Possibilities of Integrating Constructivist Learning Theory in Architecture Design Studios: An Exploration in an Indian School of Architecture

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Abstract

In order to satisfy the changing demands of the profession, architectural education has developed pedagogical methodologies that are vital. Studio. It certainly requires rethinking its current practices and energising teaching and learning processes. One such encouraging paradigm change is constructivist learning. This paper explores the possibilities and implications of incorporating constructivist learning into architecture design

It examines this issue at a school of architecture in India, in order to gain a better understanding of the opportunities and difficulties associated with introducing constructivist learning theory into architecture design education system. It employs a survey literature and a questionnaire as a method.

It concludes that by implementing constructivist theory into architecture design studios, students can benefit from the range of reality representations it provides.

Keywords: constructivist learning, architecture education, pedagogy, architecture design studio, Indian context

Introduction

In general, architectural education is confined to teaching its core concepts and skills through a unique but quite old practice of design studios. While there are great benefits of the studio-based teaching, there are also drawbacks. There is no question that architecture design studios contribute heavily in influencing how the built environments will be developed by architects in the future. Students learn the information and acquire the abilities required to become architects in these learning environments, enabling them to make valuable contributions to the vital and always changing field of architecture. The techniques and educational strategies used in these studios have a significant influence on the level of skill and originality of architectural solutions,

the future architects will conceptualize. Indeed, future developments of constructed environments will be influenced by the architecture design studios offered in schools of architecture today. In these learning environments, students gain the knowledge and skills necessary to become architects, empowering them to significantly impact the dynamic and always evolving practice of architecture.

The degree of expertise and creativity of architectural solutions, however, is greatly influenced by the methods and teaching approaches employed in these studios. Unfortunately, many studies have indicated that in order to bridge the knowledge gap between theory and practise in architectural education that exists today, new approaches are required. For example, Gannaway & Sheppard (2010) point out that there is a growing demand for recent architecture graduates with strong problem-solving, critical thinking, and socio-cultural design skills. They do not seem to possess these traits.

In the case of India, this issue is more pronounced due to its varied cultural, historical, and environmental contexts. It is undeniable that India needs creative and context-sensitive architectural solutions, which should be provided through the architectural education system of India. In this context, there is a perception that constructivist learning theory could contribute to change the direction and enhance studio based design learning. It is often argued that architecture design studios can enable a more comprehensive and flexible approach to architectural education, in line with the requirements of modern practises specifically in the Indian context, by using constructivist learning theory. In fact, the contemporary needs and demands of the profession are in line with the fundamentals of constructivist learning theory, which makes it a worthwhile direction to investigate in the context of studios for architectural design.

Constructivist learning theory is a theoretical paradigm that contends that students actively create knowledge by their interactions and experiences with the outside world. This perspective, which differs from traditional didactic teaching methods, supports the notion that students play a crucial role in shaping their understanding of the subject matter. Constructivism has been widely adopted and studied in a range of educational contexts away from architecture, but its application in architecture design studios has not yet been thoroughly examined.

Research examining constructivist learning's integration in the architecture is scarce. Most studies to date have concentrated on its application in science, mathematics, and the humanities, among other educational fields. In this context, this research aims to explore the possibility of implementing constructivist learning theory in architecture design studios, with a focus on the Indian context. Its intention is to add to the continuing conversation on architectural pedagogy by expanding upon current theories and practises in education and by offering insights into how constructivist learning might improve the experience of students in architectural design studios.

Its objectives are as follows.
1. To ascertain the current state of architecture design pedagogy in India.
2. To ascertain the potential for incorporating constructivist learning theory in architecture design studios in India.
3. To ascertain the foundational ideas of constructivist learning theory as well as current architectural education methods.
4. To identify the challenges and opportunities associated with integrating constructivist learning theory in the Indian architecture education system
5. To propose ways to incorporate constructivist ideas into the architecture design studio.

In so doing, this paper highlights the possible advantages, difficulties, and best practises related to pedagogical techniques articulated in the literature. In the end, it seeks to enable educators and students in the design studio adopt a more dynamic and student-centered learning environment that more effectively equips aspiring architects for the many challenges of the future of India.

Theoretical Framework

According to Pandey (2020), constructivist learning theory is an educational framework that places an emphasis on students actively creating knowledge via interactions with their surroundings. Its foundation is the notion that students actively construct their worldview by drawing on their past experiences and knowledge. Indeed it is strongly related to the cognitive development theory of Jean Piaget. According to Piaget (2019), children actively create their knowledge through interactions with the social and physical environments in which they live. To emphasise the impact of assimilation—interpreting new information based on pre-existing mental structures—and accommodation—adjusting pre-existing mental structures to include new knowledge—he distinguished several stages of cognitive growth.

Simultaneously, the socio cultural theory of Lev (2017) highlights the effects of society and culture on education. He holds the view that that people learn via their encounters with more informed people and that learning is a social activity. The "zone of proximal development," as defined by Vygotsky, is the space between a learner's actual development and their prospective development with the help of a qualified person.

Constructivist learning theory has been shaped by these core theories as well as other significant contributions from educational psychologists and researchers. Learner-centeredness, active participation, real surroundings, social interaction, and the creation of meaning via introspection and personal experiences are among its fundamental ideas. Constructivist teaching and learning methods promote student participation in the classrooms while developing critical thinking, problem-solving abilities, and a deeper comprehension of the material. For these reasons, it is argued that this theory has great relevance to studio-based design teaching and learning.

According to Lawson (2006), design studios are an essential part of architectural education because they help students in a hands-on, immersive learning environment in which to hone their design knowledge and skills. Literature reveals the following essential elements of design studios in architectural education as related to design studios.

1. Studio Culture: The distinct atmosphere that design studios provide promotes cooperation, ingenuity, and candid communication. Students interact with their teachers, peer reviews, and conversations are highly valued in the studio culture, which fosters a vibrant and encouraging learning environment.

2. Emphasis on the Design Process: Students can explore and improve their design concepts over time by participating in design studios, which emphasise the iterative design process. Research, conceptualization, experimenting, and the creation of design solutions are usually steps in the process. It is urged of students to investigate a variety of design options, take into account a range of factors, and refine their designs in response to criticism and introspection.

3. Practical Learning: In design studios, students can utilise tangible models, sketches, and other tactile activities to communicate and convey their design concepts. With the help of this practical approach, students may test design concepts physically, learn about importance, and develop their spatial thinking abilities.

4. Mentorship and Guidance: Students get access to knowledgeable faculty members in design studios who act as mentors and advisors during the design process. Teachers provide pupils with individualised attention, foster critical thinking, and assist them in overcoming design obstacles. Students' progress as budding architects and the development of their design talents are supported by this mentorship connection.

5. Integration of Theory and Practice: Design studios incorporate architectural theory and principles into the design process. Students research the philosophy, history, and construction technologies of architecture and use this information in their design work. This integration fosters students' capacity to apply theoretical ideas to real-world design problems and then they get a comprehensive grasp of architecture.

Literature reveals important constructivist learning theory tenets that can play a significant role in these studio related practices. As shown in the Table 1, the most significant of these are as follows.

1. Active learning: This involves students participating in practical activities,
2. Previous knowledge: This focuses primarily on the students' prior knowledge

Table 1: Key principles of constructivist learning theory
Source: Author

Key Principles	Indicators
Active learning	Learners participate in hands-on activities
Prior knowledge	Learners bring their prior knowledge and experience to the learners process
Social Interaction	Collaborative activities, group discussions, peer-to-peer interaction
Multiple perspective	Develop a broad understanding of concepts and ideas.

According to Settles (2009), active learning involves students assuming responsibility for their education and actively participating in creating and resolving assignments with a significant level of independence. It requires that students be proactive in their architectural design work, make decisions, and are self-directed and accountable for their education. Tobias (1994) articulates prior knowledge, and says that it is also called prior experience or prior knowledge. It refers to the knowledge, abilities, and comprehension that a person holds before coming across new material or starting a task that requires learning or problem-solving. New knowledge is constructed using this existing knowledge as a basis. According to Tobias (1994), prior knowledge can be acquired from a variety of sources, such as exposure to relevant information or concepts, personal experiences, cultural background, and prior learning experiences.

Chuang (2021) provide further details on social interaction, a key component of constructivist learning theory. As a learning theory, constructivism stresses the notion that learning is an active process in which people build their knowledge of the world through experiences, relationships, and past knowledge. Oliver (2000) adds to these with the notion of multiple perspectives that states that while students interact with new materials or concepts, they should be exposed to and encouraged to take into account a variety of perspectives, interpretations, and methods.

This paper is based on the idea that knowledge is created via interactions with people, synthesising information from various sources, and personal experiences rather than being provided as being absolute or fixed. Constructivist learning theory provides that theoretical framework to facilitate them in the design studios.

Research Methodology

This research explores the potential for integrating constructivist learning theory in architectural education in India. It employs a mixed-methods research strategy to collect and analyse data using both quantitative and qualitative techniques. Research was carried out with architecture students from Jamia Millia Islamia over the course of one academic semester. After identifying the key principles, various codes from Architectural design studio have been recognized from the available literature to act as the parameters for the study and questionnaire survey (Gibbs, 2008; Saquib,2022). These codes clearly establish a relationship with the principles of constructivist learning. This relation is presented in the Table 2.

Table 2: Principles and codes: A Relationship
Source: Authors

Key principles	Codes
Active learning	Independence
	Effectiveness
	Interest
Prior knowledge	Case study
	Experience
	Remembering
Social interaction	Presentation
	Group discussion
	Peer-to-peer interaction
Multiple perspective	Interpretation
	Viewpoints
	understanding

Based on these guidelines, a research instrument by Alt (2014) was consulted in the development of a questionnaire. This was administered to the students in order to assess the viability of incorporating constructivist learning theory into the architectural design studio. This is to understand how the design studio engages students in active learning, builds on their past knowledge, fosters social connections, and presents a variety of viewpoints. The survey responses of the combined B.Arch. (day) and B.Arch. (self-finance) batches have been measured using the Likert scale, the value of questions is:

    0-3 – highly disagree
    3-6 – Disagree
    6-9 – Agree
    9-12 – highly agree

1. Sample Selection: The study sample included the architecture students of the third-year B.Arch students.
2. Data Collection-Survey tool: To assess the students' understanding of how to apply their prior knowledge to the design problem during the case study, an open-ended questionnaire has been created. The questionnaire was created with the design studio students.

Findings and the Discussion

This study examines the current state of architecture design pedagogy at the Jamia Millia Islamia University in India and its alignment with constructivist learning theory. The findings of alignment are listed in the Table 1. It addresses the key principles of constructivist learning theory, and the codes listed in the Table 2. The findings show positive connections between the constructivist learning theory and architecture design studios, as being practised.

According to the survey, some challenges and opportunities exist. The architecture education system at this university may have a history of traditional teaching methods, which could pose a challenge when shifting toward a more constructivist approach. The implementation of constructivist learning theory requires updated resources such as collaborative workspaces.
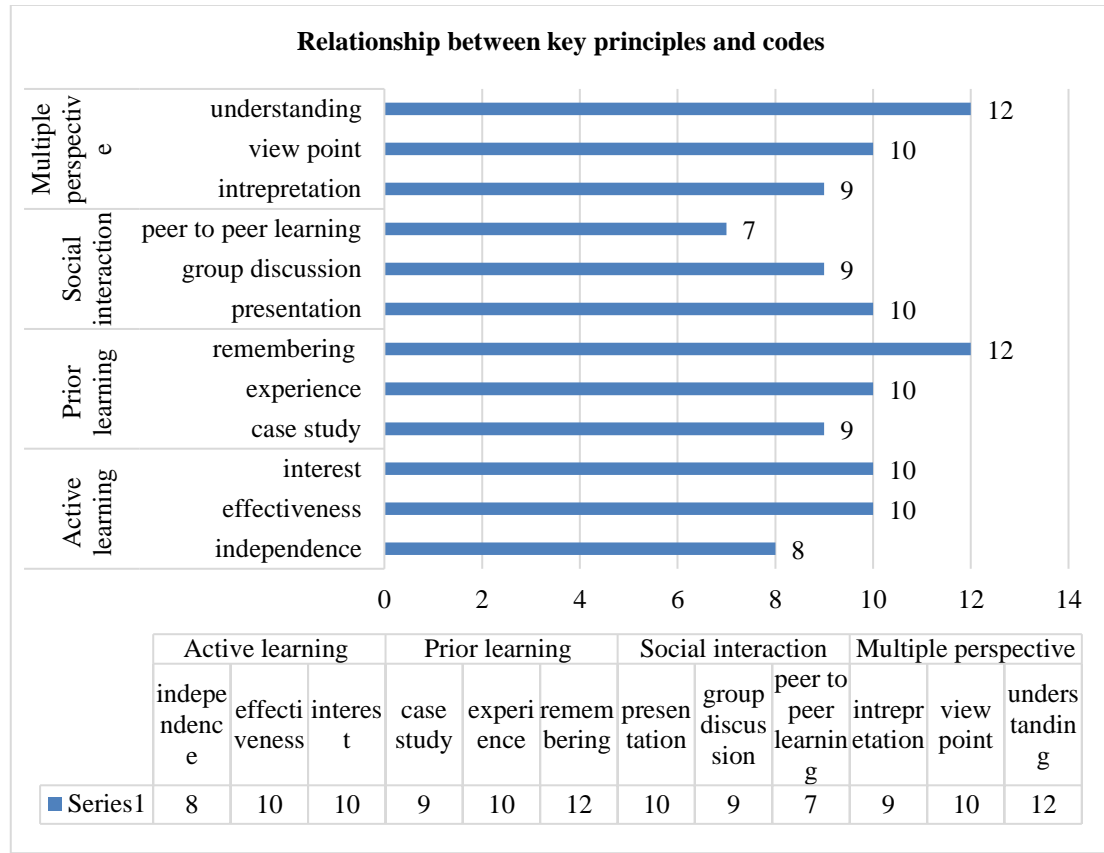
Relationship between key principles and codes

		Active learning			Prior learning			Social interaction			Multiple perspective		
		independence	effectiveness	interest	case study	experience	remembering	presentation	group discussion	peer to peer learning	intrepetation	view point	understanding
■	Series1	8	10	10	9	10	12	10	9	7	9	10	12

Fig 1: The Relationships between key principles and codes through survey
Source: Authors

Analysis of the survey also shows a high degree of relationship of codes under principles of prior learning & multiple perspectives. Among all the codes, remembering and understanding are the higher scoring codes whereas peer to peer learning have received a low scoring code. Analysis of the responses also indicates, a successful integration of constructivist learning theory into the education practices at the Jamia Millia Islamia University in India which may require a strategic, collaborative effort involving educators, administrators, and policymakers. Overcoming challenges and embracing opportunities can contribute to a more dynamic and effective architecture education system at this university.

Conclusion

This paper concludes that students' critical and creative thinking abilities can be greatly improved in architecture design studios by implementing constructivist learning theory. Findings show that it can encourage an interactive, cooperative learning atmosphere where students actively participate in the creative process, produce knowledge, and evaluate what they have learned. Constructivist learning stimulates students to investigate various viewpoints and design methodologies while also fostering the development of problem-solving skills by allowing them to actively engage in the design process. Students can gain from the various representations of reality that constructivism offers by incorporating constructivist learning theory into architecture design studios.

They consist of using physical models, virtual reality simulations, and technological tools and software. Standardised assessment procedures and theoretical knowledge may be prioritised. The curriculum may include collaborative projects and collaboration, but the focus may vary and

teachers may emphasise the value of students actively participating in the learning process and applying their knowledge in real-world situations.

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