CHAPTER I

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Architecture is the art as well as the science of building. It combines beauty and utility. The buildings have to be functional, structurally stable, pleasant, and comfortable. The architects have to design and execute the buildings in the specific geographic conditions and socio-economic contexts. They have to ensure that the buildings would not harm the environment but would rather improve the environment and enhance the beauty of the surroundings.

Architects are generalists. They have to perform as technicians, artists, counsellors, project managers and co-ordinators. Architects are members of society. They use society’s resources. They should accept the responsibility of fulfilling society’s needs. It is obvious that the deeper is their understanding, the richer their expression, and the keener their creative power, the more valuable will be their contribution to the intricate problems of the society.

Architectural education must develop architects to perform all these diverse roles and functions; hence, architectural education turns out to be a complex blend of scientific training and artistic realisation. It must impart meaningful facts and concepts, and it must develop those skills, insights, and value standards that will enable

The name of the city of Bombay was changed to Mumbai after the registration of the researcher as a Ph.D. student. Hence, the researcher has used the term ‘University of Mumbai’ instead of ‘University of Bombay’ in this thesis.
knowledge and principles to be applied most effectively to the problems of purposeful living.

Architectural education must develop architects as enlightened individuals, responsible citizens, and resourceful professionals. Such architects will serve the society better.

Education has to be progressive. It must undergo renewal. For validating the established patterns of education and for making any changes, it is necessary to understand the strengths and weaknesses of the existing educational programme. An appraisal, a systematic formal evaluation, can serve this purpose. An appraisal can also help to assess the effectiveness of educational institutions.

Educational institutions are either run by government organisations at public cost or run by private organisations by charging higher fees from the students. All these institutions use society’s resources. They are accountable to the authorities that support and finance their activities. They are accountable to their clients, the students. They are accountable to themselves for their goals and objectives, to the staff for their morale and commitment, and most important of all to the society. Hence, it is necessary to assess the effectiveness of educational institutions. This can be achieved by an appraisal of education. It will help in the following aspects:

1. To find out the worth and merit of an educational programme.
2. To assess the extent to which the programme objectives are achieved.
3. To assess the process and functioning of an educational institution.
4. To provide knowledge for justifying and validating the existing functions.
5. To assess the need for changes.
6. To suggest the necessary changes.
An appraisal is, thus, necessary and useful in the process of development and improvement of education. It is an essential part of decision making process.

The present research on architectural education includes a study of architectural education in colleges of architecture affiliated to University of Mumbai.

Before understanding the system of contemporary architectural education, it is worth reviewing the systems of architectural education from which the current methods of education are derived.

**SYSTEMS OF ARCHITECTURAL EDUCATION**

**Apprenticeship System:** It was a system of serving as assistants under master craftsman to learn the skills. The master provided house, clothing and food to his apprentices. The apprentices repaid this maintenance and training by an increasingly productive help over a long period. Eventually, the more skilled and energetic of these apprentices might themselves attain a mastership, become full members of the guild, and have shops, employees and apprentices of their own.

The apprenticeship system possessed many advantages. Under it, no gap existed between training and practice. Apprentices observed and helped their masters on real projects. They could meet clients and had close contacts with builders and workmen. The system also exhibited inherent weaknesses. The busy masters found it impossible to spare the time or energy required for systematic teaching. Some lacked the patience, sympathy and expository talent for successful teaching. Without any knowledge or insight, the heterogeneous events in building activity often resulted in frustrating confusion for the apprentices. As the system consisted essentially of individual training, its production of skilled personnel was limited.
**Supplementary System:** Architects gradually supplemented the apprenticeship system by formal group instruction. More formal classes were undertaken when architects and artists joined to organise academies of art. All such academy instruction was intended to enhance the training of apprentices and relieve their masters of the responsibility for elementary instruction.

The *Academie Royale d' Architecture* was founded in Paris, in 1671. Francois Blondel, its first professor conducted a two-year cycle of classes with semi-weekly lectures. The programme included arithmetic, geometry, perspective, hydraulics, military architecture and fortifications. Each academician was entitled to name one official student, whom he quite naturally selected from his own apprentices. The supplementary character of the program was emphasised by the academicians' reservation that each would continue to instruct his own students in his own office.

**Inclusive System of Training:** In 1742, Jacques Francois Blondel established a private school of architecture to achieve an inclusive system of training. Here, to those who could afford the stiff tuition, a faculty of able teachers taught for eight hours each day, a two years curriculum which included mathematics, physics, construction, specifications, mensuration, ornament, modelling and design. The remarkable expansion of science and technology in the eighteenth century emphasised the need for personnel trained in the new techniques. This in turn stimulated the inauguration of first schools of engineering. In August 1793, *Ecole centrale des travaux publques* was set up with three-year curricula in architecture and civil engineering. This was further transformed into the *Ecole polytechnique*, the first school of general engineering. This led to the development of similar polytechnic schools in other parts of Europe. During the late nineteenth century, applicants for polytechnic training were required to have at
least six months of experience in an architect's office. The first two years of academic
study were devoted to basic technical subjects. Then, three years of practical
experience as an inspector on government projects formed a prerequisite for admission
to further professional courses. The curricula embraced an inclusive programme of
instructions, in which design was an integral part, taught within the school by teachers
who usually were also able practitioners. Successful completion of program led to a
state diploma, which opened the way directly to governmental appointment or private
practice. The most promising graduates however, augmented their training in design by
further study in academy classes, architects' offices, or in a meisterklasse conducted by
an eminent practitioner.

Ecole Atelier System: When it became clear that the Ecole polytechnic would not
satisfy the needs of architecture; the classes of the academy were reconstructed as an
Ecole speciale d' architecture under the newly founded National Institute of Science
and Art. In 1797, it was joined with the other schools to form Ecole de speciale de
beaux-arts. The Ecole curriculum consisted of three types of instruction. One consisted
of lecture course in theoretical subjects, viz. mathematics, mechanics, surveying,
perspective, architectural theory, history, and building construction. The second was
studio training in freehand drawing, and third was architectural design. The Ecole
curriculum was remarkably comprehensive but its actual operation exhibited a curious
bifurcation. The Ecole itself conducted the lecture courses and drawing classes. In
design class, it limited its responsibility to issuing of programmes, administering the
final grading by juries of architects, and exhibiting the results. However, the crucial
stages of preparing and guiding the students in their design exercise was not the
responsibility of the school or its faculty, but of ten to twenty independent units, the
ateliers. Students worked under the instruction of a patron practitioner in these organisations. In theory, the atelier brought professional stimulus to each student through close contact with the patron, who usually was an eminent and experienced architect. The Ecole atelier system produced many accomplished architects, but the system developed definite shortcomings. The integration of the whole education process in the Ecole was impossible because the teaching of design was delegated to different private agencies. The ateliers were neither school nor office, and thus, lacked disciplines of both.

Pupilage System: This system was a modification of the apprentice system. In this system, the architects gave office instruction in return of pupils' fees. In Britain, this system remained the primary means of professional training throughout the nineteenth century. Pupils could supplement office training by the drawing classes, which the Royal Academy of Arts had provided. The institute of British architects, founded in 1834, interested itself in professional training, but did not attempt to initiate a school. In 1882, the Royal Institute of British Architects (RIBA) assumed direction and control of British architectural education by regulating the system of professional examinations, and making it a prerequisite to its associate membership. In 1890, the architectural association organised its teaching into a systematic four years curriculum. In 1894, University College of Liverpool established its School of Architecture to conduct its full time programme by daily classes. In 1920, Liverpool College adopted a five-year curriculum, and this in time became a mandatory length for all schools of architecture.
ARCHITECTURAL EDUCATION IN INDIA

Sir J. J. College of Architecture, Mumbai, is the oldest institution imparting architectural education in India. The origin of the college can be traced to the founding of a Draftsman's class attached to Sir J. J. School of Arts. The college is situated in the premises of Sir J. J. School of Arts, which was set up in the year 1856, by the erstwhile Government of Bombay, from the grants made by Sir Jamshedji Jeejibhoy, the first Baronet of Bombay. Eventually, the School of Arts became a Government institution under the Department of Education, Government of Bombay. A budget allotment was made for its maintenance. The Government Diploma Examination in Architecture was held for the first time in 1923.

The courses of study in the school comprised of an elementary school for drawing, and advanced schools for drawing-painting, design, modelling, and architecture.

The advanced course in architecture was a part-time course for 2 hours in the morning. On 12th May 1917, a meeting of the students who had passed the advanced examination of the Sir J. J. School decided to form an association- "The Architectural Students Association". This association was renamed "The Bombay Architectural Association" in 1922. Some members of this association accepted professional responsibility to participate in training of the students as 'visiting teachers'. Gradually, the syllabus of various courses was improved to bring it closer to the pattern prescribed for the examinations of the RIBA. Prof. Claude Batley, Mr. D. W. Ditchburn, and Mr. C.M. Master were among those teaching professionals who devoted a lot of their time to nurturing this course to its full status of a five year full time diploma, that was recognised adequate to appear at the Final RIBA Examination. In 1929, the RIBA
Examination was held in India for the first time. The Government sanctioned an atelier class to be conducted in the school of architecture to assist those appearing for this examination. Day classes were also started to supplement the morning classes.

The entire course was reorganised in 1936, and was made into a full time five years course, leading to government diploma examination in Architecture, bringing the standard equal to that of Final RIBA examination. Admission to the course was restricted to those who were either matriculate, or were registered as probationary members of the RIBA.

In 1952, the Architecture section was affiliated to the University of Bombay for teaching the first 3 years of the course, leading to the intermediate examinations of the University and eventually, to develop the Institution into a full-fledged degree college. The Department of Architecture was converted into an independent institution under the name of Sir J. J. College of Architecture in June 1958. The management of the college was transferred by the Government of Maharashtra to the University of Bombay in 1973. The University appointed a standing committee as the Board of Studies to advise the University on all matters relating to the management of the college.

During this period, around thirty colleges of architecture were established in other parts of India. The All India Council of Technical Education (AICTE) was charged with the responsibility of recommending a new curriculum that was to a large extent designed to take in parts of civil engineering.

The parliament passed the Architects Act in 1972. The Council of Architecture constituted under Section 3 of Architects Act was made responsible for maintaining the standards of architectural education in India. Since then, all the Colleges of
Architecture in India are required to enforce the Council of Architecture (Minimum Standard of Architectural Education) Regulations, 1983.

After passing the qualifying examinations, students have to register themselves with the Council of Architecture, New Delhi, before undertaking independent professional activities.

Most of the architecture colleges established in the early period after independence, were government-aided colleges. The government policy (both Central and State level) changed, and a decision was taken to allow privately run unaided colleges for technical education. Based on this decision, many such colleges of architecture were established in the country. Today there are around 102 colleges of Architecture in India, out of which, 32 colleges are in Maharashtra. These colleges are affiliated to different universities and boards of technical education. The present research concentrates on colleges of architecture affiliated to University of Mumbai. These colleges offer architectural education based upon the syllabus prescribed by University of Mumbai. The curriculum is described here in detail

**B. ARCH DEGREE: THE CURRICULUM**

**Admission to the Architecture Course**

At the time of the introduction of the course, the admission was offered to those who had successfully completed the matriculation and the Intermediate grade drawing examination. When the new academic pattern of 10+2 was introduced, only the students from the Science stream were considered eligible. They had to pass the 10+2 or H.S.S.C. examination with at least 50% marks. They had to appear for a competitive entrance examination. This entrance examination was given 50% weightage for the selection to the course. The other half was based on the marks obtained in the subjects
of Physics, Chemistry, Mathematics, and English at the H.S.S.C. examination. The entrance examination included assessment of drawing ability, aesthetic sensitivity, and an interview. The process was restricted to Sir J. J. College of Architecture.

In 1992, when new colleges were started in Mumbai, and the rest of Maharashtra, the admission process was centralised. The Directorate of Technical Education, Maharashtra State, now conducts it.

The criteria for selection have been modified to a certain extent. The candidate still has to pass the H.S.S.C. examination with at least 50% marks. The marks obtained in English are not considered. The marks obtained at this examination in the subjects of Physics, Chemistry, and Mathematics now carry 60% weightage. The other 40% are accorded to the aptitude test conducted by the competent authority. The aptitude test does not include an interview any more.

The admission rounds are conducted by admission authorities as per the Government of Maharashtra rules for admissions to the first year degree course in architecture.

In case of minority colleges, 50 percent of the sanctioned intake is filled in by the concerned institutions from the minority communities for which minority status is granted to that institution.

**Time Frame**

Traditionally, the architecture course has been of five-year duration. The course is conducted in two stages. The first three academic years or six semesters is considered as the first stage. The students are expected to complete this stage within five years after taking admission to the course.
The second stage is of two academic years or four semesters, including the professional training in tenth semester.

Course Content

The course is project based, where the major activity takes place in the studio, around a set of design exercises. This includes design of individual buildings, ranging from houses, apartments, shops, offices, departmental stores, theatres, industrial building complexes, large housing and commercial complexes, parking areas, sports facilities, hotels, motels, air ports; the list is endless.

Every student may not individually design all of these, but has to have the knowledge of the specific requirements of each of these. Other subjects are basically supporting the Design.

The subjects can be broadly divided as follows:


C) Subjects developing the basic skills: Graphics and Workshop.

D) Subjects creating the necessary background for thought process in Design: Art appreciation, History of Art and Architecture, Humanities, Ekistics (the study of human settlements, including area planning and the relationship between communities).

F) Electives: Any one of the subject from Design group or Building Technology and Building Services group or any other subjects offered as per A.I.C.T.E. norms.

The following subjects are included in the first stage of the course:

1. **Architectural Design**: Designing buildings of moderate complexity (e.g. schools, dispensaries, shops, restaurants, houses, etc), and presenting them in graphic form.

2. **Basic Design**: Understanding the determinants of physical form such as the concepts of space, structure, organisation, symbolism, mass, surface, etc, through drawings and models.

3. **Graphics**: Ability to present in graphic form all elements of design—study of shades and shadows, geometrical from, perspectives and projections, free-hand drawing and rendering with pencil, ink and colours.

4. **Architectural Building Construction and Materials**: Knowledge of various methods of building construction of medium complexity with timber, stone, bricks, concrete, etc, including foundation, walls, roofs, staircases, joinery and finishes. Knowledge about behaviour of these materials, effects of climate on built environment to create comfortable conditions.

5. **Theory and Design of Structures**: Understanding the structural concepts and behaviour of structural elements, simple calculations for columns, beams, frames, footings, slabs, walls in concrete, steel and timber.

6. **Workshop Practice**: Ability to make building models with various materials such as cardboard, wood, plaster of Paris and metals.

7. **Aesthetics and Art Appreciation**: Introduction to the study of aesthetics, relevant to Art and Architecture.
8. **History of Architecture**: Study of various styles of architecture and methods of construction in Indian and European Architecture.

9. **Surveying and Levelling**: Understanding of various surveys and levelling instruments, carrying out surveys of land, and preparation of survey plans.

10. **Humanities**: History of Art through the ages up to the modern movements. Study of human settlements during ancient, medieval and modern periods in India, Europe, and other parts of the world.

11. **Climatology**: Effects of climate on the built environment in terms of heat transfer, wind movement, sun path, etc.

12. **Building Services**: Study and design for water supply, drainage, sewage disposal, electricity supply, wiring and lighting for buildings.

13. **Interior Design**: Design of interior spaces and furniture for houses, shops, offices, restaurants, etc. Use of different finishing materials for walls, flooring, false ceiling, etc.

14. **Landscape Design**: Understanding of landscape elements like trees, shrubs, plants, water, rocks, and development of landscape planning and application in architectural design.

15. **Working Drawings**: Preparing detail drawings of buildings to be used on sites.


17. **Specifications**: Understanding the method of writing specifications for materials and methods of construction for bricks, stones, concrete, steel, timber, etc.

The following are the subjects covered in the second stage of the course:
1. **Architectural Design and Design Dissertation**: Design of complicated buildings and campuses involving analytical studies of buildings from sociological, economic and cultural points of view, such as Universities, Industrial Estates, Housing Schemes.

2. **Building Construction, Materials and Specifications**: Study of advanced building construction methods with new materials (such as plastics, metals, synthetic boards) and latest techniques in the use of concrete.

3. **Building Services**: Study of mechanical installations, heating, cooling, fire control, water supply and drainage systems for complicated buildings.

4. **Town Planning**: A general understanding of town planning principles as they have evolved through ages. Application in today's context.

5. **Professional Practice**: Knowledge about professional duties and responsibilities. Management and administration of an office organisation.

6. **Building Bye-laws**: Study of building regulations and application to design so as to prepare drawings for submission to concerned authorities for approval.

7. **Theory and Design of Structures**: Study of new structural technologies, such as space frames and shells. Understanding of limitations and scope of these techniques.

The following tables 1.1 to 1.10 give the schemes for instruction per week and division of marks for various semesters.
**TABLE 1.1**

SCHEME FOR INSTRUCTION PER WEEK AND DIVISION OF MARKS
FOR SEMESTER I

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Subject</th>
<th>Lectures</th>
<th>Studio</th>
<th>Theorv Marks</th>
<th>Sessional Marks</th>
</tr>
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<td>Basic Design</td>
<td>1</td>
<td>6</td>
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<td>200</td>
</tr>
<tr>
<td>2</td>
<td>Graphics</td>
<td>1</td>
<td>7</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>3</td>
<td>Design</td>
<td>1</td>
<td>3</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>4</td>
<td>Architectural Building Construction.</td>
<td>4</td>
<td>4</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>5</td>
<td>Theory &amp; Design of structures</td>
<td>3</td>
<td>3</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>6</td>
<td>Aesthetics and Art Appreciation</td>
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<td>Nil</td>
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<tr>
<td>7</td>
<td>Work-shop</td>
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**TABLE 1.2**

SCHEME FOR INSTRUCTION PER WEEK AND DIVISION OF MARKS
FOR SEMESTER II

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</tr>
<tr>
<td>2</td>
<td>Graphics</td>
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<td>4</td>
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<td>100</td>
</tr>
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<td>Architectural Building Construction.</td>
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<td>4</td>
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<tr>
<td>5</td>
<td>Theory &amp; Design of structures</td>
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**TABLE 1.3**

SCHEME FOR INSTRUCTION PER WEEK AND DIVISION OF MARKS
FOR SEMESTER III

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<td>4</td>
<td>100</td>
<td>100</td>
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<tr>
<td>4</td>
<td>Theory &amp; Design of structures</td>
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### TABLE 1.4
SCHEME FOR INSTRUCTION PER WEEK AND DIVISION OF MARKS
FOR SEMESTER IV

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<td>Material testing Work-shop</td>
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<td>9</td>
<td>Building Services</td>
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### TABLE 1.5
SCHEME FOR INSTRUCTION PER WEEK AND DIVISION OF MARKS
FOR SEMESTER V

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**SCHEME FOR INSTRUCTION PER WEEK AND DIVISION OF MARKS FOR SEMESTER VI**

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<td>Design</td>
<td>Nil</td>
<td>8</td>
<td>Nil</td>
<td>300</td>
</tr>
<tr>
<td>2</td>
<td>Architectural Building</td>
<td>2</td>
<td>4</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>3</td>
<td>Theory &amp; Design of structures</td>
<td>2</td>
<td>3</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>4</td>
<td>Building Services</td>
<td>2</td>
<td>3</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>5</td>
<td>Specification</td>
<td>2</td>
<td>Nil</td>
<td>100</td>
<td>Nil</td>
</tr>
<tr>
<td>6</td>
<td>History of Architecture</td>
<td>3</td>
<td>Nil</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>7</td>
<td>Humanities</td>
<td>2</td>
<td>Nil</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>8</td>
<td>Working Drawing</td>
<td>Nil</td>
<td>3</td>
<td>Nil</td>
<td>50</td>
</tr>
<tr>
<td>9</td>
<td>Quantity Surveying &amp; Estimating</td>
<td>2</td>
<td>2</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

### TABLE 1.7
**SCHEME FOR INSTRUCTION PER WEEK AND DIVISION OF MARKS FOR SEMESTER VII**

<table>
<thead>
<tr>
<th>Sr.</th>
<th>Subject</th>
<th>Lectures</th>
<th>Studio</th>
<th>Theory Marks</th>
<th>Sessional Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Design</td>
<td>Nil</td>
<td>8</td>
<td>200</td>
<td>300</td>
</tr>
<tr>
<td>2</td>
<td>Building Bylaws</td>
<td>1</td>
<td>Nil</td>
<td>50</td>
<td>Nil</td>
</tr>
<tr>
<td>3</td>
<td>Landscape</td>
<td>1</td>
<td>2</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>4</td>
<td>Architectural Building</td>
<td>2</td>
<td>4</td>
<td>100</td>
<td>150</td>
</tr>
<tr>
<td>5</td>
<td>Theory &amp; Design of structures</td>
<td>3</td>
<td>2</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>6</td>
<td>Building Services</td>
<td>2</td>
<td>2</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>7</td>
<td>Humanities</td>
<td>2</td>
<td>Nil</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>8</td>
<td>Town Planning &amp; Urban Design</td>
<td>2</td>
<td>2</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>9</td>
<td>Specification</td>
<td>2</td>
<td>Nil</td>
<td>100</td>
<td>Nil</td>
</tr>
<tr>
<td>10</td>
<td>Quantity Surveying &amp; Estimating</td>
<td>2</td>
<td>2</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>
### TABLE 1.8
SCHEME FOR INSTRUCTION PER WEEK AND DIVISION OF MARKS
FOR SEMESTER VIII

<table>
<thead>
<tr>
<th>Sr.</th>
<th>Subject</th>
<th>Lectures</th>
<th>Studio</th>
<th>Theory Marks</th>
<th>Sessional Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Design</td>
<td>Nil</td>
<td>8</td>
<td>Nil</td>
<td>400</td>
</tr>
<tr>
<td>2</td>
<td>Town Planning &amp; Urban Design</td>
<td>2</td>
<td>2</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>3</td>
<td>Landscape</td>
<td>1</td>
<td>3</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>4</td>
<td>Architectural Building Construction</td>
<td>2</td>
<td>4</td>
<td>100</td>
<td>150</td>
</tr>
<tr>
<td>5</td>
<td>Theory &amp; Design of structures</td>
<td>3</td>
<td>2</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>6</td>
<td>Building Services</td>
<td>2</td>
<td>2</td>
<td>100</td>
<td>50</td>
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<tr>
<td>7</td>
<td>Humanities</td>
<td>2</td>
<td>Nil</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>8</td>
<td>Working Drawing</td>
<td>Nil</td>
<td>3</td>
<td>Nil</td>
<td>50</td>
</tr>
<tr>
<td>9</td>
<td>Professional Practice</td>
<td>3</td>
<td>Nil</td>
<td>100</td>
<td>Nil</td>
</tr>
</tbody>
</table>

### TABLE 1.9
SCHEME FOR INSTRUCTION PER WEEK AND DIVISION OF MARKS
FOR SEMESTER IX

<table>
<thead>
<tr>
<th>Sr.</th>
<th>Subject</th>
<th>Lectures</th>
<th>Studio</th>
<th>Theory Marks</th>
<th>Sessional Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Design Dissertation</td>
<td>Nil</td>
<td>12</td>
<td>Nil</td>
<td>500</td>
</tr>
<tr>
<td>2</td>
<td>Working Drawing</td>
<td>Nil</td>
<td>3</td>
<td>Nil</td>
<td>50</td>
</tr>
<tr>
<td>3</td>
<td>Architectural Building Construction</td>
<td>1</td>
<td>4</td>
<td>Nil</td>
<td>150</td>
</tr>
<tr>
<td>4</td>
<td>Building Services</td>
<td>Nil</td>
<td>3</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>5</td>
<td>Specification and Materials</td>
<td>2</td>
<td>Nil</td>
<td>100</td>
<td>Nil</td>
</tr>
<tr>
<td>6</td>
<td>Professional Practice</td>
<td>3</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td>7</td>
<td>Electives</td>
<td>3</td>
<td>Nil</td>
<td>Nil</td>
<td>50</td>
</tr>
<tr>
<td>8</td>
<td>Theory &amp; Design of structures</td>
<td>Nil</td>
<td>3</td>
<td>Nil</td>
<td>100</td>
</tr>
</tbody>
</table>

### TABLE 1.10
SCHEME FOR INSTRUCTION PER WEEK AND DIVISION OF MARKS
FOR SEMESTER X

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Subject</th>
<th>Lectures</th>
<th>Studio</th>
<th>Theory Marks</th>
<th>Sessional Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Professional Practice (Training)</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
<td>100 (viva-voce)</td>
</tr>
</tbody>
</table>
Examination pattern:

Examinations are conducted semesterwise. Semester VI, semester VIII, semester IX and semester X examinations are conducted by the university. Semester I, semester II, semester III, semester IV, semester V, and semester VII examinations are conducted by the colleges.

Method of evaluation:

Evaluation of each subject includes marks obtained in theory paper and marks for sessional work. Sessional work involves a number of assignments and projects in which students apply their acquired knowledge and skills. The sessional marks include internal marks (periodic and final assessment) and external marks obtained in viva voce examinations. Distribution of marks for theory, internal marks and marks for viva-voce examination is done as per the syllabus.

RATIONALE OF THE STUDY

The curriculum implemented by colleges of Architecture affiliated to university of Mumbai is based upon the University syllabus. The following are certain factual details regarding this syllabus.

- The syllabus was initially derived from the syllabus for Royal Institute of British Architects (RIBA) examinations.
- As the architecture course was started in India to provide assistants to European architects, the initial syllabus was never aimed at fulfilling the needs of the Indian society.
- Very little efforts are taken to review the current syllabus in terms of its relevance and usefulness for fulfilling the society’s needs.
• The admission to this course is given through a centralised admission process conducted by Directorate of Technical education, Maharashtra State. Certain changes have been made in the admission procedure to suit the process.

• The examination pattern for this course was changed in 1995, but the syllabus was not restructured accordingly.

Very little attempts have been made so far to collect the opinions of the students, teachers, examiners, and principals of architectural colleges regarding the various aspects of architectural education. Though all the colleges of architecture follow AICTE norms, there may be difference in functioning of the colleges in terms of the following:

• Institutional objectives and goals.

• Implementation of academic programmes.

• Teaching-learning processes and evaluation processes in each college.

• Availability of resources, personnel, facilities, and infrastructure.

• Managerial behaviour and professional awareness of the principals.

• Characteristics and attitudes of the teachers.

• Characteristics, attitudes, and aptitudes of the students admitted to each college.

• Expected and actual performances of architectural education as perceived by students, teachers, and principals.

• Strengths and weaknesses of architectural education in each college.

• Institutional output.

No attempt has been made to study these aspects for different colleges and to find out their relationship with architectural education.
The researcher had been a student of architecture of University of Mumbai and is now working as a reader of architecture in the same university. As a former student and a teacher of architecture, the researcher does not experience major changes in education system, except for an increased number of students and increased use of computers by the students. The factual knowledge and the training offered by the institutions might be sufficient for completion of the course, but the education may not be sufficient for current pattern of the profession.

The following questions may be answered if a systematic research is conducted in all colleges of architecture affiliated to University of Mumbai to collect opinions of students, teachers and principals regarding various aspects of architectural education:

- What are the strengths and weaknesses of the course?
- How do the students and teachers describe the institutional system?
- What opinion students, teachers and principals have about institutional environment?
- Do the opinions of students and teachers about institutional environment differ from college to college?
- Are there any gender-differences in the perceived institutional environment?
- Are there any differences in the perceived institutional environment of teachers and students?
- What is the opinion of students and teachers about admission procedure and fees structure?
- What is their opinion about the examination pattern and evaluation?
- What are the suggestions of students and teachers regarding duration of the course, examination pattern and evaluation of sessional work?
• What are the suggestions of students and teachers regarding co-curricular activities?

As a reader of architecture in University of Mumbai, the researcher would like to appraise the architectural education offered by colleges of architecture affiliated to university of Mumbai and try to find out the answers to these questions.

Need of the study:

The Council of Architecture and the All India council of Technical Education make efforts to ensure and control the quality of architectural education in all the colleges of architecture. These colleges are periodically inspected by the Directorate of Technical Education and the affiliation committee, University of Mumbai. All these inspections are limited to college level for implementation of minimum standards as prescribed by the various authorities. No formal study has been done so far; to collectively evaluate all the colleges of architecture affiliated to University of Mumbai.

The available related literature reviewed by the researcher is discussed in detail in Chapter II. It may be seen from the review of related literature that no appraisal researches are available in the field of architectural education. There are researches on technical education, those include working of semester system in Madurai Kamraj University and a study of vocational education in Marathwada. The researches on architectural education give more emphasis on education management and it is restricted to a limited number of colleges. The researches in architecture give emphasis on architectural design. Besides, there is a research regarding aptitude tests and its predictive validity, but being a case study, it only offers tentative hypotheses for further studies.
Technical papers published in various newsletters and magazines and issues discussed in workshops on architectural education express views of individual architects or teachers.

Thus, very little research is done so far, to collect scientifically and systematically, opinions of students and teachers on various aspects of architectural education.

The researcher had been a student of government-aided college and is currently working as a reader in the same college. She feels that a systematic research has to be done to find out the views of other teachers and students from the same college as well as from the other colleges. The researcher also feels that suggestions given by the students, teachers, examiners and principals of colleges affiliated to University of Mumbai, will be useful for improvement of architectural education. Thus, for validating the existing programmes and for making any changes, there is a need for appraisal of Architectural Education.

**STATEMENT OF THE RESEARCH TOPIC**

"An Appraisal of Architectural Education in Colleges of Architecture Affiliated to University of Mumbai (Bombay)."
VARIABLES OF THE STUDY

The present research focuses its attention on the following variables:

A) The total institutional environment and its following dimensions, as perceived by students, teachers, and principals of colleges of architecture:
   1. Administration
   2. Admission Procedure
   3. Course content
   4. Evaluation
   5. Infrastructure
   6. Student Characteristics
   7. Student Development.
   8. Teacher Characteristics

B) Opinion of students, teachers, and principals regarding the institutional system.

C) Expected performance of functions of architectural education as perceived by the students, teachers, and principals of different colleges.

D) Actual performance of functions of architectural education as perceived by the students, teachers, and principals of different colleges.

E) College results.

DEFINITIONS OF THE TERMS

Architectural Education:

It is defined as the five-year course leading to a bachelor’s degree in architecture, approved by the Council of Architecture, New Delhi, conducted by colleges of architecture affiliated to University of Mumbai.
Institutional Environment:

It is defined as a complex of tangible and intangible conditions, as well as the academic functioning of the components and subsystems of an institution. It comprises of the following dimensions:

1. Administration
2. Admission Procedure
3. Course Content
4. Evaluation
5. Infrastructure
6. Student Characteristics
7. Student Development.
8. Teacher Characteristics.

Administration:

It refers to the nature and extent of the administrative processes at the university and college level related to planning and execution of teaching, learning, and evaluation activities.

Admission Procedure:

It refers to the criteria, relevance, and procedure of selecting and admitting students for the B.Arch. degree course.

Course Content:

It refers to the nature and extent of comprehensiveness, relevance, validity, and flexibility of the B.Arch. degree course.
Evaluation:

It refers to the nature and extent of objectivity, consistency, and comprehensiveness of the evaluation systems for B.Arch. degree course.

Infrastructure:

It refers to the nature and extent of availability, adequacy, and utilisation of the physical infrastructure, equipment and facilities provided in colleges of architecture.

Student Characteristics:

It refers to the nature and extent of student behaviour in learning, co-curricular activities, communication, group activities, and utilisation of college services.

Student Development:

It refers to the nature and extent of opportunities provided by architectural education to students in the areas of development of knowledge, skills, creativity, attitudes, values, personality, and interpersonal relationship.

Teacher Characteristics:

It refers to the nature and degree of teachers’ command over the subject matter, commitment to teaching, approachability, openness, and desirable personal qualities.

College Results

It refers to the aggregate outcome of a college in university examinations in terms of student achievement with appropriate scale values assigned as follows:

<table>
<thead>
<tr>
<th>Class Obtained</th>
<th>Scale Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Class (I)</td>
<td>3</td>
</tr>
<tr>
<td>Second Class (II)</td>
<td>2</td>
</tr>
<tr>
<td>Pass Class (P)</td>
<td>1</td>
</tr>
<tr>
<td>Failed (F)</td>
<td>0</td>
</tr>
</tbody>
</table>
**Institutional Systems (as perceived by students, teachers, and principals):**

It refers to the various components and subsystems of an institution including aims, objectives, teaching-learning methods, text and reference books, students' attendance, the quality of students and teachers, evaluation of students, strengths and weaknesses of the course, as well as suggestions of improvement as expressed by students, teachers, and principals.

**Perceived Expected Performance of Functions of Architectural Education:**

It refers to the desire of an individual for some functions to be performed by architectural education, which are perceived as useful in individual and societal development.

**Perceived Actual Performance of Functions of Architectural Education:**

It refers to the perceptions of an individual of the extent to which the functions of architectural education are actually performed, to help in the progress of society in general and individuals in particular.

**Discrepancy in the Performance of the Functions of Architectural Education Scores (DS):**

It refers to the difference between the scores representing the perceptions of actual performance of functions of architectural education (APFAES) and expected performance of functions of architectural education (EPFAES).

\[ DS = APFAES - EPFAES \]
**Perceived Effectiveness of Architectural Education:**

The system of architectural education is said to be effective if the findings are as follows:

i) Discrepancy Scores are positive;

ii) There is a significant, positive, and perfect association between APFAES and EPFAES, with the mean APFAES being greater than mean EPFAES;

iii) The college results are very high.

**Effectiveness Ratio of Architectural Education:**

It is defined as the ratio of mean APFAES to mean EPFAES.

**Appraisal of Architectural Education:**

It refers to the extent of, and consistency in, the quality of architectural education measured formally in terms of the following:

a) Perceived effectiveness of architectural education.

b) College results.

c) Conduciveness of institutional environment.

d) Contribution of institutional environment to institutional outputs.

**THE CONCEPT OF APPRAISAL OF EDUCATIONAL PROGRAMMES**

The researcher has studied the conceptual literature related to 'Appraisal of Education'. These concepts are discussed here first.

Good! (1945) defines an appraisal as a formal and accurate valuation of property, usually made by persons familiar with such value. As described in Webster’s?
Student Dictionary (1996), an appraisal is an official valuation. It is the estimation of amount, quality, or worth.

These definitions or meanings of the term appraisal are general in nature. However, it is necessary to understand the meaning of assessment, evaluation and appraisal, with reference to research in the field of education. Best and Kahn (1993) have explained these terms as follows:

An assessment is a fact-finding activity. It describes the status of a phenomenon at a particular time. It describes, without value judgement, a situation that prevails. It attempts no explanation of underlying reasons. No hypotheses are proposed or tested. No variable relationships are examined, and no recommendations for action are suggested.

An evaluation is a process used to determine what has happened during a given activity or in an institution. To assessment, evaluation adds the ingredients of value judgement, social utility, desirability or effectiveness of a process, product, or programme. It may involve recommendations for action.

Barr, Davis, and Johnson (1953) have explained data gathering versus appraisal as follows:

The collection of data, even with a valid and reliable instrument, is only a part of the larger process of research and appraisal. The worth or meaning, in some educational context that may be assigned to the data obtained, is of equal importance. An appraisal is, thus, a much broader term than measurement, since it involves not only the collection and analysis of data, but also the placing of some values upon it or reaching to a conclusion regarding its worth. In other words, the term appraisal refers to formal, systematic evaluation.
The purpose of appraisal, i.e., of systematic evaluation is described by Dressel\(^2\) (1976) as follows:

a) To bring the assumptions and values inherent in educational programme to a conscious level.

b) To relate these to anticipated procedures and expected accomplishments.

c) To compare these plans with actual functioning and results.

Evaluation facilitates the comparisons of intended and actual means and ends. It is a basis for decision making.

Purpose of evaluation as described by Best and Kahn\(^6\) (1993) is as follows:

1. To find out whether the given programme is successful, according to the goals set for it.

2. To give suggestions for improvement, if necessary, in terms of administration, infrastructure, and personnel.

3. To find out if the given programme is effective in terms of social utility.

4. To give suggestions for changes in the policy decisions, so as to increase the effectiveness.

**Types of Evaluation**

Stufflebeam et al\(^7\) (1971) have identified the following four types of evaluation.

1. **Planning or developmental evaluation**: It facilitates decisions required at the early stages of developing a new programme, or of revising an existing one. Planning evaluation requires a systematic, organised approach to the total task because it involves both a review of past practice, and a prediction of desired and possible developments.
2. **Input Evaluation**: Input evaluation helps in making decisions about how to use resources to attain programme goals. Input evaluation calls for imaginative and creative thinking. For any research study to be comprehensive, all the aspects of institution, namely inputs, processes and outputs need to be included. It tends to be microanalytical, in that it deals in detail and depth with many alternatives.

3. **Process Evaluation**: It provides continuing or periodic feedback, so that those responsible for programme planning and operation can review and possibly alter earlier decisions.

4. **Output Evaluation**: It assesses the attainment at the end of a project, or at appropriate stages within it. Output evaluation includes identification of the correspondence and discrepancies between the original objectives and the actual attainment. It also includes identification of unintended results and suggestions so as to the possible causal factors.

Another classification of the types of evaluation as described by Chinaph and Miron\(^\text{a}\) (1990) is as follows:

There are three types of evaluation, which can be specified according to the areas to which they ascribe themselves.

a) If an evaluation assesses whether or not a programme has been implemented correctly and according to its guidelines, it can be considered as ‘Process Evaluation’.

b) When the evaluation is designed to assess the impact a programme has had on its intended target group, it is considered as ‘Impact Evaluation’.

c) ‘Holistic Evaluation’ should include the activities of both the process evaluation and the impact evaluation.
Planning input, process and output evaluation can be frequently regarded as both summative and formative evaluation. These terms are described as follows:

Summative evaluation provides a basis for decisions regarding continuation, modification, termination, or replacement of a programme.

Formative evaluation provides a basis for formulation and reformulation of a programme.

If planning an evaluation leads to a decision that a programme is not feasible, a summative decision is made. Output evaluation, to the extent that it is used for feedback, development of alternatives and improvement, is considered as formative evaluation.

On the basis of the conceptual literature related to appraisal of education, the researcher has planned the present research on appraisal of architectural education.

**AN APPRAISAL OF ARCHITECTURAL EDUCATION**

**IN THE PRESENT STUDY**

The present research uses a holistic approach to the appraisal of architectural education as it includes a study of the existing system of architectural education in terms of input, output, and process of architectural education. The present research includes a study of suggestions for improvement given by students, teachers, principals, and practising architects. It also includes an action plan for one college. Thus, the present research is formative in its nature.

The present research can also be described as a combination of the following types of appraisal:
a) **Developmental Appraisal:** The developmental appraisal for the present research is not aimed at starting of a new programme, but it includes suggestions for improvement in the existing programme.

b) **Input Appraisal:** The present research can be considered as an input appraisal as the researcher studies infrastructure, course content, resources, teacher characteristics, student characteristics, as perceived by students, teachers, and principals of institutions.

c) **Process Appraisal:** The present research includes a study of processes such as admission procedure, teaching-learning activity, evaluation and administration, as perceived by students, teachers, and principals of institutions.

d) **Output Appraisal:** The present research also includes a study of institutional output in terms of 1) Institutions' results in University examinations and 2) Discrepancy between actual and expected performance of architectural education as perceived by students, teachers, and principals of the institutions. The output appraisal for the present research is based upon goals of architectural education formulated by the research. These goals are described here in detail.

**Goals of Architectural Education:**

The goals of architectural education could be described under the following heads:

**A) Broad Aims:** The broad aims of architectural education are as follows:

1. **Self Realisation:** This aim refers to the zeal for learning, ability to communicate, ability to solve problems, skills in listening and observing, development of interest in physical and mental pastimes, appreciation of
beauty, ability to identify one’s potentials, and the ability to give direction to one’s life.

2. **Human Relationship**: This aim refers to respect for human relationships, enjoyment of a rich, sincere, and varied social life, ability to work with others, facilitation and identifying one’s role in society, and the development of abilities for social adjustment.

3. **Economic Efficiency**: This aim refers to the satisfaction in good workmanship, understanding of requirements and opportunities for various jobs, efficiency and desire for improvement in the chosen vocation.

4. **Civic Responsibility**: This aim refers to sensitivity to disparities of human circumstances and disposition to correct unsatisfactory conditions, an understanding of social structure and processes, regard for the nation’s resources, regard for scientific advances, co-operation as a member of the world community, respect for law, sense of commitment towards society, and the creation of social awareness.

B) **Specific objectives of architectural education are as follows**:

1. Ability to express oneself through planning of building projects using a variety of building materials and methods of construction.

2. Understanding of environmental issues.

3. Understanding of building industry, its current products and services, together with their influence on determining patterns of living in the modern society.

4. Understanding of established patterns of architecture, seeking out validity in tradition, and combining these with the possibilities of today.

5. Creation of social awareness and understanding of social problems.
6. Ability to express ideas in the form of drawings and verbal instructions.

7. Inculcation of work habits, safety practices, working in co-operation with others, and ability to co-ordinate.

These aims and objectives of architectural education are attained through specific programmes of architectural education. The designs of these programmes are determined through a hierarchical process, which is described below.

1) Council of Architecture (COA) and All India Council of Technical Education (AICTE) provide norms for the minimum standard of architectural education, and formulate goals for architectural education for colleges of architecture in India.

2) The syllabi for architectural education designed by various universities are based upon the recommendations of COA and AICTE.

3) The colleges of architecture work out their educational programmes as per the syllabus prescribed by the university, and as per the specific institutional objectives.

4) The planning of classroom activities and the designs of studio projects in an institution reflect the educational policy of the institution.

Thus, the colleges of architecture affiliated to University of Mumbai follow AICTE norms and the syllabus prescribed by the university. The planning and implementation of the education programme may differ as per the institutional system. The colleges may differ in terms of institutional outputs, which are likely to be associated with the institutional environment. The perceptions of students, teachers, and principals regarding the same may also be different. These perceptions are considered as variables for the present research. Thus, the extent and consistency in the
quality of architectural education in colleges of architecture is formally measured in this research in terms of the following:

a) Perceived effectiveness of architectural education.

b) College results.

c) Conduciveness of institutional environment.

d) Contribution of institutional environment to the institutional outputs.

The concepts of effectiveness of education and institutional environment are discussed in detail in the following sections.

THE CONCEPT OF EFFECTIVENESS OF EDUCATION

According to Webster’s Student Dictionary (1996), education is defined as the knowledge and skills resulting from instruction and training in an institution of learning. It is the acquisition of information, skills, attitudes, appreciation, personal-social adaptability, interest and work habits.

According to Mohanty (1995), education is always related to the life and aspirations of the society. Its aims and objectives are determined and defined according to the local, regional and global needs. Education finds its sustenance in the existing social order, and its solace in the moral, social and ethical values of the country. Mohanty has further stated the functions of universities as enunciated by the Education Commission (1966). These functions reflect the following objectives of higher education:

1. To seek and cultivate new knowledge, to interpret old knowledge and beliefs in the light of new needs and discoveries.
2. To provide the right kind of leadership in all walks of life, to identify gifted youth and to help develop their potential to the full by cultivating physical fitness, developing the powers of mind and cultivating the right interests, attitudes, moral and intellectual values.

3. To provide society with competent men and women trained in agriculture, arts, medicine, science and technology and various other professions, who will also be cultivated individuals, imbued with a sense of social purpose.

4. To strive to promote equality and social justice and to reduce social and cultural differences through diffusion of education.

5. To foster in the teachers and students, and through them, in the society generally, the attitudes and values needed for developing the good life in individual and society.

These objectives of higher education are described by Gupta\textsuperscript{11} (1983) as ‘long range goals of education’. According to him, the immediate goals of education are as follows:

   
   b) Cultivation of reasoning, leading to judgement, and problem solution.

   
   b) Reinforcement of ways of thinking.

   c) Creative will or desire to achieve the goals.

3. Goals related to psychomotor domain: Positive action and efforts for fulfilment of the goals.
The achievement of the goals will depend upon the system of education including syllabi, instructional processes, technology, methodology, teaching personnel, and the students. The extent to which the goals are achieved can be considered as the effectiveness of the educational institution.

According to Etzioni (1964), effectiveness of a specific organisation is determined by the degree to which it realises its goals.

Rao and Narayana (1987), have identified four broad approaches to organisational effectiveness which are as follows:

1. **The Goal Attainment Approach**: An organisation primarily exists to accomplish goals. The degree of accomplishment indicates the degree of effectiveness. Organisational effectiveness is appraised in terms of the accomplishment of ends rather than means.

2. **The Systems Approach**: This implies that organisations are made up of interrelated and interacting elements. The effectiveness of the total system is dependent on the performance of all its components. The open systems perspective emphasises the interrelationships as they jointly influence organisational effectiveness.

3. **The Strategic Constituencies Approach**: It is similar to the systems approach in appearance, but with a slightly different emphasis. Strategic constituencies’ approach assumes that an organisation faces competing demands from various interest groups, both within and outside the organisational environment. Management must filter all unimportant and non-competing demands out, and select only those critical or strategic constituencies in the environment so as to survive.

4. **The Behavioural Approach**: This emphasises the role of individual behaviour, as it affects organisational success or failure. When the integration of both individual and
organisational goals are high in degree, it results in high degree of organisational effectiveness. The reverse is true when there is low integration.

The present research uses the combination of the first two of the above approaches for the study of effectiveness of architectural education.

A) The Goal Attainment Approach: The effectiveness of architectural education is measured in the present study in terms of 1. college results in university examinations; and 2. discrepancy between the actual and expected performances of functions of architectural education as perceived by students, teachers, and principals of colleges of architecture. The goals and objectives of architectural education are already discussed in this chapter.

B) The Systems Approach: Webster's Student Dictionary defines a system as 'a group or arrangement of parts, facts, phenomena, etc that relate to, or interact with, each other in such a way as to form a whole.'

Sharma (1985) has defined a system as an entity, conceptual or physical, which consists of interrelated, interacting, or interdependent parts. In functional elements, it may be regarded separately, each from other, but it is not independent of the environment in which it exists. Every system, except the largest, has supra-system (environment) and every system, except the smallest, has a sub-system.

Ashby (1952) explains that each system, if it is to be a system, must have certain well-defined variables, which are closely interrelated. An adjustment of their interrelationship accounts for the survival of the system in some specified state. These variables may be called the essential variables of the system. All variables in a system's analysis may then be divided into two classes, those which are within the system and are related variables, and those which are outside the system but interact
with it and are related parameters. It is through the organisation that the parts of a system interact by a process of instructing and controlling. The system has to be studied as a whole with its integrated parts, as a study of isolated parts of the system cannot provide adequate information about the system. The idea that a whole is more than a summation of its component parts is accepted as the concept of synergism.

Sharma\(^7\) (1985) has described the components of a system in terms of a) subsystems; b) environment of a system; and c) the goal state. These are described in detail below.

a) **Subsystems:** The elements which constitute a system may themselves be viewed as systems of a lower order, the elements of which, in their turn, are subsystems of yet lower order and so on. Subsystems are significant sets of variables within a suprasystem. The subsystems of a system may react to stimuli from their environment by adaptive behaviour in the course of seeking or attaining a goal without affecting the remaining subsystems in the whole.

b) **Environment of the system:** A system operates in an environment. For a given system, a change in whose attributes affects the system and also whose attributes are changed by the behaviour of the system. This environment includes both the external environment, as well as the internal, institutional environment. The concept of institutional environment is further discussed later on in this chapter.

c) **The Goal State:** The set of specified objectives, so stated may be called the goal state of the system. The Goal State is the state towards which the system moves.
All systems can be described in terms of four parameters, namely input, process, output, and environment context and constraints.

A system draws inputs from the external environment and gives output to the external environment, as a result of the processes. A system has to operate within the confines of the environmental constraints.

According to Ryan (1985), the systems approach refers to a scientific method of problem solving, decision-making, and planning. The systems approach is concerned with identifying goals, and determining and evaluating the means for accomplishing these goals.

The systems approach involves monitoring progress once the system is initiated, and is being maintained, with feedback to direct adjustments in the operating system. Evaluation is an integral part of the systems approach. This requires checking the amount and quality of accomplishments, checking contributions of the elements in the process towards goal achievement, and using the results of the evaluation to make improvements and to design new systems.

Two major functions are performed by the systems approach: 1) Analyse the existing systems; and 2) synthesise new, modified systems.

For the study of a system, it is necessary to adopt the following procedure:

a) Determine the purpose and scope of the system.

b) Identify input, process, and output variables.

c) Establish effectiveness criteria.

In order to establish the criteria for effectiveness, a systems specialist has to consider the following:
A) **Compatibility**: The more the system is compatible with its environment, the more effective it is. For the present research, this is referred to as conduciveness of the internal, institutional environment.

B) **Optimisation**: The more the system is designed to have the capability of accomplishing the mission of the organisation or structure, the more effective it is. For the present research, this is considered as actual performance of architectural education in terms of the expected performance of architectural education, as perceived by students, teachers, and principals of institutions.

C) **Wholeness**: The more the system is designed to include all the component parts, the more effective its operation is.

The present research includes a study of the components and variables of institutional systems described as follows:

A) **Subsystems of educational institution**.

1. Administration or governance system, which lays down the policy and provides guidelines and direction.
2. Faculty.
4. Resources, their availability, adequacy, and their utilisation.
5. Academic programme.

B) **Input Variables**.

1. Aims and objectives of the institution.
2. Available time.
5. Infrastructure.


7. Financial resources.

8. Faculty.


C) Process Variables.

1. Primary Processes:
   a. Teaching-learning.
   b. Evaluation.

2. Supporting processes:
   a. Planning.
   b. Organising.
   c. Leading.
   d. Directing.
   e. Controlling.

D) Output Variables.

1. College results in university examinations.

2. Performance of architectural education measured in terms of discrepancy
between actual and expected performance.

THE CONCEPT OF INSTITUTIONAL ENVIRONMENT

The present section is aimed at clarifying and conceptualising the term
'Institutional Environment', as studied by the researcher through related literature on
organisational and/or college climate and environment.
According to Davis\(^9\) (1975), organisations are always unique. Each has its own traditions, procedures, and cultures, which in their totality comprise its climate. Organisational climate has a profound influence on the outlook, well being, and attitudes of the organisational members.

According to Tagiuri\(^20\), institutional climate is a relatively enduring quality of internal environment that is experienced by its members, influences their behaviour, and can be described in terms of values of a particular set of characteristics of the organisation.

Baird\(^21\) (1985) has reviewed the research and theory in the field of college environment. According to Baird, there are four major approaches to college environment.

A) Demographic approach: Demographic methods are descriptive and are based on the data of records, such as enrolment, library books per student, etc.

B) Perceptual approach: This relies on the responses of students, faculty members, and administrators to items and scales designed to assess their perceptions of their institutions.

C) Behavioural approach: This attempts to assess the environment by measuring detail observable behavioural regularities of students, faculty members and staff.

D) Multimethod approach: This combines the other three into a single assessment.

The history of research on college students and their institutions seems to have followed two main streams. One stream focused on understanding and assessing the environment per se, i.e. environmental description. The other stream assessed the environment as a part of research that focused on other concerns such as development of talent, the course of vocational choices, etc.
In the present research, the perceptual approach is used to study the perceptions of students, teachers, and principals on various pre-determined dimensions of institutional environment, which are discussed in detail, later in the study. The concept of institutional environment is discussed here first.

The related literature shows that the first formal proposal for measuring college environment lies in the work of Pace and Stern\textsuperscript{22}(1958). They attempted to implement the ideas of the Harvard psychologist Henry Murray about the personality ‘needs’ of an individual and the ‘presses’ of the environment on the individual’s behaviour. Needs are manifested by a tendency to perform actions of a certain kind. For example, working hard for grades might manifest a ‘need for achievement’. A press is a property or attribute of an environment, which encourages or discourages the individual to behave in particular ways. Presses are of two types. The first exist in reality, or an objective inquiry discloses them to be present (alpha press). The second are perceived or interpreted by the individual (beta press). The beta press is further composed of a private press based on the unique and personal view each person holds about his or her experiences and consensual press is the common or mutual interpretation of experiences shared by people participating in the events. An individual student could feel that the given work was easy or difficult (private beta press) and could also sense the students’ collective view of its difficulty (consensual or aggregated beta press).

Thus an individual’s perception of the environment is based on his or her own interpretation of experiences and partly on the interpretations of the reference group. It is this perceived environment that Pace and Stern attempted to assess with the College Characteristics Index (CCI), designed to parallel the measure of ‘needs’ tapped in the
Activities Index (AI). The approach seemed to focus on the individual’s perceptions of the environment.

Stern subsequently argued that these individual perceptions of the environment from CCI could be aggregated and averaged to yield a portrait of the college environment. Stern further attempted to describe the culture of the colleges by factor analysing the Activities Index and CCI, and describing the colleges in terms of the characteristics of their students and students’ perception of their environment.

Another environmental approach, described by Baird, is the Institutional Functional Inventory (IFI), by Peterson et al (1970). This was developed in the environmental tradition with a project to assess “Institutional Vitality”, that is to identify the characteristics of colleges that seemed to have strong individual atmospheres. This effort changed to one of identifying the major dimensions of college functions. In addition, the authors realised, that in order to understand how colleges function, they would need to assess the perceptions of faculty and administrators as well as students. The eleven scales in the IFI represent the aspects that the authors consider most important for college functioning.

The IFI seems to be sensitive to the actual differences among the colleges. As the study of related research illustrates, the IFI assesses perceptions of components of the environment that are important to faculty, as well as components that are important to students. In that sense, it involves an implicit recognition that there are multiple environments that are based on experiences of respondents. For example, faculty would generally have little knowledge of students’ social life or groups. Students have little knowledge of the institutional policies on publication and tenure, although these are
extremely important to groups that can report on them. Thus the accuracy of the perceptions depends upon the knowledge of the respondents.

**The Formal Properties of the Institutional Environment:**

In the present study, institutional environment is conceptualised in terms of the following characteristics:

a) It is phenomenological, rather than physical, since it is studied in terms of descriptions of occurrences that are perceived by the students and teachers.

b) It is subjective, rather than objective, as it is expressed in terms of opinions and perceptions rather than purely mathematical ratios, as used in natural sciences.

c) It is inner-directed, rather than outer-directed, as it is studied in terms of subjects' interpretation, and not in terms of an external entity's measurements, observations, and interpretations. In other words, the properties of the environment are not independent of the organisms immersed in it.

d) It is perceiver-oriented, rather than observer-oriented.

e) It is central, rather than peripheral, as it takes into account the opinions of the responders, namely, the students, teachers, and principals of the colleges, as well as practising architects.

f) It is functional, rather than substantive, as it includes those dimensions, which are conceptually and/or empirically expected to influence, i.e. instigate or constrain, the institutional outputs.

g) It is abstract, rather than concrete, as it can be felt, sensed, and understood psychologically, but not touched physically.
In addition, institutional environment in the present study has other structural characteristics such as multi-dimensionality, complexity, intensity, continuity, extensity, locality, non-randomness, and contemporaneity. Its frame of reference is predominantly psychosocial.

From the preceding discussion, it may be concluded that institutional environment is multidimensional in nature. For the present research, the researcher has identified those dimensions of institutional environment, which are known to, and experienced by, students, teachers and principals. Their perceptions on the total institutional environment and its dimensions are considered as variables for the present research. These dimensions are as follows:

1. Administration Dimension.
2. Admission Procedure Dimension.
3. Course Content Dimension.
4. Evaluation Dimension.
5. Infrastructure Dimension.
7. Student Development Dimension.
8. Teacher Characteristics Dimension.

Each of these dimensions of institutional environment is described in the following paragraphs:

**Administration Dimension:**

Administration is the major support system of the academic system at college and university levels. It is the system of implementation of policies and plans. The administration dimension of institutional environment is conducive, if all notices for
students are put up well in advance, if there is co-ordination between teachers teaching various subjects for one class, if there is co-ordination between the teachers teaching the same subject at different levels, if administrative staff is ready to help the students, if most of the lectures are conducted as per the time table, if college examinations are conducted as per the university rules, if the results for college examinations are declared in time, if the results for university examinations are declared in time, if the students get the various certificates in time from the college office, if most of the facilities in this college are properly utilised, and if all the equipment is well maintained in the college.

**Admission Procedure Dimension:**

This dimension measures opinions concerning ease of interpreting rules and regulations for admissions, relevance of criteria and reliability of admission procedure, culture-fairness of aptitude tests and so on.

The admission procedure is said to be appropriate, if it is easy to interpret the rules and regulations for admission for this course, if the students find the ratio (60:40) of PCM marks to Aptitude test marks as criteria for admission to this course as appropriate, if it is not easy to make guesses for passing the aptitude test, if the aptitude test is culture-fair and valid.

**Course Content Dimension:**

Colleges of architecture conduct their educational programmes based upon the syllabus prescribed by the university. The educational programme is normally project-based, where the major activity takes place in the studio, around a set of design exercises and projects related to design. The course content dimension is expected to be conducive if the overall intended goals of the course are clearly stated
in the college, if the emphasis of this course is to develop appropriate professional skills in the students, if the course develops desired values and attitudes, if the course prepares the students to practice in urban as well as rural areas, if the course covers most of the subjects related to urban and rural architecture, if the course gives equal emphasis to theory as well as application of theories, and if the course gives specialised in-depth knowledge of specific subjects.

**Evaluation Dimension:**

The examinations for this course are semester-wise. The evaluation of theory papers and sessional work is carried out at college and university levels as per the syllabus. The present research includes the evaluation dimension, which is considered to be conducive if the examination pattern gives the teachers enough chance to judge the knowledge as well as the application of the knowledge, if the examinations evaluate decision making ability of a student, and if the evaluation is fair, impartial, and consistent.

**Infrastructure Dimension:**

The type of infrastructure in colleges of architecture should be as per the minimum standards prescribed by All India Council of Technical Education (AICTE). The infrastructure includes the following:

A) Physical facilities:

1. Academic areas: class rooms, drawing studios, exhibition/conference room, workshop, library, and auditorium/seminar hall.

2. Administrative areas: Principal’s room, faculty room, and administrative office.

3. Amenity areas: students’ common room, faculty common room, sports/recreation rooms, and canteen.
B) Equipment: material testing equipment, workshop machinery, photocopying machinery, computers, audio-visual equipment, telephone, and fax facilities.

C) Resources: books and magazines in the library, internet facility.

The infrastructure dimension is considered to be conducive if the latest technical books and a variety of magazines related to architecture are available in the library, if photocopying facility is available in the college at reasonable charges, if the available computers are adequate in number and quality with the latest software for architecture, if internet facility is available in the college, if proper training for computer applications is available in the college, if material testing laboratory is made available to the students, if the studios are well equipped with drawing boards, soft boards, and lockers, if the studios have adequate number of lights and fans, if the lecture halls are provided with adequate audio-visual equipment, if the classrooms are adequate in size, if the classrooms are adequately ventilated, if adequate space is available for the students' activities, if an exhibition hall/display area is provided for the display of students' work, if adequate staff rooms are provided, if adequate toilet facilities are provided for the staff and students, if overall cleanliness is maintained in the college, and if the canteen facility is available in the college.

**Student Characteristics Dimension:**

Students of architecture colleges should possess certain basic skills and qualities as follows:

1. Understanding of scientific and technical concepts.
2. Visualisation.
3. Imagination.
4. Drawing, sketching and colouring.
Other important student characteristics are as follows:

1. Peer relationships.
2. Group behaviour.
3. Communication skills.
4. Resourcefulness.
5. Leadership qualities.
6. Organisation skills.

Student Characteristics dimension is expected to be conducive if the students complete their work after understanding the subject, if the students actively communicate with the teachers, if the students apply the knowledge of the technical subjects to their designs appropriately, if the students have a healthy competition amongst them, if the students’ performance is better in group activities as compared to individual work, if the students are actively interested in organising activities such as seminars and workshops, if the student use library adequately, and if the students make adequate use of computers.

Student Development Dimension:

It is an important outcome of architectural education. Students enter a college as boys and girls, and are expected to leave as men and women with adequate professional socialisation, and as productive individuals. They enter a college as students, and leave college as design professionals. The gradual transformation spread over five years is brought about by education. Architectural education is supposed to enhance knowledge and skills. Though important, it is one of the lesser goals of education. The architectural education must develop students into good persons and responsible citizens. It must inculcate right kind of values and attitudes as
professionals. It should develop those attitudes and awareness that will make students go beyond problem solving, and make them identify problems of the society. The education must develop the properties such as maturity, creative ability and adaptability.

Student Development dimension is considered to be conducive if architectural education increases the power of imagination and creative ability, if it develops communicative skills, if it provides opportunities for students to participate in various co-curricular activities, if it develops an appreciation for cultural heritage of the nation and gives opportunities to visit people and places through Study tours, if the course develops the skills for project management, if the course inculcates the appropriate attitudes and values required by an architect, if the group activities give chance for interaction and competition amongst the students, if the course trains the students in adapting the acquired knowledge to future needs, and if the architectural education develops the whole personality of the student.

Teacher Characteristics Dimension:

The following characteristics of the teachers are considered for the present research:

1. Professional awareness.
2. Willingness to accept changes.
3. Communication skills.
4. Initiative.
5. Motivation.
6. Availability.
7. Interest in students' activities.
8. Willingness to help students.

9. Active participation in students' activities.

Teacher Characteristics dimension is considered to be conducive if the teachers have a very good command over their respective subjects, if the teachers are well informed about the new developments in their subjects, if the teachers come to class well prepared, if the teachers are available to students outside the class for academic difficulties, if the teachers are available to students for their personal difficulties, if the teachers are ready to accept new ideas from the students, if the teachers are punctual and impartial, if the teachers are interested in students' activities, if the teachers actively participate in students' activities, and if the teachers are willing to help the students.

**Total Institutional Environment**

Total institutional environment is a complex of the preceding dimensions. If the total institutional is conducive in an institution, it is likely that institutional outputs will be superior; that is

a) college results will be high;

b) Discrepancy Scores measured in terms of the difference between the actual and the expected performance of functions of architectural education will be positive; and

c) Effective ratio for the institution will be high.

The present research is aimed at ascertaining the relationships of the total institutional environment, as well as its dimensions, with the institutional outputs.
AIMS OF THE STUDY

The following were the broad aims of the study:

1. To study the following aspects of architectural education as perceived by students, teachers, and principals of different colleges of architecture, affiliated to the University of Mumbai.

A) Total institutional environment and its following dimensions:

   1. Administration
   2. Admission Procedure
   3. Course Content
   4. Evaluation
   5. Infrastructure
   6. Student Characteristics
   7. Student Development
   8. Teacher Characteristics

B) Expected performance of functions of architectural education.

C) Actual performance of functions of architectural education.

D) Institutional systems.

2) To ascertain the relationship of institutional environment with:

   a) college results,
   b) discrepancy between the actual and expected performances of functions of architectural education.
OBJECTIVES OF THE STUDY:

The following were the specific objectives of the study:

1) To ascertain the gender differences* in the students' perceptions of the total institutional environment and its following dimensions:
   1. Administration
   2. Admission Procedure
   3. Course Content
   4. Evaluation
   5. Infrastructure
   6. Student Characteristics
   7. Student Development
   8. Teacher Characteristics

2) To compare the total institutional environment and its following dimensions, as perceived by the students from different colleges:
   1. Administration
   2. Admission Procedure
   3. Course Content
   4. Evaluation
   5. Infrastructure
   6. Student Characteristics
   7. Student Development
   8. Teacher Characteristics

* The word "gender-difference" is a technical term borrowed from the social and behavioural sciences of sociology and psychology where the term signifies differences arising on account of sociological and psychological differences between males and females.
3) To ascertain the gender differences in the students' perceptions of the following variables:
   1. Expected performance of functions of architectural education
   2. Actual performance of functions of architectural education
   3. Discrepancy between the actual and expected performances of functions of architectural education.

4) To compare the following variables, as perceived by the students from different colleges:
   1. Expected performance of functions of architectural education
   2. Actual performance of functions of architectural education
   3. Discrepancy between the actual and expected performances of functions of architectural education.

5) To ascertain the relationship of the actual performance of functions of architectural education with the total institutional environment and its following dimensions, as perceived by the total sample of students:
   1. Administration
   2. Admission Procedure
   3. Course Content
   4. Evaluation
   5. Infrastructure
   6. Student Characteristics
   7. Student Development
8. Teacher Characteristics

6) To ascertain the relationship of the discrepancy scores with the total institutional environment and its following dimensions as perceived by the total sample of students:
   1. Administration
   2. Admission Procedure
   3. Course Content
   4. Evaluation
   5. Infrastructure
   6. Student Characteristics
   7. Student Development
   8. Teacher Characteristics

7) To ascertain the relationship between the actual and expected performances of functions of architectural education, as perceived by:
   1. the total sample of students,
   2. the students from different colleges.

8) To ascertain the relationship between the actual performance of functions of architectural education and the total institutional environment, as perceived by the students from different colleges.

9) To ascertain the relationship of discrepancy scores with the total institutional environment scores of students from different colleges.
10) To ascertain the relationship of college results with the total institutional environment and its following dimensions as perceived by the students from different colleges:

1. Administration
2. Admission Procedure
3. Course Content
4. Evaluation
5. Infrastructure
6. Student Characteristics
7. Student Development
8. Teacher Characteristics

11) To ascertain the relationship of college results with the following variables:

1. Actual performance of functions of architectural education, as perceived by students from different colleges.
2. Discrepancy scores of students from different colleges.

12) To ascertain the gender differences in the teachers' perceptions of the total institutional environment and its following dimensions:

1. Administration
   1-a. Administration for teachers.
2. Admission Procedure
3. Course Content
4. Evaluation
5. Infrastructure

6. Student Characteristics

7. Student Development

8. Teacher Characteristics

13) To compare the total institutional environment and its following dimensions, as perceived by the teachers from different colleges:

1. Administration
   
   1-a. Administration for teachers

2. Admission Procedure

3. Course Content

4. Evaluation

5. Infrastructure

6. Student Characteristics

7. Student Development

8. Teacher Characteristics

14) To ascertain the gender differences in the teachers’ perceptions of the following variables:

1. Expected performance of functions of architectural education

2. Actual performance of functions architectural education

3. Discrepancy between the actual and expected performances of functions of architectural education.
15) To compare the following variables as perceived by the teachers from different colleges:

1. Expected performance of functions of architectural education.
3. Discrepancy between the actual and expected performances of functions of architectural education.

16) To ascertain the relationship of the actual performance of functions of architectural education with the total institutional environment and its following dimensions, as perceived by the total sample of teachers:

1. Administration
   1-a. Administration for teachers
2. Admission Procedure
3. Course Content
4. Evaluation
5. Infrastructure
6. Student Characteristics
7. Student Development
8. Teacher Characteristics

17) To ascertain the relationship of the discrepancy scores with the total institutional environment and its following dimensions as perceived by the total sample of teachers:

1. Administration
   1-a. Administration for teachers
2. Admission Procedure
3. Course Content
4. Evaluation
5. Infrastructure
6. Student Characteristics
7. Student Development
8. Teacher Characteristics

18) To ascertain the relationship between the actual and expected performances of functions of architectural education, as perceived by the total sample of teachers.

19) To compare the total institutional environment and its following dimensions, as perceived by students and teachers:
   1. Administration
   2. Admission Procedure
   3. Course Content
   4. Evaluation
   5. Infrastructure
   6. Student Characteristics
   7. Student Development
   8. Teacher Characteristics

20) To compare the following variables as perceived by students and teachers:
1. Expected performance of functions of architectural education.

3. Discrepancy between the actual and expected performances of functions of architectural education.

21) To compare the coefficient of correlation for the following relationships as perceived by total sample of students and teachers:
   1. Relationship of actual performance of architectural education with total institutional environment and its dimensions.
   2. Relationship of discrepancy scores with total institutional environment and its dimensions.
   3. Relationship between the actual and expected performances of functions of architectural education.

22) To give factual descriptions of colleges of architecture.

23) To study the institutional systems as expressed by the principals of architectural colleges concerning their own performance.

24) To study the performance of the colleges as perceived by the respective principals.

25) To analyse opinions on institutional systems as expressed by
   a. Students
   b. Teachers
   c. Principals
26) To study the strengths and weaknesses of architectural education as expressed by students, teachers, principals, and practising architects.

27) To study the suggestions for improvement in architectural education as put forward by students, teachers, principals, and practising architects.

28) To prepare an action plan for improvement of architectural education in one of the colleges of architecture.

29) To make appropriate recommendations based upon the findings of the study.

**HYPOTHESES OF THE STUDY**

The following null hypotheses were formulated for the study:

1) 1.1) There is no significant gender difference in the perceived total institutional environment scores of students.

1.2) There is no significant gender difference in the following dimensions of total institutional environment scores of students:

1. Administration Dimension Scores
2. Admission Procedure Dimension Scores
3. Course Content Dimension Scores
4. Evaluation Dimension Scores
5. Infrastructure Dimension Scores
6. Student Characteristics Dimension Scores
7. Student Development Dimension Scores
8. Teacher Characteristics Dimension Scores.
II) 2.1) There is no significant difference in the perceived total institutional environment scores of students from different colleges.

2.2) There is no significant difference in the perceived administration dimension scores of students from different colleges.

2.3) There is no significant difference in the perceived admission procedure dimension scores of students from different colleges.

2.4) There is no significant difference in the perceived course content dimension scores of students from different colleges.

2.5) There is no significant difference in the perceived evaluation dimension scores of students from different colleges.

2.6) There is no significant difference in the perceived infrastructure dimension scores of students from different colleges.

2.7) There is no significant difference in the perceived student characteristics dimension scores of students from different colleges.

2.8) There is no significant difference in the perceived student development dimension scores of students from different colleges.

2.9) There is no significant difference in the perceived teacher characteristics dimension scores of students from different colleges.

III) 3.1) There is no significant gender difference in the perceived expected performance of functions of architectural education scores of students.

3.2) There is no significant gender difference in the perceived actual performance of functions of architectural education scores of students.

3.3) There is no significant gender difference in the discrepancy scores of students.
IV) 4.1) There is no significant difference in the perceived expected performance of functions of architectural education scores of students from different colleges.

4.2) There is no significant difference in the perceived actual performance of functions of architectural education scores of students from different colleges.

4.3) There is no significant difference in the discrepancy scores of students from different colleges.

V) 5.1) There is no significant relationship between the perceived actual performance of functions of architectural education scores and the perceived total institutional environment scores of students.

5.2) There is no significant relationship between the perceived actual performance of functions of architectural education scores and the following dimensions of total institutional environment scores of students.

1. Administration Dimension Scores
2. Admission Procedure Dimension Scores
3. Course Content Dimension Scores
4. Evaluation Dimension Scores
5. Infrastructure Dimension Scores
6. Student Characteristics Dimension Scores
7. Student Development Dimension Scores
8. Teacher Characteristics Dimension Scores

VI) 6.1) There is no significant relationship between the discrepancy scores and the perceived total institutional environment scores of students.
6.2) There is no significant relationship between the discrepancy scores and the following dimensions of the perceived total institutional environment scores of students.

1. Administration Dimension Scores
2. Admission Procedure Dimension Scores
3. Course Content Dimension Scores
4. Evaluation Dimension Scores
5. Infrastructure Dimension Scores
6. Student Characteristics Dimension Scores
7. Student Development Dimension Scores
8. Teacher Characteristics Dimension Scores

VII) 7.1) There is no significant relationship between the actual and expected performances of functions of architectural education, as perceived by the total sample of students.

7.2) There is no significant relationship between the actual and expected performances of functions of architectural education, as perceived by the students from different colleges.

VIII) There is no significant relationship between the perceived actual performance of functions of architectural education scores and the perceived total institutional environment scores of students from different colleges.
IX) There is no significant relationship between the discrepancy scores and the perceived total institutional environment scores of students from different colleges.

X) 10.1) There is no significant relationship between the weighted college result scores and mean total institutional environment scores of students from different colleges.

10.2) There is no significant relationship between the weighted college result scores and the following scores of students from different colleges.

1. Mean Administration Dimension Scores
2. Mean Admission Procedure Dimension Scores
3. Mean Course Content Dimension Scores
4. Mean Evaluation Dimension Scores
5. Mean Infrastructure Dimension Scores
6. Mean Student Characteristics Dimension Scores
7. Mean Student Development Dimension Scores
8. Mean Teacher Characteristics Dimension Scores

XI) 11.1) There is no significant relationship between weighted college result scores and the actual performance of functions of architectural education scores of students from different colleges.

11.2) There is no significant relationship between the weighted college result score and the discrepancy scores of students from different colleges.
XII) 12.1) There is no significant gender difference in the perceived total institutional environment scores of teachers.

12.2) There is no significant gender difference in the following dimensions of perceived total institutional environment scores of teachers.

1. Administration Dimension Scores
   1-a. Administration for Teachers Dimension Scores

2. Admission Procedure Dimension Scores

3. Course Content Dimension Scores

4. Evaluation Dimension Scores

5. Infrastructure Dimension Scores

6. Student Characteristics Dimension Scores

7. Student Development Dimension Scores

8. Teacher Characteristics Dimension Scores

XIII) 13.1) There is no significant difference in the perceived total institutional environment scores of teachers from different colleges.

13.2) There is no significant difference in the perceived administration dimension scores of teachers from different colleges.

13.2-a) There is no significant difference in the perceived administration (for teachers) dimension scores of teachers from different colleges.

13.3) There is no significant difference in the perceived admission procedure dimension scores of teachers from different colleges.

13.4) There is no significant difference in the perceived course content dimension scores of teachers from different colleges.
13.5) There is no significant difference in the perceived evaluation dimension scores of teachers from different colleges.

13.6) There is no significant difference in the perceived infrastructure dimension scores of teachers from different colleges.

13.7) There is no significant difference in the perceived student characteristics dimension scores of teachers from different colleges.

13.8) There is no significant difference in the perceived student development dimension scores of teachers from different colleges.

13.9) There is no significant difference in the perceived teacher characteristics dimension scores of teachers from different colleges.

XIV) 14.1) There is no significant gender difference in the perceived expected performance of functions of architectural education scores of teachers.

14.2) There is no significant gender difference in the perceived actual performance of functions of architectural education scores of teachers.

14.3) There is no significant gender difference in the discrepancy scores of teachers.

XV) 15.1) There is no significant difference in the perceived expected performance of functions of architectural education scores of teachers from different colleges.

15.2) There is no significant difference in the perceived actual performance of functions of architectural education scores of teachers from different colleges.

15.3) There is no significant difference in the discrepancy scores of teachers from different colleges.
XVI) 16.1) There is no significant relationship between the perceived actual performance of functions of architectural education and the perceived total institutional environment scores of teachers.

16 2) There is no significant relationship between the perceived actual performance of functions of architectural education scores and the following dimensions of the perceived total institutional environment scores of teachers.

1  Administration Dimension Scores
   1-a. Administration for Teachers Dimension Scores

2  Admission Procedure Dimension Scores

3  Course Content Dimension Scores

4  Evaluation Dimension Scores

5  Infrastructure Dimension Scores

6  Student Characteristics Dimension Scores

7  Student Development Dimension Scores

8  Teacher Characteristics Dimension Scores

XVII) 17.1) There is no significant relationship between the discrepancy scores and the perceived total institutional environment scores of teachers.

17.2) There is no significant relationship between the discrepancy scores and the following dimensions of the perceived total institutional environment scores of teachers.

1  Administration Dimension Scores
   1-a. Administration for Teachers Dimension Scores

2  Admission Procedure Dimension Scores
3. Course Content Dimension Scores

4. Evaluation Dimension Scores

5. Infrastructure Dimension Scores

6. Student Characteristics Dimension Scores

7. Student Development Dimension Scores

8. Teacher Characteristics Dimension Scores

XVIII) There is no significant relationship between the actual and expected performances of functions of architectural education as perceived by the total sample of teachers.

XIX) 19.1) There is no significant difference in the perceived total institutional environment scores of students and teachers.

19.2) There is no significant difference in the following dimensions of the perceived total institutional environment scores of students and teachers.

1. Administration Dimension Scores

2. Admission Procedure Dimension Scores

3. Course Content Dimension Scores

4. Evaluation Dimension Scores

5. Infrastructure Dimension Scores

6. Student Characteristics Dimension Scores

7. Student Development Dimension Scores

8. Teacher Characteristics Dimension Scores
XX) 20.1) There is no significant difference in the perceived expected performance of functions of architectural education scores of students and teachers

20.2) There is no significant difference in the perceived actual performance of functions of architectural education scores of students and teachers

20.3) There is no significant difference in the discrepancy scores of students and teachers.

XXI) 21.1) There is no significant difference in ‘r’ values for relationships of actual performance of functions of architectural education with total institutional environment and its dimensions as perceived by students and teachers.

21.2) There is no significant difference in ‘r’ values for relationships of discrepancy scores with total institutional environment and its dimensions, as perceived by students and teachers

21.3) There is no significant difference in ‘r’ values of relationships between the actual and expected performances of functions of architectural education, as perceived by students and teachers.
SCOPE AND DELIMITATION OF THE STUDY

The research is restricted to the following colleges of architecture, affiliated to University of Mumbai.

3. I.E.S. College of Architecture, Bandra, Mumbai.
5. Late Bhausaheb Hiray College of Architecture, Bandra, Mumbai.
7. Rizvi College of Architecture, Bandra, Mumbai.

The research does not include L. S. Raheja School of Architecture, Bandra, Mumbai, as it is a diploma college and it is not affiliated to University of Mumbai.

Academy of Architecture, Prabhadevi, Mumbai is affiliated to the University of Mumbai since 1999. At present only first year and second year classes are conducted in this college as per university syllabus. So far, no students of this college have appeared for University examinations, hence this college is not included in the research sample.

The researcher has used the perceptual approach to the study of institutional environment, hence the research includes only those dimensions of institutional environment, which are perceived and experienced by students, teachers, and principals of respective colleges. These dimensions are administration, admission procedure, course content, evaluation, infrastructure, student characteristics, student Development, and teacher characteristics dimensions.
The analysis of the data is based upon perceptions of students, teachers, and principals of various colleges, and it is assumed that these are their honest opinions. The research does not include opinions of administrative staff of any college.

The description of the institutions by the researcher is based upon the factual data obtained from teachers and principals of the respective institutions. It does not include any detailed observations by the researcher.

The qualitative data analysis includes:

a) self-appraisal of principals of different colleges regarding their own performance and performance of the respective colleges,

b) responses to Institutional Environment Perception Scale as expressed by the students,

c) responses on Institutional System Opinionnaire as expressed by students, teachers, and principals.

The study of institutional system includes only those characteristics of students and teachers that are related to teaching-learning activity. It does not include a study of their social backgrounds.

The expected and actual performances of functions of architectural education are subjective terms, as experienced and expressed by the students and teachers. The researcher does not try to compare these against any standards determined by external agencies.

The research does not include practising architects’ opinion regarding the expected and actual performance of architectural education in any institution. It includes their views concerning the strengths and weaknesses of the course, and it invites their suggestions for overall improvement of architectural education.
The data on college results include only the results for the university examinations; results for the college examinations are not included.

The research includes students’ perceptions of academic programmes, infrastructure, communication, and administration within the institution. It does not include any other problems faced by the students, such as hostel-accommodation, transport, etc.

The study includes an action plan for improvements in architectural education in the government-aided college managed by the University of Mumbai. This is not done for any other colleges.

The action plan is based on the findings of the present research and it is designed within the framework of University rules and regulations.

**SIGNIFICANCE OF THE STUDY**

The study is likely to be useful to teachers and principals of colleges of architecture to identify strengths and weaknesses of educational programmes in their respective colleges. They can implement the suggestions and make necessary changes, to remove the weaknesses and enhance the strengths.

The opinions of students, teachers, and principals regarding the admission procedure may give direction for change in the pattern of aptitude test and the admission process itself.

The suggestions for changes regarding the examination pattern and methods of evaluation may be helpful for redesigning of examination pattern and restructuring of the syllabus. Thus, the study may be useful to the Board of Studies in Architecture, University of Mumbai.
The suggestions from practising architects are likely to be useful,
a) to improve the course content with respect to the current patterns of profession,
b) to organise continuing education programmes,
c) to make architectural education relevant to the needs of the society.

The research may give some useful suggestions regarding various aspects of architectural education, so that the Council of Architecture can take necessary action for overall improvement in architectural education.

The research includes a detailed study of educational system in the government-aided college managed by the University of Mumbai. An action plan is suggested. Thus the study is likely to be useful for improvement in institutional systems. The suggestions may increase institutional effectiveness in terms of contribution of institutional environment to institutional outputs.
References:


