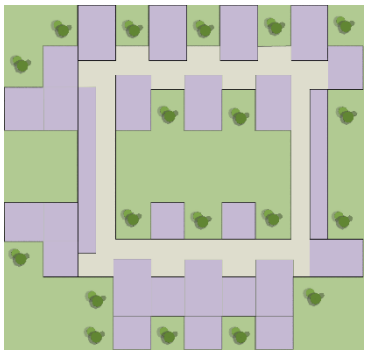


Figure 87: Spatial Organization

Networking of Pieces – Enhance the learning experience and provides proximity which promotes engagement.

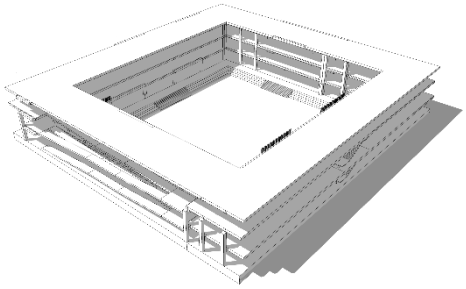


Figure 91: Academic Block: Servant/ Shared Spaces

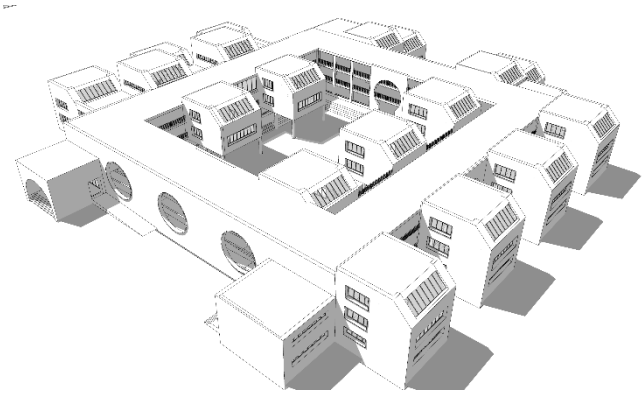


Figure 90: Academic Block: Networking of mass, voids and joints

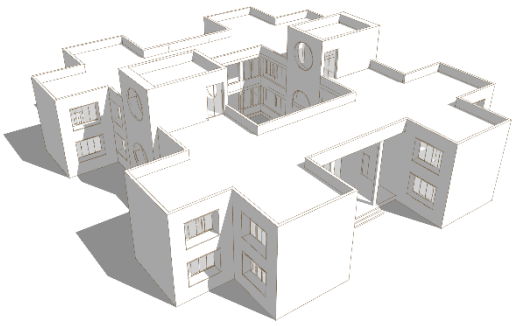


Figure 89: Dormitory: Mass and voids

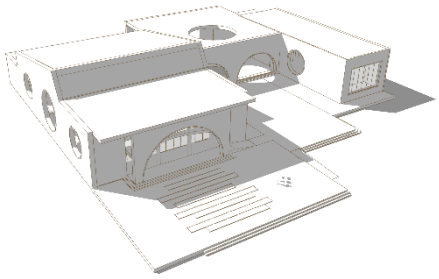


Figure 88: auditorium & Cafe: Mass and Void

6.7 Concept in Masterplan

The main entrance is towards the east road along with vehicular entrance. Secondary entrance/service entrance is towards the south so services are located towards the south of the site.

The spatial organization is mixed use of linear organization and clustered form creating a courtyard. In academic block, central court acts as lungs of the whole complex along with pockets of open spaces. Three different hubs have been placed in such a way that they all get unobstructed daylight and natural ventilation. Circulation is centralized connecting the whole complex. Horizontal, vertical and staggered nature of circulation is planned according to the function and usability.

Concept in landscape

Following the building complex planning, landscape is designed as per nature of circulation. In each void space between the mass, greenery is planned such that in whole site complex it creates a micro climate of cool and peaceful study environment.

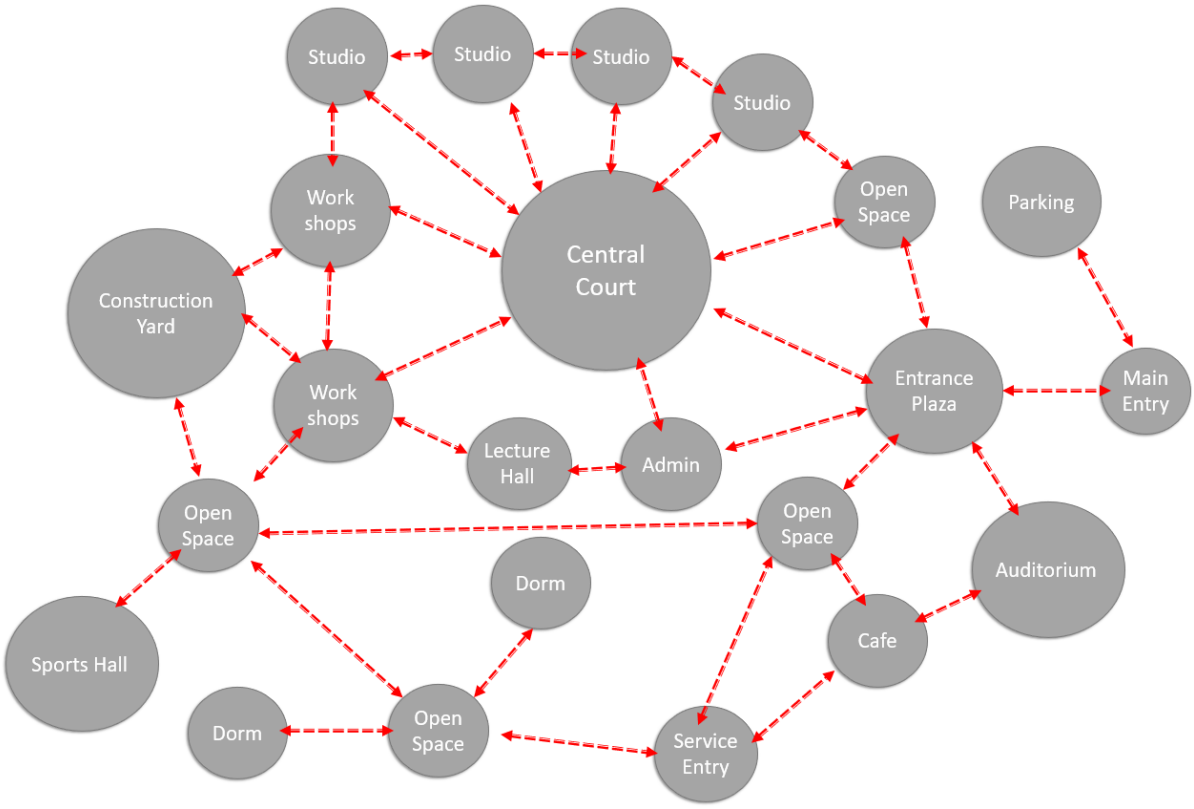


Figure 92: Bubble Diagram of Master Plan

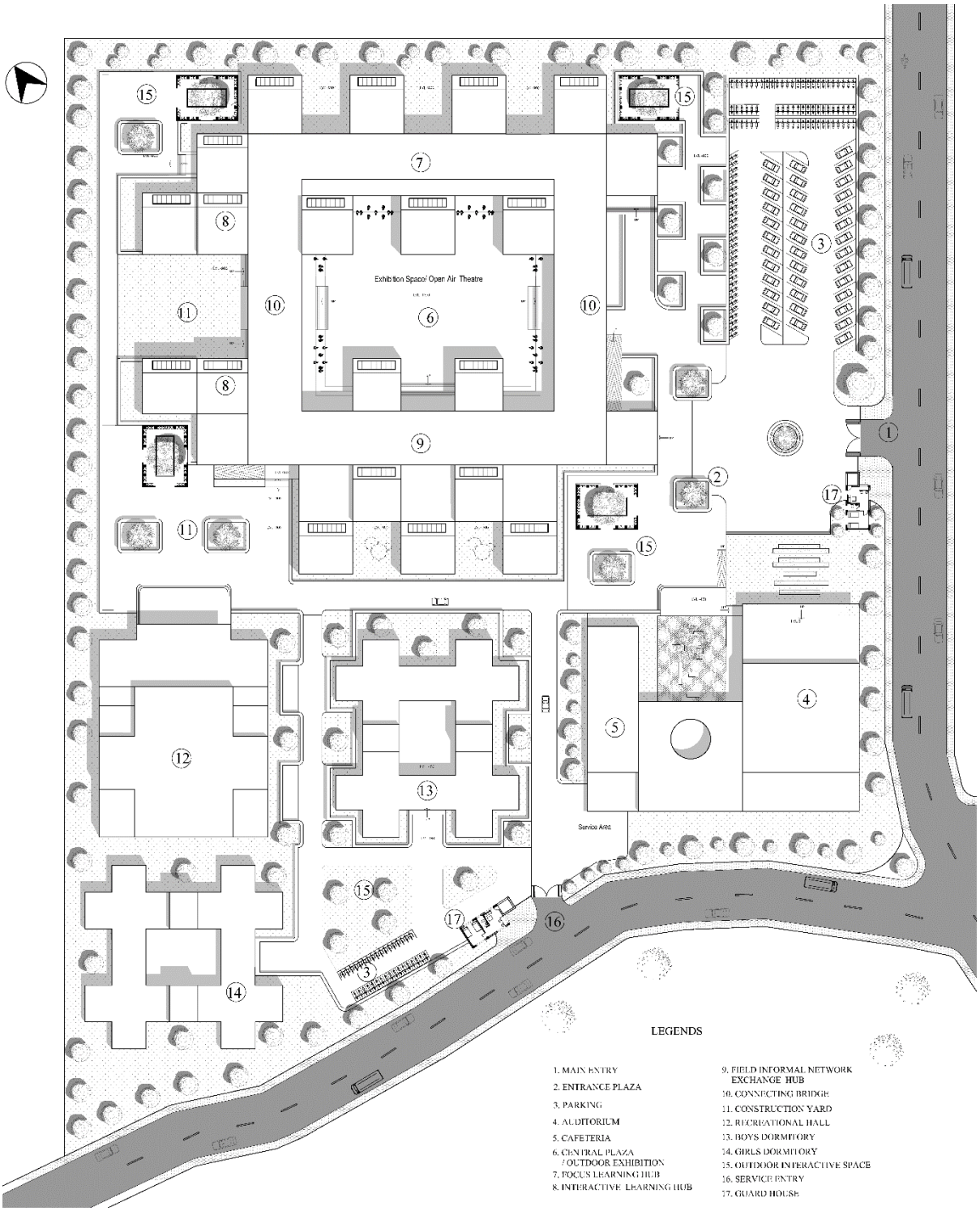


Figure 93: Master Plan with sciagraphy

6.8 Elevation Design Approach

"ARCHITECTURE CAN BE BEST LEARNED FROM THE SURROUNDING"

The very first thing that the building communicates with the users is through its elevation and forms. Being an architecture school, it should give an excitement to the students by its forms and elevation. So, the elevation is composed with basic geometric shape; Square, rectangle, Circle and Semicircle and play with natural light and shadow in circulation areas like corridor, lobby and staircase. The south side wall is left blank to cutoff direct harsh sunlight and north light is collected into the classrooms.

6.9 Elements of Design

6.9.1 Entrance Plaza

Entrance Plaza in the main entrance leads to surface parking in the right turn and auditorium and cafeteria in the left turn. Guard house is located left beside this plaza. The plaza gives the feeling of openness and provides place for interaction. It is the commencing point of the Public and semi-public space and also acts as transition space between public and institution.

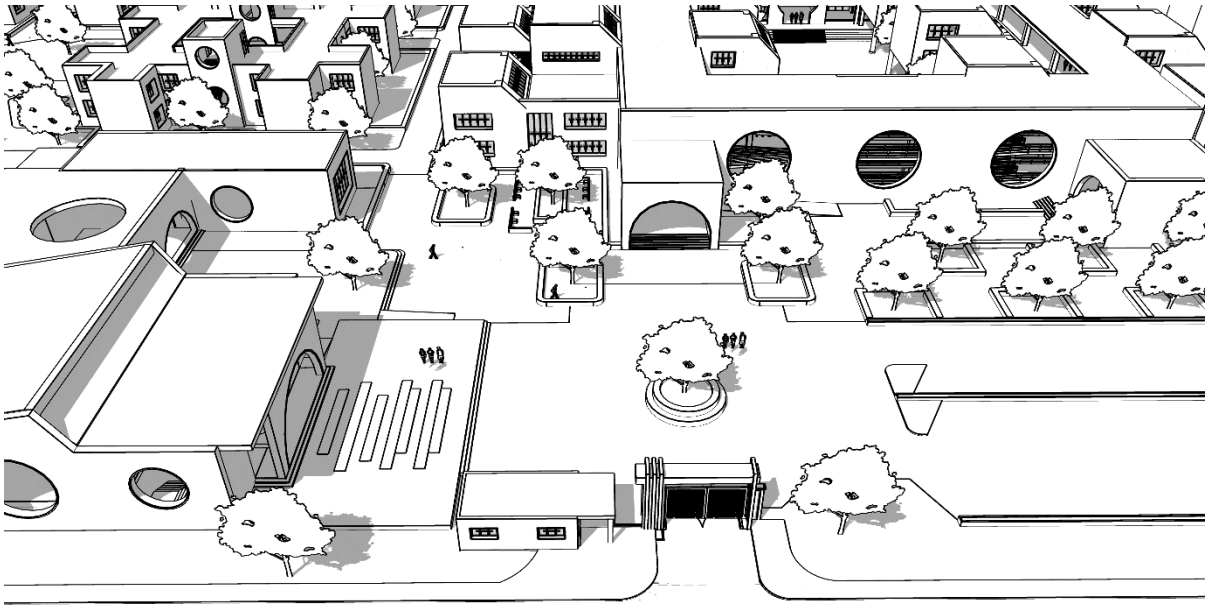


Figure 94: Entrance Plaza

6.9.2 Central Plaza:

Central plaza transited through entrance plaza is the focal point of the whole complex. Central Plaza as a courtyard gives a grandness to the complex. This plaza space connects the design studios, admin, conference hall, workshops and presentation hubs. Learning corridor and staircase along with extended ramp for vertical and horizontal circulation are arranged considering the movement of the students around this plaza. This plaza can be used as an outdoor exhibition space and open-air theatre. The breakout spaces from design studio and workshops areas are aligned facing this plaza for visual interaction.

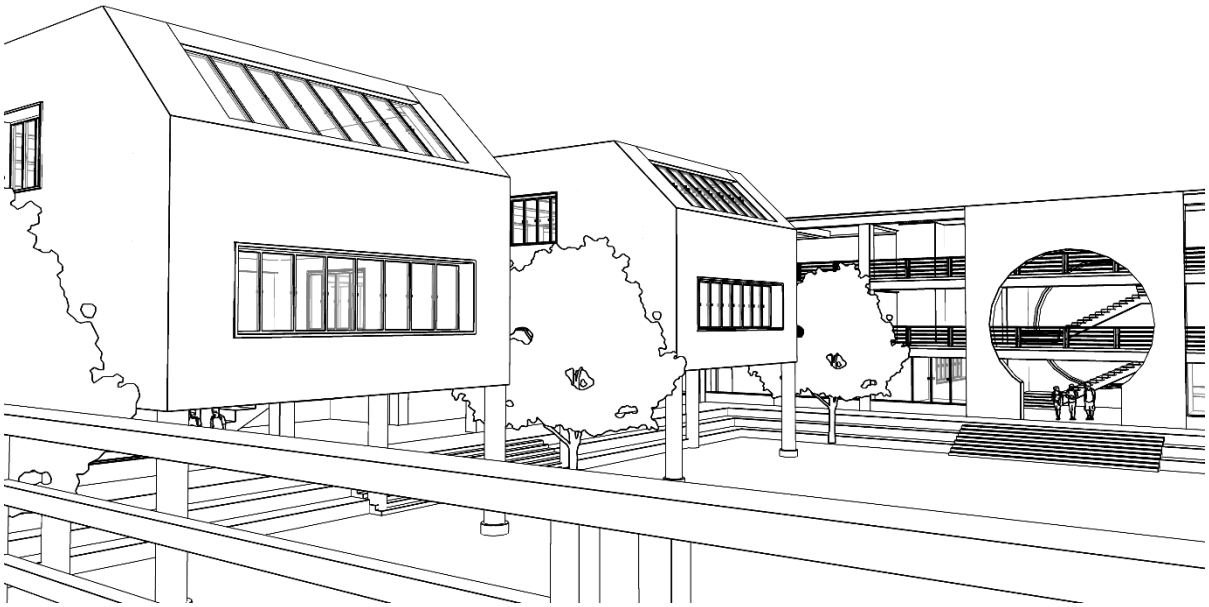


Figure 95: Central Court in academic block

6.9.3 Auditorium and cafeteria:

Auditorium connected directly with the entrance plaza space through stepped path which forms a part of landscape as well. It houses 250 capacity seating inside it. The curved entrance of an auditorium gives the feeling of welcoming and circular voids in façade creates a sense of transition and playful elevation language.

Cafeteria is connected with auditorium split out area which serves for both institutions, dormitory and public as well. Closed, semi open and open dining areas have been planned as per informal activities. To enhance the quality of cafeteria and break the monotony, vegetation is inserted into the semi-open and open dining.

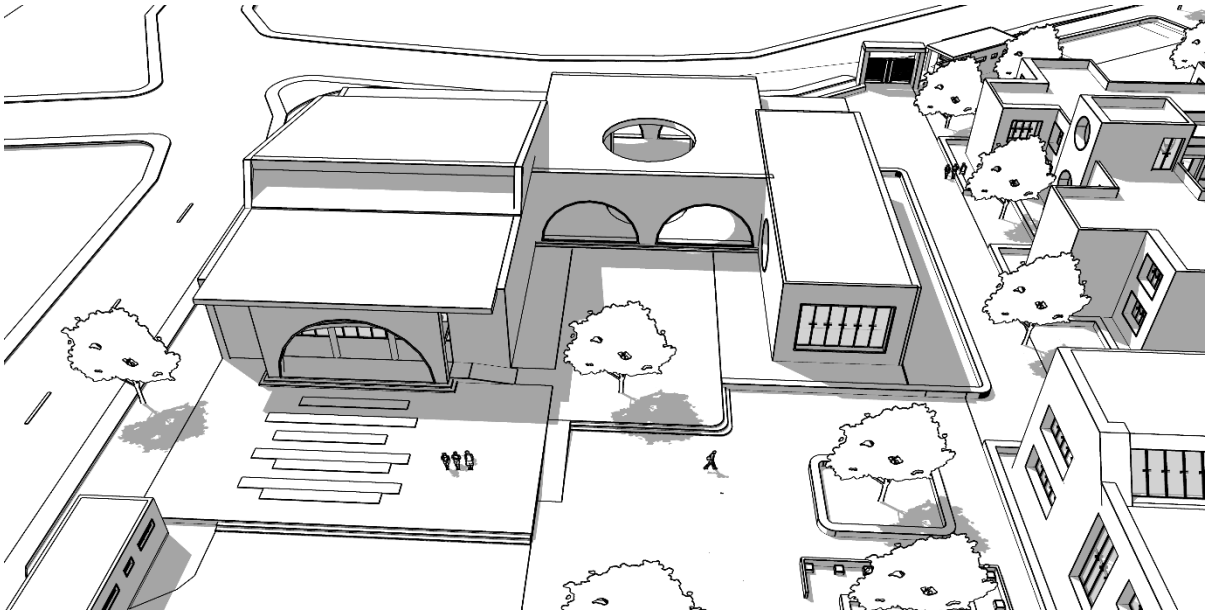


Figure 96: Auditorium and Cafeteria

6.9.4 Administration:

The administration block is the center of administrative related activities. It stands as control point and guiding body of the complex, thus placed near academic services. Administrative block is located at the right side of central plaza, directly accessible from the entrance plaza. Courtyard is placed on another side of the plaza for light and ventilation. HOD and DHOD room, administrative sections and meeting rooms are placed on ground floor facing the courtyard. Teacher cabinet, student discussion cabinet, counselling section are provided in upper floors which is accessed through the learning staircase straight to the double height lobby. The teacher lounge is placed facing the entrance plaza so that people can enjoy the activities running on the plaza, through glazed façade.

6.9.5 Labs and workshop

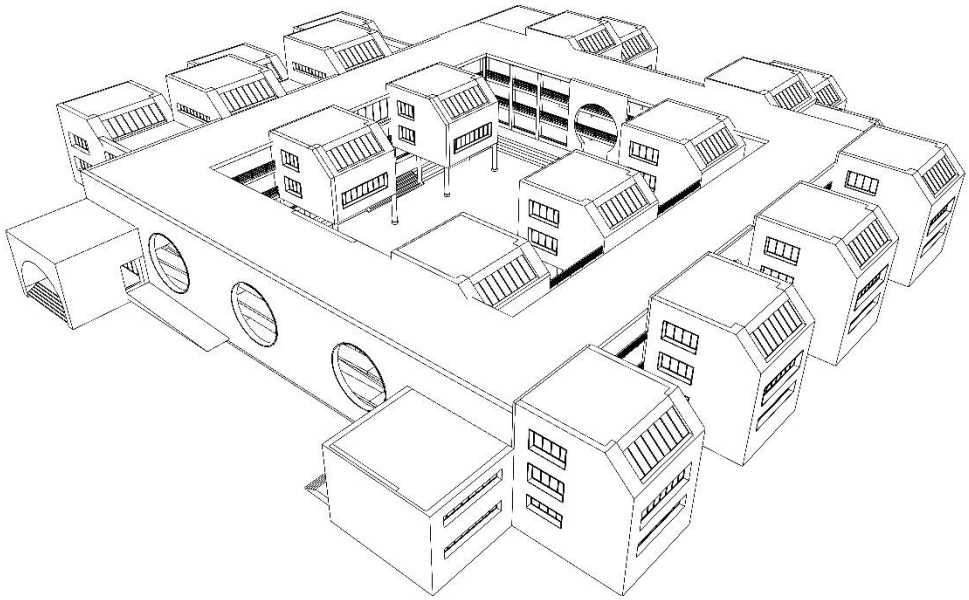
Block with labs and workshop is placed on the left side and adjacent to the central plaza. Ground floor consists of wood carpentry workshop of double height where teacher and student can experiment the thing. Carpentry and model making workshop room opens into the courtyard and have adjacent connection to the construction yard. Heavy equipment machine room for building materials test is placed adjacent to secondary entrance of the academic block. The 5m wide permeable road is used as both service and emergency purpose. Whereas, different labs such as building science, building construction, material, photography, survey are located on the second floor which is accessible from the learning staircase and lobby in first floor.

6.9.6 Communication Block

It contains library, computer lab, IT center on the second floor and stationary store, printing room and student union office on the ground floor.

6.9.7 Studio Block:

It is placed on the north-south axis. It is planned in 3 different levels. Ground level is used for presentation hub and permanent work display along with informal art studio. First floor consists of active design studio with temporary work diplay area and breakout space. Second floor consists of flex space as an informal private space for each studio which is connected to the isolated learning pods and digital library. Each level is connected with learning corridor internally which forms the part of the studio. Each studio has mezzanine space. Studio of different years are connected through common breakout spaces.



6.9.8 Dormitory

This is planned for students only and have a capacity of 45% of total students. This is located in southern part of the site through secondary entrance. There is common outdoor interaction area for both boys and girls next to their entry areas. This creates their own private space. Each dormitory block consists courtyard with common room, guard room, store room and bedroom for 2 and 3 persons as a combined. All the opening are faced inwards to the dormitory to provide some privacy and tress are used as screening and buffer.

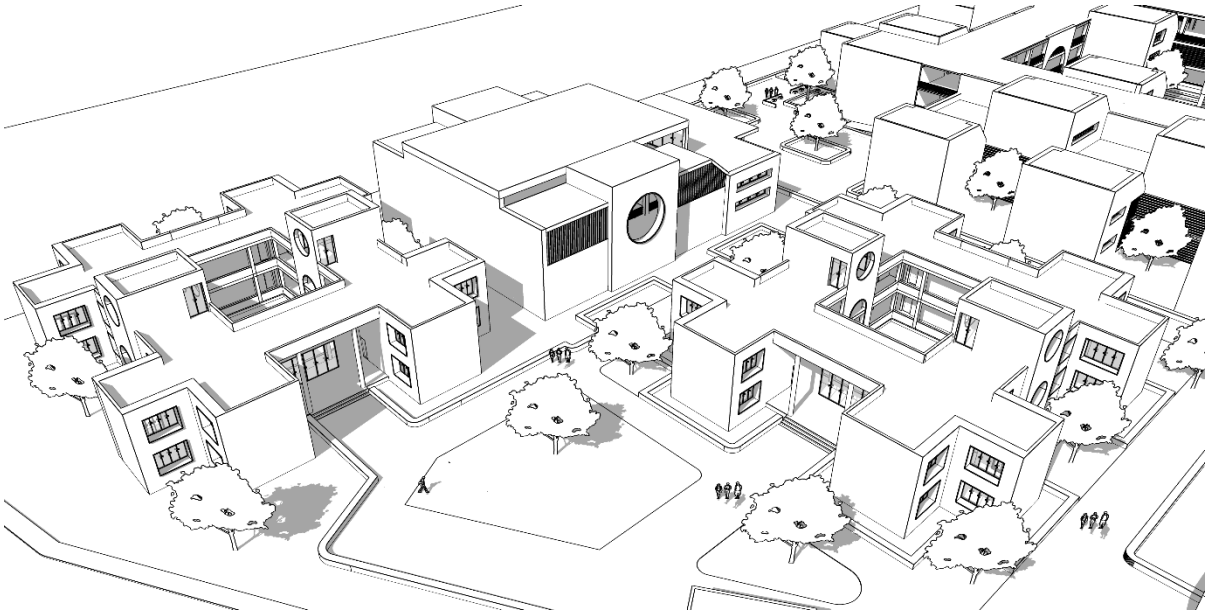
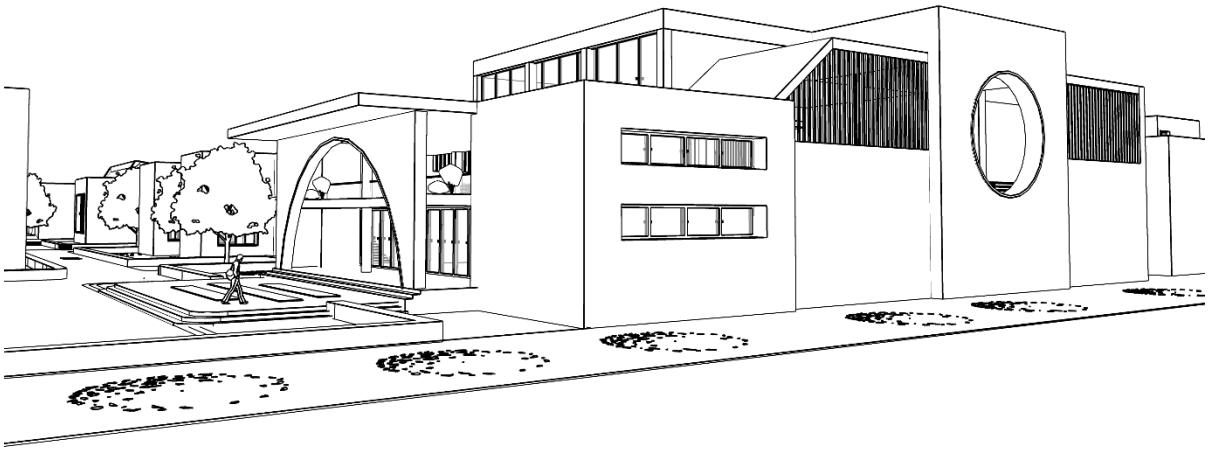


Figure 97: Left side: Girl Dormitory and Right side: Boys Dormitory

6.9.9 Recreational Hall

It is placed adjacent to the academic block and dormitory units. The curved entrance gives the welcoming gesture with large lobby. Hall can be used as multipurpose for gaming and exhibition. Ground floor consists of big hall with stores and first floor consists of spectators viewing deck.



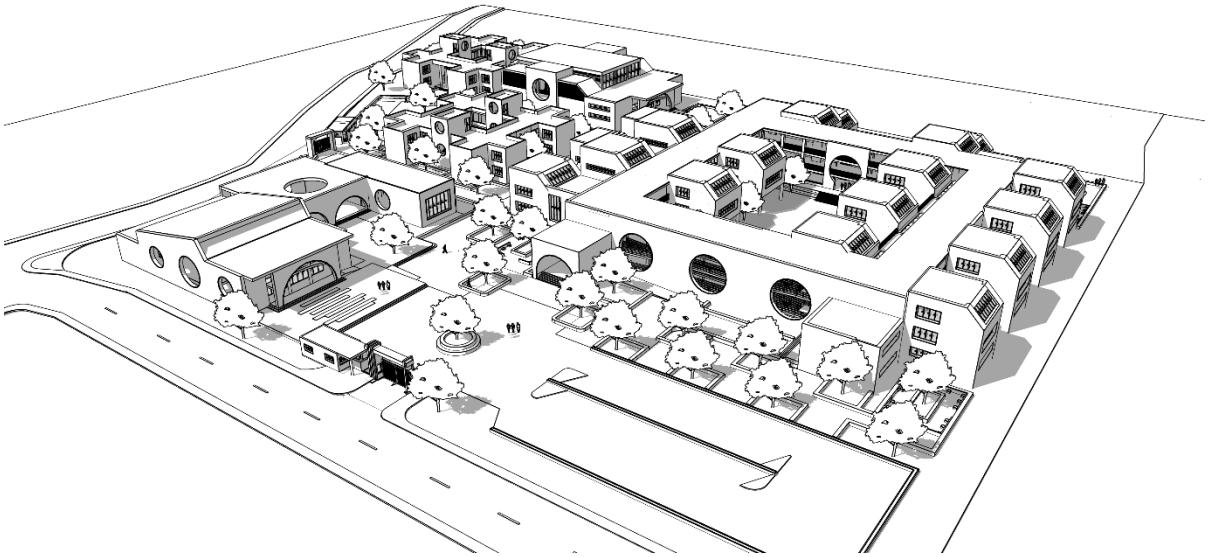


Figure 98: View from top N-E

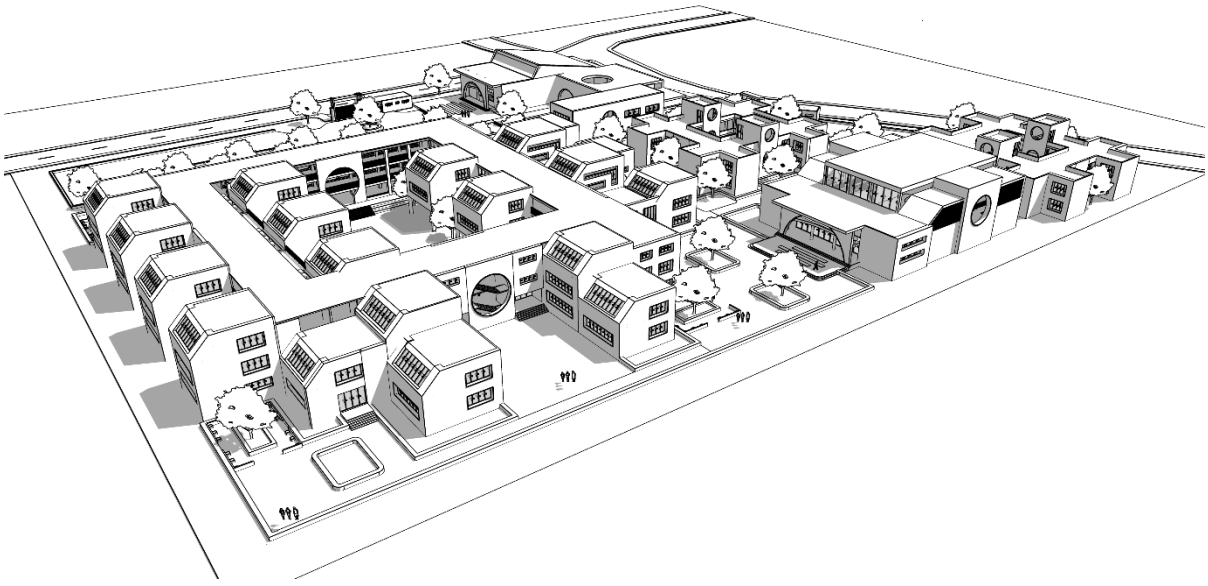


Figure 99: View form top N-W

7. Physical Model

Figure 100: View from top N-E

Figure 101: View from top S-E

Figure 103: View from top S-W

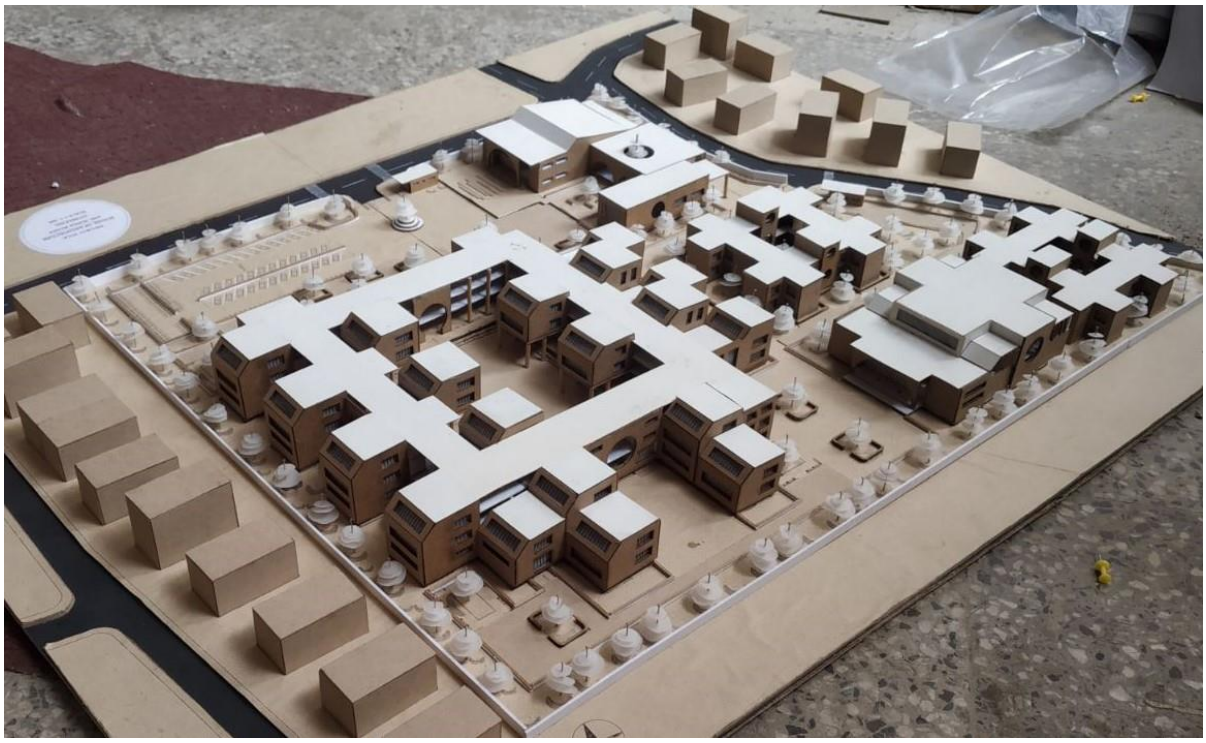


Figure 102: View from top N-W

Figure 105: Main Entrance

Figure 104: Entrance Plaza

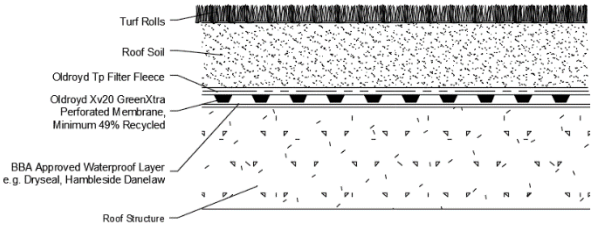
Figure 107: Dormitory Units

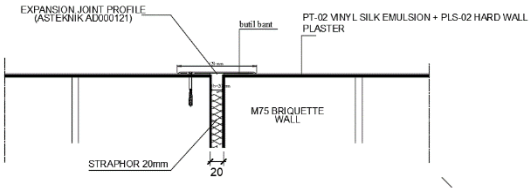
Figure 106: Northern View

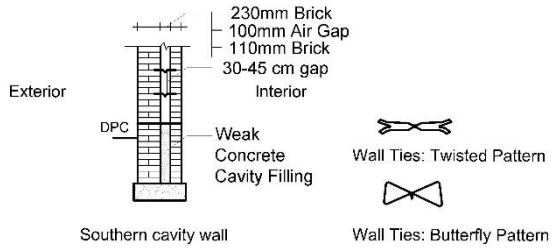
8. Construction System

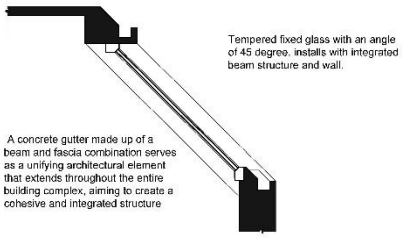
8.1 Structural Plan/Form

The buildings do not go higher than three stories. The structure system used for the complex is RCC structure. The buildings house simple rectangular grids with simple square columns of general size from 600 x 600 mm and general span of 5m*10m is used. Expansion joints are provided for the stability of structure. Huge circular voids in elevation up to diameter ranges from 3m to 7m and arches of diameter ranges from 8m to 11m as a welcoming entrance to the building complex.









North Light and Gutter Details

8.2 Material Selection

The building has been designed with usage of materials like exposed bricks, plaster, glass, steel to derive its stunning aesthetics and thus to compliment with the nearby institutional buildings. With the combination of brick exposed outside wall and green vegetation, a balanced texture has been maintained.

9. Services

9.1 Water Supply

A. Source

Ghorahi Bharatpur Water Supply Corporation is the main source of drinking water for the whole project. The supply of water is stored in the underground tank and supplied to various buildings via pipelines and stored in the respective overhead tanks.

B. Location

There are two main underground tanks located beside the girls dormitory unit.

C. Quantity of water

Calculation of the water tank capacity is done based on water requirement as guided by NBC-208: 2003.

Table 5: Calculation for water tank size

SN	DESCRIPTION	NO. OF PEOPLE	OVERHEAD CAPACITY (Lit)	TOTAL (Lit)
1	Admin	34	45	1530
2	Academic Block	240	15	3600
3	Auditorium	250	15	3750
4	Cafeteria	100	50	5000
5	Library	50	15	750
6	Workshop	60	15	900
7	Sports Hall	60	45	2700
7	Dormitory	100	100	10000

Total = 28230, per head per day about 29 cu. m

Size of water tank = 87 cu. m, 29 x 3 (safety factor 3)

Fire tank = 50 cu. m, a/c to NBC

Total underground tank = 137cu. m, (87 + 50)

Tank size = 140 cu.m , 7 x 5x 4 m

Overhead tank = 44 cu. m (87/2, pumping twice a day)

Tank size = 45 cu. m, 5 x 3 x 3 m

9.2 Rain Water Collection

By adopting low-cost rainwater harvesting techniques water demand could easily be met even in dry seasons such water collected from the catchments could not only be used for daily purposes but can also be used in irrigation.

Rain water catchment areas of different blocks

Academic Block = 5322 sq.m.

Sports Hall = 1335 sq.m.

Auditorium = 927 sq.m.

Cafeteria = 800 sq.m.

Dormitory = 850*2= 1700

Total rain water catchment area = 10,084 sq.m.

Total rainwater harvesting potential = catchment area * run off coefficient * annual rainfall of area exposed = 10,084*0.7*1.4 = 9882.32 cu.m.= 9882.32 liters per annum.

9.3 Sanitation

Septic tank is used for proper management of sewerage. Two septic tanks are placed within the site, which collects the sewerage from different blocks through soil manhole for solid waste and waste manhole for water waste.

CALCULATION OF SEPTIC TANK CAPACITY

AS PER I.S. (PART I & II) the size of 150 user septic tank is

L1= 4.6, L2= 2.3, W= 2.5, D=1.8

10. Conclusions

The School of Architecture is steadfastly committed to helping students develop their fundamental skills and critical thinking in order to foster the design creativity and leadership necessary to make long-lasting improvements to our built environment. In addition to preparing students to become architects, the curriculum is set up to help them learn how to adjust to changes that will inevitably occur in the future and that they will face in their jobs. An architecture school's critical teaching is supported by this design. Different learning environments and settings, including individual learning environments, immersive environments, and simulation environments, are designed to foster student creativity and outcomes. An organizational conceptual framework for the study was created through the critical review of the literature. To determine the various components and requirements of the study, related case studies were conducted. The design program was created using standards from the literature and recommendations from case studies. The design was then developed in accordance with the site's characteristics, practical needs, and aesthetic preferences. The primary objective of the design, which is driven by functional components, is to improve interaction between students and teachers and to develop new learning spaces that are more adaptable. I have made an effort to reconsider the design studio, a crucial component of an architectural school, as a place that may be both individually and collectively creative.

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12. Annex