

Developing Graphic Communication Skills in Architecture Education

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Abstract

Graphic thinking is term adopted to describe thinking assisted by sketching. In architecture, this type of thinking is usually associated with the conceptual design stages of the project in which thinking and sketching work closely together as stimulants for developing ideas. There is need to incorporate graphic thinking to develop visualization, imagination, critical thinking of architecture students. Graphic thinking is a device for communication between the designer and for the designed. There is actually very strong tradition of graphic thinking in architecture. Architects use different symbols and configurations in their drawings to explore alternatives and to communicate with each other. The study highlights the historical background of graphic communication and the appraisal of graphic design communication in architecture design process. It discusses the role that graphic communication plays in architecture education. The study focuses on numerous graphic techniques that can be applied in Varsity of solution. Finally, the study concludes with the revamping the content and teaching method. The study will end by designing teaching module focuses on graphic communication and techniques for architecture student.

Keywords: *Graphics, Design process, Graphic Communication, Drawing, Sketching*

I Introduction

In architecture, the primary goal of a design analysis and its representation is to expose the underlying concept, organizational pattern, design characteristics, and 'tectonics through simplified diagrams. Designers— especially architects—are trained to use paper and pencil when developing conceptual designs. Architects are visually oriented and are taught to think graphically. They draw to

develop ideas graphically, and in the process of drawing, designers communicate their thinking. The activity of drawing includes both seeing and thinking about the subject being represented. Designing is a knowledge-based activity. This creative act involves analyzing, synthesizing and integrating information such as production requirements and constraints. Diagrams and sketches are symbolic representation that designers developed for problem solving and spatial reasoning for their specific domain or discipline. Functional and formal design intentions are often embedded in architectural sketches.

To realize the potential of graphic thinking in architecture, we must understand today's prevailing attitude of the design process and the use of drawing in the process. Today we have broader concept of how and where design task takes place, but drawing are still normally thought of as simply representation of idea: their purpose is to explain to other people the product of our thinking. Design thinking and design communication should be interactive: this implies new roles of graphics.

1.1 Need for the study

There is actually a very strong tradition of graphic in architecture. The act of drawing is important not only as a vehicle for communication with others, it actually helps designers to see and understand the step-by-step process they work with. In the early design process, architects sketch to help themselves to see, to reason, and to understand the form they work with, and to explore functional ideas and solutions.

Historically building design was not so in different to human well-being that "communication with the people" becomes issue until the act of drawing was divided into two specialized activities. The first was design drawings, in which the designer expressed his or her ideas.

The second was drafting used to instruct the builder. Fuller Moore stated that “The graphics skills I had assumed to be a part of architectural training was being neglected in the school and that a more basic book on drawing in support of thinking was needed”. (Laseau, 1980 graphic thinking for). There has, of course, been an intense interest in architecture drawings rekindled by exhibits like the beaux-arts and 200 years of American architectural drawings. But the emphasis is mostly on communication of the final fixed product, and these presentation drawings tell us practically nothing about the way in which building were designed.

In the architecture curriculum (B.Arch.) students learn about graphics. The present scenario focuses more on the engineering drawings (technical). Graphic thinking is the term adopted to describe thinking assisted by sketching. In architecture, this type of thinking is usually associated with the conceptual design stages of the project in which thinking and sketching work closely together as stimulants for developing ideas. There is a need to incorporate graphic thinking to develop visualization, imagination, critical thinking of architecture students. Graphic thinking is a device for communication between the designer and for the designed. Therefore, there is a requirement for incorporating graphic thinking, graphical communication techniques in the present syllabus of architecture (B.Arch.)

Methodology

This research employs a comprehensive methodology to enhance the understanding and pedagogy of architectural graphics education. The study encompasses a thorough literature review, investigating key concepts, theories, and historical developments in architectural graphics, coupled with an examination of the practical application of graphic communication in architects' work and design processes. By analyzing the graphics syllabi from various universities in Mumbai, Pune, Bhopal etc. the research aims to identify existing variations and assess the need for research in architectural graphics education. The investigation includes an in-depth exploration of graphic communication types and their roles in architecture, culminating in a proposal for revamping syllabus content at an appropriate level. The research further contributes a practical design module, integrating insights from literature and empirical observations, to facilitate hands-on learning experiences and address the identified gaps in current architectural graphics education. This methodology ensures a holistic approach to the study of architectural graphics, fostering meaningful

improvements in syllabus design and educational practices

II Graphics in Architecture

Graphics are visual images or designs on surfaces like walls, screens, paper, or stone, used to inform, illustrate, or entertain. They include signs, charts, logos, graphs, drawings, symbols, and geometric designs. In art, 'graphics often refers to line-based work, as opposed to painting.

Graphic design involves visual communication and problem-solving using typography, space, images, and color. It blends skills from visual communication and design, using words, symbols, and images to convey ideas and messages. It includes both the process of creating designs and the final products themselves.

- Architectural Drafting Architectural drafting produces scaled drawings of buildings, interiors, and details. These drawings communicate construction processes and include plans, elevations, sections, and mechanical details like electrical and plumbing layouts.
- Types of Architectural Graphics Architectural drawings fall into categories such as process drawings (sketches, schematics) and construction documents (working drawings, plans, elevations, and isometrics).
- Sketches and Drawings Sketching is a vital skill in architectural graphics. Freehand drawing helps in developing graphic thinking and communication. It allows designers to visualize and communicate ideas, with sketches often representing abstract ideas or material attributes.

Why Study Design Drawing? Designers use sketches to explore ideas and solutions. Even rough drawings help architects understand forms and communicate concepts. Drawing involves seeing and thinking about the subject, combining conceptual and perceptual knowledge.

2.1. Types of Drawing

- Drawing from Memory: Depicts events and experiences from visual memory.
- Drawing from Observation: Involves drawing from real-life views, improving analytical observation.
- Drawing from Imagination: Visualizes non-existing ideas and creates new designs.

2.2. Diagrams

Diagrams are simplified drawings showing structure or functions. They are crucial in design fields for problem-solving and communication, offering a structured yet visual approach to ideas.



Figure 1 Bubble diagram

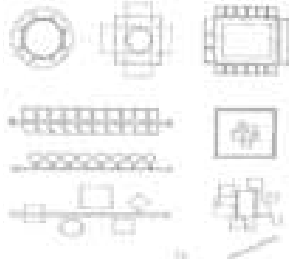


Figure 2 Part diagram

2.3. Architectural/Technical Drawing

Technical drawings follow specific conventions, showing plans, sections, and elevations. They evolved from manual ink drawings to modern computer-aided designs, enhancing precision and efficiency. In summary, graphics in architecture support visualization, communication, and design processes, making them a critical tool for architects and students alike.

III Graphic Communication

Graphic communication involves the use of visual material to convey ideas, such as drawings, photographs, slides, and sketches. It includes any medium that uses graphics to communicate messages, instructions, or ideas. One of the most widely used forms of graphic communication is drawing.

3.1. Communication

Communication involves transmitting ideas, experiences, or messages between people. It can be verbal or nonverbal, including talking, writing, and drawing. Verbal communication relies on words and has a sequential nature, while nonverbal communication includes visual elements like images, signs, numbers, and graphics, offering a simultaneous and complex way to convey information.

3.2. Graphic communication in architecture is critical as architects use drawings to communicate visually. As the saying goes, “Drawing is the language of architects... architects do not build – they draw.” Graphic communication involves visual materials such as drawings, photographs, slides, and sketches. It has been an essential tool since ancient times, from cave paintings and early record-keeping on stone tablets to Greek geometrical representations.



Figure 3 Marcel Breuer, Cape Cod cottage

IV Drawing evolution in architectural design

Graphic thinking has a long tradition in architecture. Leonardo da Vinci's notebooks demonstrate dynamic and exploratory thinking through sketches. His drawings show diverse approaches, from perspective views to detailed sections, reflecting how hand, eye, and mind work together.

Modern architects like Alvar Aalto and I. M. Pei also showcase this graphic thinking tradition. Aalto's rapid and diverse sketches reveal the development of his ideas, while Pei's design process for the East Building of the National Gallery of Art demonstrates how conceptual drawings evolve into final designs. His early sketches explore geometric solutions to architectural challenges, emphasizing the relationship between form and function.



Figure 4 By Alvar Aal

Zaha Hadid's sketches similarly illustrate the step-by-step design process, showcasing how graphic communication supports architectural development from concept to execution.

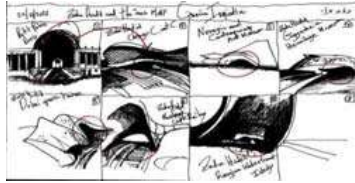


Figure 5 zaha hadid

V Design Process

The design process in architecture involves translating a client's needs into a specific building or design solution. The process generally includes five key phases:



Figure 6: Five phases in design process

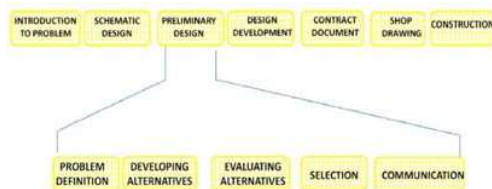


Figure 7: design project and problem solving process

5.1. Communication in the design Process

Each design phase involves converting one form of communication to another, from initial sketches to detailed construction drawings. Graphic communication plays a crucial role in managing information throughout the design process, supporting decision-making and execution.

5.2. Applying graphic thinking

Graphic thinking aids at every design stage, from abstract sketches in the early phases to precise hard-line drawings in the final stages. The versatility of sketches helps in visualizing ideas, problem-solving and achieving design clarity.

5.3. Study of graphics syllabus at univ Ersities

The graphics syllabus at universities typically covers:

- Basic drafting materials, instruments, and skills
- Basic visual elements and graphic principles

- Freehand drawing
- Orthographic and complex projections
- 3D views
- Sciography
- Measured and working drawings

| Mumbai University | Bhopal University | Pune University |
|--|---|---|
| Architectural Representation And Detailing | Graphic 1, Graphic 2, Graphics 3 | Architectural drawing and graphics 1 |
| GRAPHIC <ul style="list-style-type: none"> • studio work culture pencils, instrument tables etc • Orthography (plane and solid) • Drawing a building thickness and plan, section etc. • Views (isometric axonometric) • Perspective and Sciography FREEHAND <ul style="list-style-type: none"> • Memory left brain creativity • Object taking things apart/ reassembly • Landscape outdoor sketching • Anatomy WORKSHOP <ul style="list-style-type: none"> • Building skills studio work cutting, joining shaping • Materials and media installations assembly | GRAPHIC 1 <ul style="list-style-type: none"> • Freehand drawings • Scales • Orthographic projections • Complex projection • Angular projection GRAPHIC 2 <ul style="list-style-type: none"> • One point –two point • Perspective • Sciography Graphic 3 <ul style="list-style-type: none"> • software | GRAPHICS I <ul style="list-style-type: none"> Unit 1 Introduction to various drawing instruments and methods of employing them for technical drawing and sketching. Unit 2 Introduction to graphic language and its components Unit 3 Plane and Solid geometry Unit 4 Scale Drawing Unit 5 Sketching GRAPHICS II <ul style="list-style-type: none"> Unit 1 Solid Geometry Unit 2 Measured drawing/ Scale Drawing Unit 3 Sketching Unit 4 Introduction to CAD |

| Nagpur university |
|---|
| Architectural Graphics |
| Architectural Graphics I <ul style="list-style-type: none"> Unit -1 Free hand drawings Unit :2 Architectural symbols Unit :3 Scale Drawing |
| Architectural Graphics II <ul style="list-style-type: none"> Unit I Orthographic Projections Unit II Complex Projections Unit III: Architectural Drawing |
| Architectural Graphics-III <ul style="list-style-type: none"> Types perspective views Methods of drawing perspective views Measured Drawing Sciography |
| Architectural Graphics IV <ul style="list-style-type: none"> Sciography: Perspective |
| Architectural Graphics-V <ul style="list-style-type: none"> Submission drawing as per the local building bye laws Working drawings |

Table No. 1.1 Syllabus of different university

An analysis of various university syllabi reveals a strong focus on technical drawing, primarily used in the final product stage of design. However, a broader approach incorporating conceptual and creative aspects could enhance architectural education.

VI Revamping the content and teaching method

To align architectural graphics education with emerging trends, the syllabus and teaching methods need revamping. A good syllabus should:

- 1. Include all essential information for students at the beginning of the course.
- 2. Provide all necessary resources and guidance throughout the course.

6.1 Proposal for syllabus coverage at appropriate level

The updated syllabus should cover: graphic communication

| | |
|-------------------------------------|---|
| DRAWING | Freehand drawing Sketching (tools and techniques) Elementary drawings |
| ABSTRACTION | 1. Grammar (Alternative grammar) 2. Vocabulary Identities Relationships Modifies Other graphic vocabulary Applying graphic language |
| EXPRESSION | |
| APPLIED SKILLS | |
| Abstraction and expression | |
| Application to architectural design | |

Table No. 1.2 Proposal of syllabus

Alternative Grammar Graphic diagrams rely on fundamental grammatical rules to ensure clarity and reduce complexity by minimizing the number of variables considered at a given time. Within the realm of graphic language, three primary types of alternative grammar are utilized

- Bubble Diagrams
- Network Diagrams
- Matrix Representations

A key advantage of graphic communication is its ability to convey information across multiple levels simultaneously. This concept has long been understood by artists, whose successful compositions engage viewers through overall visual impact, intricate details, and mastery of technique. Similarly, in architectural design, graphic diagrams leverage these multi-layered communication strategies to enhance clarity, organization, and problem-solving efficiency. The structured approach to constructing a graphic diagram follows a systematic process that ensures coherence and effectiveness in visual representation. The subsequent sections will outline the step-by-step methodology for developing these diagrams in architectural communication.

6.3. Vocabulary in Graphic Language

For any form of language whether verbal, written, or visual to facilitate effective communication, its words and symbols must carry a consistent and universally understood meaning. This structured set of meanings is referred to as a vocabulary.

Unlike spoken or written language, the acquisition of graphic language is not a fundamental part of general education. Instead, it is primarily introduced within specialized fields such as design, architecture, and art. However, certain graphic "languages" are encountered by the general public in everyday life, including international road signs, map legends, musical notation, and mathematical symbols.

The accessibility and comprehension of graphic languages largely depend on their association with familiar objects and experiences. These connections can be reinforced through direct labelling of graphic elements or by using symbols that are easily recognizable as simplified representations of real-world objects. This ability to bridge abstract visuals with familiar references enhances the effectiveness of graphic communication in both professional and public contexts.

6.4. Integration of Digital Tools in Architectural Graphics

- The integration of digital tools such as AutoCAD, Sketch Up, Rhino, Revit, and Photoshop has transformed architectural graphics.
- Hybrid approaches combining manual sketching with digital drafting can improve students' adaptability and efficiency.
- Virtual and Augmented Reality (VR/AR) applications in architectural graphics can help students visualize spaces more interactively.
- Algorithmic and parametric design tools like Grasshopper and Dynamo allow for computational thinking and generative design.

6.5. Enhancing Teaching Methods for Graphic Communication

- Shifting from passive learning to interactive and hands-on learning experiences.
- Encouraging collaborative sketching sessions and peer reviews to enhance critical thinking and communication.
- Implementing design-based problem-solving activities to develop visualization skills.
- Workshops and guest lectures by practicing architects and graphic designers to expose students to real-world applications.

6.6. Assessment Strategies for Graphic Communication Skills

- Moving beyond traditional grading methods to portfolio-based assessments that track the progression of graphic skills.
- Evaluating students on conceptual clarity, creativity, and precision rather than just technical accuracy.
- Encouraging students to document their design process using sketches, diagrams, and digital renderings.

Conclusion

Graphic communication is an essential component of architectural education, serving as a bridge between conceptual thinking and design realization. The study emphasizes the need to integrate graphic thinking into the curriculum to enhance students' visualization, imagination, and critical thinking skills. While traditional hand-drawing techniques remain fundamental, the rapid advancement of digital tools necessitates a balanced approach that incorporates both manual and computational methods. By revamping the syllabus to include freehand sketching, abstraction techniques, and digital applications, students can develop a more comprehensive understanding of architectural graphics. Furthermore, interactive teaching methods such as workshops, peer reviews, and design-based problem-solving activities can foster a deeper engagement with graphic communication. Assessment strategies should move beyond technical accuracy to evaluate creativity, clarity, and conceptual depth. Ultimately, enhancing architectural graphics education will equip future architects with the skills necessary to navigate the evolving demands of the profession, ensuring their ability to communicate design ideas effectively in both academic and professional settings. Future research can explore the role of emerging technologies, such as AI-driven design tools and digital fabrication, in shaping the future of architectural representation and communication.

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