

INNOVATIVE TOOLS AND TECHNIQUES TO TEACH ARCHITECTURE

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Abstract

This paper presents the issues on the cognition of a architecture student towards the academic coursework. The innovative tools and techniques used as a key factor to attain cognition of higher level. Considering the students psychology and changing trends of teaching learning process. This paper aims to develop a module and testing it for a topic in a subject of architecture using modern teaching aids as a sample of teaching tool. These modules can be used by lecturers to supplement their lectures, enabling them to demonstrate and teach the subject material in a more intuitive, interesting and fun way. The teaching aid should be available as a learning tool for students to use.

Keywords: teaching aids, innovation teaching tools, innovation teaching techniques, visual communication, changing trends in teaching, cognition, retention,

Introduction

Technology plays an important role in enhancing learning system. The time of blackboards with chalk and notice boards is going to change. The crucial factor in a teaching process is the quality of the lessons given by the teachers. Teachers therefore should use modern teaching tools. Modern teaching tools are used to make learning sessions interactive and motivating. Nowadays, Classes are equipped with Modern teaching tools such as Interactive Whiteboards, Visualizers, response system, projectors and educational software etc. Teaching with Modern teaching tools is essential in the technological age. Many subject topics can be taught better and in more depth with Modern teaching tools. Teachers must use various types of Modern teaching tools to connect with students. Modern teaching tools incorporate audio-visual techniques that influence the interest and memory of students. Utilizing Modern teaching tools successfully will create the best platform for learning and teaching. Teacher may bring a chart or draw a neat diagram on the board, but effective learning still misses out. A multimedia content gives the student a better learning experience as they can watch the actual phenomena and processes.

Architecture Education

Architecture as a career is the practice of providing architectural services. Architectural services address both feasibility and cost for the builder, as well as function and aesthetics for the customer. An architect is a person who is involved in the planning, designing, modeling and overseeing a building's construction. The most prestigious award a living

architect can receive is the Pritzker Prize, often known the 'Nobel Prize' for architecture.

Teaching Aids In Architecture Education

As it's known that today's age is the age of science and technology. The teaching learning process has also been affected by it. The process of teaching - learning in architecture is evolved and now it depends upon the Different type of equipment's and aids available in the classroom. The teaching aid is evolved from paper and pencil to chalk and board to OHPs to PPTs. And would evolve further as days would pass.

Types of Teaching Aids

There are many aids available these days. We may classify these aids as follows-

1. Visual Aids- The aids which use sense of vision are called Visual aids. For example :- actual objects, models, pictures, charts, maps, flash cards, flannel board, bulletin board, chalkboard, overhead projector, slides etc. Out of these black board and chalk are the commonest ones.
2. Audio Aids- The aids that involve the sense of hearing are called Audio aids. For example: - radio, tape recorder, gramophone etc.
3. Audio - Visual Aids- The aids which involve the sense of vision as well as hearing are called Audio- Visual aids. For example: - television, film projector, film strips etc.

Role of audio visual aids in Teaching- Learning process.

1. Every individual has the tendency to forget. Proper use of teaching aids helps to retain more concepts permanently.
2. Students can learn better when they are motivated properly through different teaching aids.
3. Teaching aids develop the proper image when the students see, hear taste and smell properly.
4. Teaching aids provide complete example for conceptual thinking.
5. The teaching aids create the environment of interest for the students.
6. Teaching aids helps to increase the vocabulary of the students.
7. Teaching aids helps the teacher to get sometime and make learning permanent.
8. Teaching aids provide direct experience to the students.
9. Clarification- Through teaching aids , the teacher clarify the subject matter more easily.

10. Discouragement of Cramming- Teaching aids can facilitate the proper understanding to the students which discourage the act of cramming.(forcing)
11. Saves Time and Money
12. Classroom Live and active- Teaching aids make the classroom live and active.

Need For Developing Teaching Aids For Architecture Education

Today the architecture students are well worse with the use of computers and internet. They can avail the information about any topic in any subjects like building material, construction, history etc. beforehand, using the computers and internet if they want.

“Information” about the topic can be attained by the student with the help of internet but to make the student understand the working of the topics like the construction of a truss or brick masonry etc. and apply it, we need these teaching tools to be integrated in to the classes to help students retain knowledge for longer time.

Teaching aid is the media to transmit the knowledge and enhance the affective domain of the student which he or she has already got from the internet, books or any other source. Actual application of that knowledge to various disciplines is to be discussed and initiated. To initiate this process we can use these teaching tools.

Methods of Teaching

For effective teaching to take place, a good method must be adopted by a teacher. A teacher has many options when choosing a style by which to teach. The teacher may write lesson plans of their own, borrow plans from other teachers, or search online or within books for lesson plans. When deciding what teaching method to use, a teacher needs to consider students' background knowledge, environment, and learning goals. Teachers are aware that students learn in different ways, but almost all children will respond well to praise. Students have different ways of absorbing information and of demonstrating their knowledge. Teachers often use techniques which cater to multiple learning styles to help students retain information and strengthen understanding. A variety of strategies and methods are used to ensure that all students have equal opportunities to learn. A lesson plan may be carried out in several ways: Questioning, explaining, modeling, collaborating, and demonstrating.

Teaching methods

In general methods of teaching which could be implemented are as follows :-

Teaching Method 1 Learning by Doing

Students need to be able to try new real world skills in a mentored environment. Teachers should be available to monitor students and to know when a student is having difficulty, as well as the nature of the difficulty he is having. They should be prepared to respond to the questions, errors, and omissions that a student has while trying things out.

Teaching Method 2 Incidental Learning

Implicit instruction allows students to pick up facts without recourse to explicit instruction about those facts. Rather, the students should be allowed to adopt goals and be given

materials that will cause them to pick up the desired information "in passing." It is up to course designers to construct situations in which factual knowledge can be naturally acquired.

Teaching Method 3 Learning by Reflection

Teachers should help their students develop the ability to productively muse about their ideas. Through dialog with their teachers, students should learn to become better understanders and creators by learning to ask and pursue interesting questions.

Teaching Method 4 Cased-Based Teaching

When students are engaged in tasks and encounter expectation failures, teachers need to make cases available to them that indicate how to resolve those failures.

Teaching Method 5 Learning by Exploring

Learners should have access to a variety of experts. Students should be able to access these experts easily and quickly, and should have the opportunity to compare and contrast the different opinions of the different experts.

Teaching Method 6 Learning by Arguing

Teachers should be able to adopt multiple points of view. When a student expresses a point of view, a teacher should be able to respond with either an argument supporting that point of view or one undermining it. The teacher should not pose as the ultimate authority, but only as a source the students can turn to in order to sharpen their own idea.

Bloom's Taxonomy

Bloom's Taxonomy refers to a classification of the different objectives that educators set for students (learning objectives). The taxonomy was first presented in 1956 through the publication "The Taxonomy of Educational Objectives, The Classification of Educational Goals, Handbook I: Cognitive Domain," by Benjamin Bloom (editor), M. D. Englehart, E. J. Furst, W. H. Hill, and David Krathwohl.

Bloom's Taxonomy divides educational objectives into three "domains:" Affective, Psychomotor, and Cognitive. Within the taxonomy learning at the higher levels is dependent on having attained prerequisite knowledge and skills at lower levels. A goal of Bloom's Taxonomy is to motivate educators to focus on all three domains, creating a more holistic form of education.

Cognitive: Categories in the cognitive domain of Bloom's skills in the cognitive domain revolve around knowledge, comprehension, and critical thinking of a particular topic. Traditional education tends to emphasize the skills in this domain, particularly the lower-order objectives. There are six levels in the taxonomy, moving through the lowest order processes to the highest:

Affective: Skills in the affective domain describe the way people react emotionally and their ability to feel another living thing's pain or joy. Affective objectives typically target the awareness and growth in attitudes, emotion, and feelings.

There are five levels in the affective domain moving through the lowest order processes to the highest:

Psychomotor:Skills in the psychomotor domain describe the ability to physically manipulate a tool or instrument like a hand or a hammer. Psychomotor objectives usually focus on change and/or development in behavior and/or skills.

Bloom and his colleagues never created subcategories for

skills in the psychomotor domain, but since then other educators have created their own psychomotor taxonomies.

Student Development

Development refers to long-term personal changes that have multiple sources and multiple effects. It is like the difference between my music at fifteen compared to my music at five, rather than the difference between one week and the next. Some human developments are especially broad and take years to unfold fully, like a child's ever-evolving ability to "read" other people's emotions and moods. Others are faster and may be more specific or focused, like a child's increasing ability to solve crossword puzzles. The faster and simpler it is, the more likely we are to call the change "learning" instead of development.

Need of development

Students' development matters for teachers, but the way it matters depends on the kind of teaching. Working exclusively with one grade (like, say, a third-year students) highlights differences among students that happen in spite of their similar ages, and obscures similarities that happen because of their having similar ages. Under these conditions it is easy to notice students' diversity, but somewhat harder to know how much of it comes from differences in their long-term development, as opposed to differences in shorter-term learning or immediate experiences. Yet this knowledge is useful in planning appropriate activities and in holding appropriate expectations about students.

Cognitive Development

Cognition refers to thinking and memory processes, and cognitive development refers to long-term changes in these processes. While cognition has been studied from several different perspectives and in the light of several theories, the one that is both the most widely known among educators and the most frankly "developmental" is the cognitive stage theory of a Swiss psychologist named Jean Piaget.

Evolution of technology (visual communication) in education

The connection between seeing and remembering

Why do people remember what they see so much more readily than what they hear? One recent article on the subject describes the evidently limitless capacity of long-term memory to store concepts and then points to studies that seem to indicate that "Pictures have a direct route to long-term memory, each image storing its own information as a coherent 'chunk' or concept." If this is so, then it follows that the more visual content in a presentation, the more memorable the information will be over the long term.

Importance of technology (visual communication) in education

Visual communication

Visual communication as the name suggests is communication through visual aid and is described as the conveyance of ideas and information in forms that can be read or looked upon.

Visual communication solely relies on vision, and is primarily presented or expressed with two dimensional images, it includes: signs, typography, drawing, graphic design, illustration, colour and electronic resources. It also explores the idea that a visual message accompanying text has a greater power to inform, educate, or persuade a person or audience.

The evaluation of a good visual communication design is mainly based on measuring comprehension by the audience, not on personal aesthetic and/or artistic preference as there are no universally agreed-upon principles of beauty and ugliness.

The Importance of Visual Aids in Communication

Effective communication can be quite challenging, especially when making a presentation or giving a speech. In order for the communication to be effective, you must keep the attention of the listeners and deliver the information in such a way that it is fully understood. One of the most effective ways to get your message across and make it memorable is with visual aids.

Memory Retention

The psychologists and educators have found that use of visual tools led to a retention of information rate three days after a meeting or other event that was six times greater than when information is presented by the spoken word alone. Visual aids allow the speaker to use verbal and nonverbal communication to solidify the message and provide a point of reference for the mind.

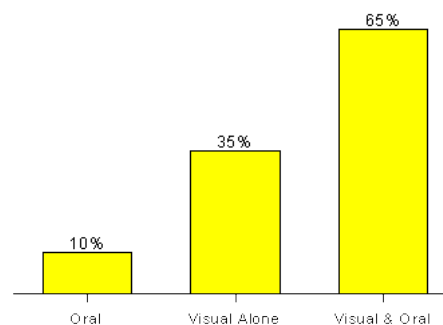


Figure 2.1
Bar Chart Showing Retention of Information

Attention Span

Everyone has a limited attention span. Once this capacity is spent, the mind will decrease its ability to retain information and listen effectively. Using visual aids refreshes the mind and engages it in a different way, renewing the attention span. Visual aids keep the mind entertained and therefore sharp and ready to receive information.

Organizing Communication

Visual aids can be used to organize communication, making it easier to remember points made in a presentation. The introduction of a different visual aid for each point of a speech or presentation helps the mind to separate messages into smaller chunks of information. The visual aids also create a point of reference for the mind to quickly refer to when attempting to retrieve information. For example, the use of icons or labels helps trigger messages in the mind.

Comprehension

Not everyone understands concepts and information at the same rate. Some people can understand messages quickly

while others need help to grasp what is being said. Visual aids are a way of further explanation. If some people are more visual than audio learners, the visual aids may be necessary for comprehension. Visual aids create repetition and the more repetition in communication, the greater the chances that your audience will understand and remember effectively.

Create a Focal Point

Visual aids help a speaker stay on track. If there is one central visual aid that the speaker can use, then the speaker's thoughts and the audience's attention will stay on course. There's nothing worse than listening to a speaker ramble and lose the audience. Visual aids assist in avoiding such a scenario.

The Effect of Visual Aids on Learning

The use of visual aids in the classroom helps children who are more inclined to learn by sight to become more interested in the subject at hand. There are visual aids for all ages of children that are appropriate for classroom use. Visual aids are meant to be a tool to help teach a subject and are meant to be used in addition to a regular lesson plan.

Effects- Visual aids affect learning by helping the children to keep their attention focused on a visual aspect of the presentation. These aids can help children to break down information and manage it on their own. Using visual aids in the classroom is a good way to make a lesson more memorable to the students involved.

Significance- Visual aids should be learning tools that can make an idea become more concrete to the learner. They help the student to focus his thoughts and ideas on the subject, which in turn helps them to understand and interpret the information being presented.

Advantages & Disadvantages of Visual Communication

Visual communication is just one of the ways people interact, but it is one of the most important methods of communication. While written and verbal communication are both valuable, it can be difficult to explain yourself without a visual aid. Visual communication has several advantages and disadvantages, and the process can add to, or detract from, a presentation.

Benefits

Being able to view the person speaking gives his words more power than if the individual was merely heard. After all, facial movements and gestures are a valuable addition to the communication process.

Significance

Expert speakers know how to properly orchestrate their gestures and facial expressions to enhance speaking performance. By making eye contact with the audience and using applicable hand motions, such as a teacher signaling "silence," the words become more meaningful to the audience.

Misconceptions

Excessive gesturing can detract from a spoken presentation, because the listener's attention is directed to the gestures.

Warning

A speaker can lose track of the topic if a visually distracting element is in the room.

Fun Fact

Many experts recommend imagining members of the listening audience in their underwear to help reduce the speaker's anxiety.

Importance Of Various Subject Matter In Architecture Curriculum

Architecture involves the study and transformation of the built environment, from the scale of furniture to the scale of the city. The goal of an architectural education is to develop a synthetic thought process of critical thinking and creative problem solving. Creative thinkers must address all aspects of the built environment in its cultural, social, and ethical context.

Five-year Bachelor of Architecture (B. Arch.) Professional degree undergraduate programs, with approximately 25% of the curriculum devoted to the humanities and electives.

The program is oriented toward developing the student's ability to deal creatively with architectural problems on analytical, conceptual, and developmental levels. The sequence courses in design, consisting of studio work augmented by lectures and seminars, are the core of the program. Sequences of studies in the history of architecture and cities, culture and society, architectural theory, visual studies, environmental control, structures, construction, and computer applications provide a base for the work in design.

In the first three years, the student has the opportunity to establish a foundation in the humanities and sciences through electives. During the fourth and fifth years, this base may expand through further detailed studies in these areas. Within the professional program a basis for understanding architecture in its contemporary and historical cultural contexts is established.

RESEARCH PROPOSAL

Selection of soft ware

sr no	name of software	Animation	2D Modeling	3D Modeling	Lighting	Rendering	Video Game Creation	3d Visual Effects	Post-Production Video Editing
1	3D Max	yes	yes	yes	yes	yes	no	yes	yes
2	AutoCAD	no	yes	yes	yes	yes	no	yes	no
3	Revit	no	yes	yes	yes	yes	no	yes	yes
4	Maya	yes	yes	yes	yes	yes	yes	yes	yes
5	Sketch Up	no	yes	yes	no	no	no	yes	no

Table 3.1 Comparison Between 3D Animation Soft wares

Maya soft-ware is not selected because it's very costly and it's more used in film animation and the experts are not easily found.

Selected soft-ware 3D MAX

Autodesk 3ds Max, formerly **3D Studio MAX**, is a modeling, animation and rendering package developed by

Autodesk Media and Entertainment. It has modeling capabilities, a flexible plugin architecture and can be used on the Microsoft Windows platform.

Autodesk 3ds Max Design provides a comprehensive, integrated rendering, 3D modeling, and animation software solution for architects, designers, civil engineers, and visualization specialists to help tell the story behind their designs.

- **Explore**—Develop unique organic forms. Experiment with shape, scale, and look. Generate and control architectural entities and design concepts procedurally with scripts.
- **Validate**—Create animated walk-through, line-of-sight studies, and physically near accurate daylight analysis, to help better understand and communicate how the design functions in context.
- **Communicate**—Help customers make crucial decisions during design reviews and gain valuable buy-in during various stages of the design process with more emotionally engaging narratives.

Usefulness of 3D Soft-wares in education industry

Soft-wares like 3D Max, Revit, Maya, Sketch Upetc are used by students to create and develop their designs but even teachers could make use of such 3D soft-wares to make students understand the topics like staircase, timber trusses, wooden floors etc. and make it more interesting and easy to retain.

Testing of module/ survey conducted.

Thus the audio-visual module developed on “Fenestration” for first year student was put to test by presenting it to the students of first year students as well as 2nd year students who had already learnt the topic in a different manner or way.

A survey was conducted for the students of first year and second year by making a list of few simple questions to be answered by the students whether they enjoyed while learning, gained knowledge more than what they were taught earlier, or if they agree to the fact audio-visual presentation helps in better understanding and few more questions are listed below.

1. How will you rate the quality and appropriateness of the given visuals?
2. Have you been taught earlier by audio-visual presentation?
3. Do you think no. of students going to the site visit at a time affects the understanding of a topic?
4. How will you rate the delivery of the given audio-visual presentation?

Conclusion of the analysis

90% students agree that they enjoy the audio visual presentation and they find the presentation very interesting. They also agree that Audio visual presentations will help save time spent for travelling and on site live work presentation Just Pictorial presentations and Lectures might loosen the interest of a student or the retention graph may fall down very easily. Thus such audio visual presentations may it be animation or a video shot or may be a combination of both might definitely help raise the retention graph

CONCLUSION

Considering the statistical information given in 5.1 the conclusion can be drawn that such audio visual presentations can be very well incorporated in the class lectures to make students understand the topic, retain for longer time and at the same time learning could be made more enjoyable along with time saved for going to the site. These kinds of modules can be created for different topics of various subjects and could be stored in the library, so as to if students could access and revise it any time they want.

How can it be effectively used by students?

The modules such created by the teachers could be stored in the library in the form of CD format and copies could be made if required and could be accessed by the students whenever needed and revision could be done. They could repeatedly see it if they don't understand any thing or they can then consult teachers in case of confusion in any topic.

How can it be effectively used by teachers?

Teachers can also use the same modules or modify it by adding or subtracting necessary and unnecessary clippings or parts respectively. The time required for the students to travel to and fro to the site will be effectively neglected and the difficulties if any could be solved very easily by the teachers on the spot. And also the risks of accident on the sites could be managed.

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