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Active Learning and its Application in Architectural Education

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Abstract—*Architecture is different than any other courses. It required different approach for its pedagogy. The background demands various innovations in teaching learning process in architectural education. The traditional model of education in which teacher delivers information to students, is no longer effective at making millennial engaged. If active and innovative methods are not adopted there are probabilities that student lack interest which may even last throughout course.*

Already, educators are trying to create active learning environments for today's student, but here learning spaces plays a vital role for making active learning strategies work. Informal learning spaces have the ability to elevate communication, encourage creativity and promote collaboration. Hence it is important to understand the active learning strategies, its applications and spaces associated with it. The study aims to understand the importance of active learning in architecture education. The study focuses on numerous active learning strategies and spaces required for making active learning work in architecture education.

1. INTRODUCTION

Architecture requires different approach for its pedagogy. The first year of architecture is a transition from the logical world of science to the world of art and architecture which is a major change in their overall perception of education and learning. They get to face a new language which is quite different than they used before. Students do not learn much just by sitting in class, listening to teachers, memorizing pre-packed assignments and giving out answers. They must make what they learn part of themselves. Students can learn more if they are actively engaged with the material that they are studying.

Active learning methodology has become the preferred way to change the traditional teacher centered classroom into the newer student centered approach. The objectives of active learning techniques are to encourage advantageous learning environment for the student so that they have an active role in their learning process.

Active learning spaces play a vital role in making active learning work. At the basic level, "active" spaces are the spaces that can be reconfigured and adapted to meet the needs in architecture education. It can be an interesting blend of formal and informal learning spaces, where spaces supports academic classrooms with co-curricular activities and social interaction.

2. ACTIVE LEARNING IN ARCHITECTURE EDUCATION

Various knowledge types are integral to learning in architectural education. Architecture, because of its most important qualities such as professional work in teams, practical skills and creativity, is an area in which it is likely that active learning technique can demonstrate its most important strengths.

2.1 Need of Active learning in Architecture Education

Architecture education demands different educational approach to its pedagogy. As we define architecture, it is the art or practice of designing and constructing buildings. Architecture education is a blend of theoretical and practical knowledge enabling students using these theories and technical knowledge for creating society. By transforming course to remove the traditional classroom lecture model, architecture student must be kept engaged with each other and faculty allowing them to have more time to here new ideas, ask questions and learn at their own pace. "Students who engage interactively learn concepts better, retain them longer, and can apply the information more effectively in other contexts than do students who sits passively listening" (Wood W., 2006). Hence, it is important to use active learning strategies in architecture education.

3. THE THREE ASPECTS OF ACTIVE LEARNING

Education is a process. Educationalists like Adams and Ross believe that education is essentially a bipolar process and recommends close co-operation and better understanding between the teachers and students for achieving the aims of education. Even though teacher-student interaction is a vital component of the educative process, we cannot ignore the influence of social environment and technological advancement on the education system. In this sense, it is difficult to view education as a bipolar process.

John Dewey believed that education is essentially a tri polar process. This view motivated educationalist to consider the societal change and social environment while constructing the curriculum. Tri-polar process justifies the bilateral relationship between the society and education.

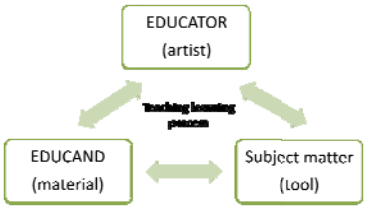

Figure 1: Education as tri-polar process

Active learning is process of enhancing the quality of education by directly involving students in teaching learning process. It makes the education process 'student-centered'. Relating the tri-polar education process to active learning, we can assume, the faculty (educator), the student (educand) and the institute (the learning space) are the three important aspects of active learning.

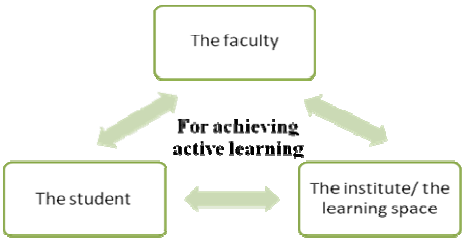

Figure 2: Three aspects of active learning

4. UNDERSTANDING THE INTERRELATIONSHIP OF ALL THREE ASPECTS

Education is the process of facilitating learning, skills, values, beliefs, and habits. Education frequently takes place under the guidance of educators. Education can take place in formal or informal settings. The methodology of teaching is called pedagogy.

Education began in prehistory, as adults trained the young in the knowledge and skills deemed necessary in their society. Evolving from prehistoric, now formal education occurs in a structured environment whose explicit purpose is teaching students. Usually, formal education takes place in a school environment with classrooms of multiple students learning together with a trained, certified teacher of the subject. Most school systems are designed around a set of values or ideals that govern all educational choices in that system.

Quality teaching has become an issue of importance as the landscape of higher education has been facing continuous changes. New students call for new teaching methods. Modern technologies have entered the classroom, thus modifying the nature of the interactions between students and professors. Student-faculty relationships are important on a number of fronts. Also the environment shapes the learner, and that learners influence their environment.

We live in a digital and mobile world where Google, the Internet and mobile technologies have disrupted traditional classroom learning and requirements for immediate recall. Internet-accessible resources are extensions of our memory. For this, faculty must be updated to meet the need of 21st century students. Therefore it is important to teach today's students on their terms.

5. SPACES ASSOCIATED WITH ACTIVE LEARNING

Teaching and learning on campus takes place within specific physical settings. The traditional, teacher-centered and didactic instruction of universities has been embedded in the constructed environment of the campus, particularly the formal classrooms. However, these same facilities now threaten to impede the implementation of more student-centered and flexible learning approaches being introduced worldwide.

'Active' and participative learning and spaces that facilitate this are at the heart of the teaching-learning process. An Active Learning Space is simply a space that facilitates, much more readily than traditional spaces, active learning and participative learning amongst and between students, and between the students and faculties. They take many different forms, and in some the emphasis is on the use of technology as an agent of this active approach, while in some the emphasis is on the layout of the room and the kind of furniture and AV equipment provided, with the emphasis on high levels of flexibility.

5.1 Architecture Education scenario

History of architectural education in India is a matter of the British colonial legacy starting from early 20th century and it didn't get into a different mode till 1964 when School of Architecture, Ahmedabad started as a vision of Prof. Doshi and his likeminded architect friends. The curriculum model is almost the same all over the country with minor differences and the course has been of five years duration with the office or practical training. The student and the teacher get simultaneously engaged in the business of learning. The curricular matters are subject to approval by the COA which modifies its broad framework after circulating proposals and conducting debates and seminars on the proposed modifications. It is not only the curriculum but the space it provides the student for learning and broadening their horizons that matter. Distinction between information and knowledge is becoming increasingly crucial in the process of imparting education of the professionals.

5.1.1 Traditional/ Conventional methods of teaching

Conventional teaching refers to a teaching method involving instructors and the students interacting in a face-to-face manner in the classroom. These instructors initiate discussions in the classroom, and focus exclusively on knowing content in textbooks and notes. Students receive the information passively and reiterate the information memorized in the exams. Technology in education is not something new in today's classrooms, but many education systems are still limited by conventional teaching and learning methods. Many teachers are still teaching their students in the same manner as how they were taught and how their own teachers were taught, not much of progress in terms of the teaching perspectives. Many lecturers are still using conventional teaching and have noted that in conventional teaching classrooms, while the lecturer is explaining and writing on the board, students will be copying the same thing onto their notes, some day-dreaming and some sleeping. It would be difficult to stop students from copying the notes from the board and at the same time ensured that every student was paying attention in the class because the lecturer was too busy explaining the lecture. Conventional teaching is also limiting the room for more creative thinking and also seldom considering individual differences. It is necessary to realize these limitations in conventional teaching and take a step to move forward.

5.1.2 Active learning based methods of teaching

Active learning involves students and helps them to have an in-depth understanding of the course through induction of practice; in other words, the inductive teaching has better results than productive teaching (Adler, 1999). Moreover, it has been argued that inductive methods increase the consolidation and conservation of a subject as well as the assessment and evaluation of performance with better subsequent future career paths for students studying a given subject from a book (Kelley et al., 1999). Active learning requires deeper planning than simply leading students through a classroom behavior.

Bonwell & Eison (1991) have proposed several techniques to support and promote active learning:

- The use of visual media during the lectures.
- The encouragement of students to take notes during lectures.
- The use of computers during teaching.
- The encouragement of students to solve problems during the case study.
- The use of simulations, role playing and various graphics.
- The use of collaborative learning.

Students must be doing things and simultaneously think about the work done and the purpose behind it so that they can enhance their higher order thinking capabilities.

Active learning requires appropriate environments through the implementation of correct strategy.

5.1.3 Comparative analysis of traditional and active learning based teaching methods

Given below is the comparative analysis of traditional and active learning based lectures based on the classroom observation in traditional and active learning based learning environment.

Table 1: Traditional and active learning based teaching

Traditional lectures	Active learning based lectures
Learners learn passively in an often silent classroom.	Classroom environment resembles an active workplace with various activities depending on the kind of work being done.
Learners usually work individually.	Learners often collaborate with peers, experts and teachers.
The teacher is the information giver—helping learners acquire skills and knowledge.	The teacher is the facilitator—providing opportunities for learners to apply skills and construct their own knowledge.
Learning starts with what learners do not know.	Learning starts with learners' previous knowledge.
Teaching is an instructive process.	Teaching is a constructive process.
Student to student speaking is discouraged.	Student to student speaking is encouraged in active learning classroom.
Subject matter is forced upon the students by means of traditional lectures.	Student's involvement makes student curious to learn the subject matter.
Student's concentration graph decreases after 10-15 minutes lecture.	Student's concentration graph is always maintained due to active engagement of students in activity.
Students' understanding of subject matter is not tested during the lectures.	Students understanding of the subject is tested during lecture itself by means of active learning strategies.
Hence, opportunity to correct students misunderstanding is not provided during lectures.	Hence, there are opportunities to correct students misunderstanding during lectures.
Students absent rate are high in traditional classrooms.	Student's rate of attendance is high in active learning based classroom.
Learners are motivated by the desire to get good grades, to please teachers, and to gain rewards.	Learners' interests and involvement promotes intrinsic motivation and effort.
Teachers use various kinds of technology to explain and illustrate various topics.	Learners use various kinds of technology to conduct research, communicate, and create knowledge.

Teacher- centered environment in traditional classrooms.	Lerner- centered environment in active learning based classrooms.

5.2 Active learning spaces

Active learning, an instructional model that focuses the responsibility of learning on learners, required active learning spaces. In active learning based environment student works in teams to solve problems that are often multidisciplinary in nature, using techniques that are technology-rich. Active learning classrooms can generally characterized by furniture and technology settings that foster small-group collaboration, a rich-media working environment, and the ability to easily reconfigure within the class period.

These new active learning classrooms can enable students to acquire exactly the kinds of skills that employers are demanding of today's graduates. Just as education is changing and adapting to the digital economy, the workplace must change as well. Learning spaces plays a vital role in teaching-learning process.

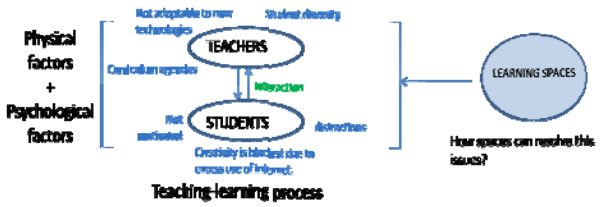

Figure 3: Role of learning spaces

6. PROPOSAL FOR MODIFIED OR ACTIVELY ENGAGED ACTIVE LEARNING CLASSROOMS

Apart from the usual formal teacher-centered approaches, such as one hour lecture, the active teaching and learning creates opportunities for interaction between teachers and students, discussions among students themselves, as well as between students and the subject materials. The visual and other methods of learning will create a strong bond to relate between the theoretical subjects taught to the practical design studios.

The following tips can make the lecture approach more effective-

1. Focus on specific topic
2. Organize the points for clarity
3. Relation to exiting examples, illustrations/sketches to be shown.
4. Present more than one side of an issue and be sensitive to other perspectives
5. Beware of the audience's reaction.
6. Enjoy ones presentation.

Various active learning based methods have more of student's involvement, discussions, questions and solutions (more than one). This would lead to students working in group (collaborative or cooperative learning).

Case study based leaning

The students must be exposed to Case study based leaning, where they require to visit an existing project, document (take photographs, measurements ,sketches) the whole , observe, study the facts, critically analyze the advantages and disadvantages and finally incorporate it into their own design solution. This helps them to finally arrive on a design solution that is more functional and also aesthetical. The case study approach works well as it acts as an extra support to the environmentally based design solution and it also stimulates critical thinking and awareness of multiple perspectives.

Site visits

The exposure to site visits (factories, construction sites, etc) the students are practically aware of what's happening in the real world, more than just the theoretical approach.

Construction yard activities

A hands-on workshop in the construction yard would create awareness for the students to real life applications.

Teaching methods guidelines:

Teaching Methods can be described as the way of achieving learning results. The selection of teaching methods is dependent on the students and the form of the learning condition. The selected teaching methods should support the completion of learning results.

1)Involve the students during learning hours i.e, they should be attentive and active by participating in the learning process.

2) Teaching and Learning process are better achieved by linking the learning to a concrete application where knowledge, skills and competence are to be used.

3) Support students in their learning process. Special lectures with demonstration.

4) Social engagement is essential part of active learning.

5) Students- faculty discussions on the subject matter encourages student to actively participate and understand the subject matter.

6) Group work/discussions provide students with opportunities to learn from and support each other rather than mere formal, teacher-centered approaches.

7) By sharing knowledge and experiences, by encouraging students to think in different perspectives would make them react more critically.

8) Interactive teaching and learning sessions would encourage the students to become more self-directed and self-motivated.

7. RECOMMENDATION FOR MAKING ACTIVE LEARNING WORK

An educational building is an expensive long-term resource. Well designed learning spaces have a motivational effect. Open-plan informal learning spaces provide individualized learning environments which supports collaborative activities. New types of learning spaces not only incorporate technology, they also create new patterns of social and intellectual interaction. Taken altogether these trends suggest new strategies for overall campus design. In essence, the entire campus becomes an interactive learning device. It is important to understand that what can be the design principles for active learning campuses? By means of various studies we can assume that following can be the active learning design principles.

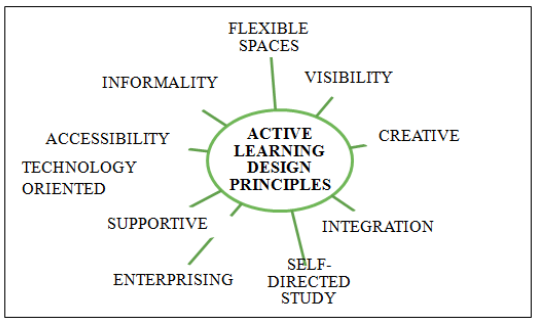

Figure 4: Active learning spaces

Listed below are general guidelines for creating active learning based environment in schools of architecture:

1) School Sitting

- Consider locating new schools in higher density neighborhoods where students live close to school when possible.
- Consider safe walking/cycling and public transportation access in choosing school sites.
- Structure built and natural elements on and around the school site for variety and visibility that will be pedestrian-friendly and pedestrian-safe.

2) Building Massing

- Consider building connections and spatial patterning as opportunities to promote physical activity.
- Orient building to amplify outdoor views.
- Mass and orient building to allow penetration of natural light from most areas of the building interior.
- Provide community-use spaces that can accommodate healthy community activities.
- Allow for ample interactive open and semi-open spaces per student.

3) Active Classrooms

- Provide ample room for students and teachers to move in and around the classroom, supporting potential activity breaks, as well as for actively engaged activities.
- Design modular areas and learning hubs, including activity and reading nooks
- Provide a flexible classroom layout to allow for multiple and changing configurations.
- Provide easy access from classrooms to informal outdoor learning areas.

4) Outdoor Learning Areas

- Provide outdoor classroom spaces, with cover and/or
- shade as appropriate for the local climate.
- -Locate outdoor classrooms adjacent to outdoor and natural learning opportunities
- Include gardens as learning and activity areas, in addition to trails and natural areas.
- Provide infrastructure (power, water, and lighting) to support high utilization of outdoor classrooms and learning areas.

5) Interactive Spaces and Leisure Areas

- Include both hard and soft surfaces, green areas, and variations in sun and shade, to promote varieties of activity and exploration of nature in outdoor areas.
- Ensure sufficiently large interior gathering areas.

6) Active Navigation Areas

- Locate visually appealing stairs in prominent circulation areas with natural lighting.
- Provide alternate routes from place to place where possible
- Provide variation and interest in views (indoor/outdoor) throughout navigation areas and pathways.

7) Flexibility in Furniture Layout

- Individual workstations
- Specify adjustable and flexible furniture in classroom.
- Specify a variety of furniture to promote choice options and changes in postures for group work, free work, individual work, etc.

8) Mobile Technologies and Virtual Designed Environments

- Incorporate infrastructure for use of technology to promote mobile learning and exploration.
- Plasma screen for presentations.
- Multifunctional equipment must be provides for Print/copy/scan.
- Power sockets for recharging laptops, tabs etc.
- -Whiteboards and projection screens for presentations.
- Journal/newspaper/information leaflet racks and quick-reference books must be kept handy in classroom itself.

Building as learning aid is a tool which can promote learning, curiosity, care and concern, wonder and lifelong learning. It can help learners to practice and revisit concepts. It also helps learning to take place everywhere - in the classroom, the corridor, the outdoors, etc. School of architecture, itself can be designed as a learning aid for exploring various materials, tools and techniques used in architecture education.

There are two levels of these interventions:

1) Develop the spaces to create various teaching-learning situations.
2) Develop the built elements in these spaces as teaching-learning aids.

Table 2: two levels of interventions

The spaces can be:	The built-elements can be:
Classrooms	Floors/ Ceilings
Corridors	Walls
Steps and staircases	Windows/ doors
Outdoor interactive spaces	Furniture

For example, consider various components of school building. Some Walls can be of exposed brickwork with English, Flemish and mixed masonry or of earth blocks or can be of adobe construction or stone walls etc which enables student to experience the originality and texture of material at the same time can see the construction details for the same. Same with the roofing and flooring techniques and materials. Different types of trusses such as wooden, steel etc can be used in building design itself which will act as a learning aid for students of architecture. Interactive spaces can be the blend of open, semi-open, formal, informal spaces providing construction yard space in it. Fully equipped labs and workshop can help students to understand the small details of the practicality of architecture education and on-going and trending of building materials.

In this way, school of architecture can itself be a learning tool, encouraging active participation from students.

8. CONCLUSION

Active learning strategies offer a promising opportunity for faculty to explore new methods, content, and pedagogies for teaching in architecture education. The goal should be to facilitate the students to become self- learners rather than them to depend on faculty as key source of information. Active engagements of students help them to understand what they are learning. Informal learning spaces play an important role for making active learning work. In 21st century, students become makers and learners, teachers become facilitators and activators, and classrooms become learning studios and learning commons. Supporting 21st century learners realize that new pedagogies project-based learning and active student use of technology and making tools - are what enables and activates these learners. Existing classrooms inhibit "makers" from "making" and learners from collaborating. New learning environments linking the new pedagogies and space are needed to support 21st century learners.

REFERENCES

[1]Benninger, Christopher.2011.letters to a young Architect. Pune.CCBA.
[2]Salama, A., 1995: New Trends in Architecture Education: Designing the Design Studio. Raleigh: Tailored Text & Unlimited Potential Publishing.
[3]Active learning: creating excitements in the classroom.
[4]Bonewell C.C.Active learning: creating excitements in the classroom.ASHE-ERIC higher education.1991. blinger Diana. Learning Spaces.2006.
[5]Kolb, DA (1984) *Experiential Learning: Experience as the Source of Learning and Development.* New Jersey: Prentice-Hall.
[6]Laird, D (1985) *Approaches to Training and Development*. Harlow: Addison Wesley.
[7]Perry, William G. (1999). *Forms of Ethical and Intellectual Development in the College Years*. San Francisco: Jossey-Bass Publishers.
[8]Piaget, Jean (1968). *Six Psychological Studies*. Anita Tenzer (Trans.), New York: Vintage Books.
[9]Jain A.K. Future of architectural education. 2016. Architecture-Time Space and People. New Delhi. Council of architecture.