

Co-relation of Pedagogical Strategies in Hindu Temple Architecture and Contemporary Architecture Education

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ABSTRACT: *The Temple provides a deep insight into the artistic, educational and social aspects of the religion. With the advancement in technology and means of communication, methods of teaching philosophy, skills, design and art forms have undergone radical changes. Presently the new emerging trend is of Design Build Studio which is being followed by architectural firms as well as architecture institutes as a pedagogical method and is claimed to be the western trend in Architectural domain. This study examines the pedagogical methods of transmission of knowledge in medieval temple architecture. Efforts have been put in place for identifying the pedagogical strategies in Hindu Temple Architecture. This research explores some of the connections between medieval pedagogical methods manifested in temple construction which may prove to be the basic concept of Design Build Studio and the*

contemporary pedagogical methods of architecture education. From the analysis, the existence of carved plans, scriptures and creative diversity of carving styles shows that, the study area is a typical depiction of a place for teaching-learning process of Philosophy, Skills and Design. The paper makes room for contemporary pedagogical strategies to be considered as having relevance with medieval pedagogical strategies. In larger perspective this research suggests to develop the pedagogical strategies beneficial for architecture education system here after, which can be referred for using in upcoming teaching learning processes. This helps to nurture the sense of Cultural Heritage in contemporary education system.

Keywords: Temple Architecture, Pedagogy, Design Build Studio, Medieval Architecture Education, Architectural Drawings.

Introduction:

“The history of Architecture is deeply intertwined with the History of its Educational Methods.”¹ The Architecture of a region during particular period is a result of Architecture education of that region which is depended on Architects of that region during the same period and vice versa. It is actually interdependent continuously moving cyclic process. Each component of this process has its influence on other two components for example the architecture institutes produce architects and these architects create the architectural masterpieces which ultimately becomes the architectural history of that particular region (Refer Figure 1).

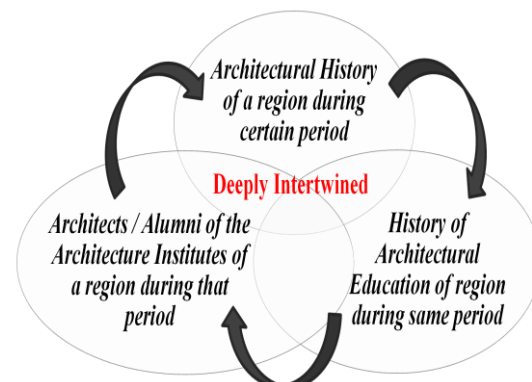


Figure 1: Co-relation of Architectural History, Architecture Education and Architecture Institutes (Source: Author)

¹ Tschumi B., 1995, Article “One, Two, Three, Jump”, from, Martin Pearce and Maggie Toy, Educating Architects Academy Editions: Great Britain.

This research paper identifies the pedagogical methods of transmission of philosophy, skills and design in medieval temple architecture and explores some of the connections between medieval pedagogical methods which may prove to be the basic concept of Design Build Studio and the contemporary pedagogical methods of architecture education. In present scenario pedagogical approach gives us the best opportunity to teach philosophy, skills and design in a design studio.

Architecture education can be categorized in three parts; Philosophy, Skills and Design. Vitruvius in his book *“What Architecture Means: Connecting Ideas and Design”*, Chapter 4: *The Architect*, mentions about various subjects an architect must study. These subjects can be grouped under Philosophy, Skills and Design. Design Build Studio is an emerging trend in architectural domain which is adopted by western architectural firms and architecture institutes. This is a concept of a project being handled by the architects right from the concept making and designing till the final execution and giving possession of the finished site to the client. The architect is involved in each and every activity and work progress of that project his job does not end by mere designing of the project.

This paper also claims that Design Build Studio is not a new term but it has its roots in Hindu Temple Architecture. In architecture institutes Design Build Studio is selection of a live site for a live project, involving students in its complete design process right from site analysis and zoning to final 3D views. Then the students are supposed to be involved in the execution of project on site right from providing working drawings to taking decisions for on-site modification till handing over site to the client. Then the students return to their college and they have complete knowledge about all the stages of designing and execution of a project, i.e. they have theoretical as well as practical knowledge gained through experiential learning process.

Background:

Temple and Temple Architecture

“The temple is the most characteristic artistic expression of Hinduism, providing a focus for both the social and spiritual life of the community it serves. It reflects the culture and ideals of the patrons and the devotees as a link between man and

the Supreme Being.”² (George Michell). In the Hindu Temple, the potentially divine becomes visibly manifest and therefore approachable by man. (Michell,1988). Apart from the act of communication with the Supreme Being, Temples were always the centre of intellectual and artistic expression of the community. Many schools and colleges were incorporated as a part of the Temple Complex. Temples were the direct manifestation of a need to provide an appropriate shelter to a divine force in the form of the Deity that would otherwise remain invisible (Michale Meister, 1988). The main purpose of the early building art in the Indian sub-continent was the representation of the existing religious perception of the people in a tangible form. It is not easy to distinguish these temples otherwise due to limited information has survived about the Hindu temple and their builders which are mostly inscribed on the stone slabs and metal plates and on manuscripts written on the plant leaves. The information which survived explains that the temple building, especially in stone and brick was carried out as a result of royal patronage. Building of temple in stone was an expensive affair and expresses the physical power and economic resources of the ruler. Other than royal patrons, association of wealthy merchants and group of individuals played an important role in the construction of temples³(Shweta Vardia, 2008).

Temples of Medieval Period

Medieval India refers to the Post Classical Era i.e. 8th to 18th Century in the Indian Subcontinent. It is divided into two periods:

- “The Early Medieval Period” which lasts from 8th to 13th century
- “The Late Medieval Period” which lasted from 13th to 18th century

The distinct architectural styles of temple architecture of the North India and the South India was the result of broad geographical, climatic, ethnic, racial, historical and linguistic differences. The three major styles of Hindu Temple Architecture are:

- Nagara or the Indo Aryan or the Northern Style
- Dravida or the Southern Style
- Vesara or the mixed style of Temple Architecture

² Michell, George. 1988. *“The Hindu Temple: An Introduction to Its Meanings and Forms.”* USA: The University of Chicago Press

³ Building Science of Indian Temple Architecture by Shweta Vardia Portugal I 2008

Temples of Ashapuri and Shiva Temple of Bhojpur are visited and studied to find out the evidences which can be interpreted as the methods of transmission of knowledge in Hindu Temple Architecture of Early Medieval Period.

Ancient Education System

Education occurs through any experience that has a formative effect on the way one thinks, feels, or acts. In its narrow, technical sense, education is the formal process by which society deliberately transmits its accumulated knowledge, skills, customs and values from one generation to another. Vedic education included: proper pronunciation and recitation of the Veda, the rules of sacrifice, grammar, understanding the secrets of nature, and reasoning including logic, the sciences, and the skills necessary for an occupation. The teaching methods used reasoning and questioning. The teacher imparted knowledge of Philosophy, Literature, Skills, Warfare, Statecraft, Medicine, Astrology and History. The first millennium and the few centuries preceding it saw the flourishing of higher education at Nalanda, Takshila, Ujjain, & Vikramshila Universities. Art, Architecture, Painting, Logic, Grammar, Philosophy, Astronomy, Literature, Buddhism, Hinduism, Arthashastra (Economics and Politics), Law and Medicine, etc. were taught at ancient universities.

Architecture Education of Medieval Period

The Temple Architecture of whole country (India) was under the certain fundamental principles which controlled and guided the art and architecture of building in all its phases in spite of distinctions in architectural styles.⁴ The co-ordination of architectural practice was brought about mainly by means of two indigenous institutions, both of which played a considerable part in the aesthetic development of the country; these were the *Seni*, or guilds and the *Silpas*, or canons of art. Guilds in India were a very ancient organization, known to have been in existence as early as seventh century B.C., and therefore the oldest of their kind. What guilds did for the practice, the other institution, the *Silpas* professed to do for the theory.

Models to scale were prepared before the construction. The Architects of medieval period followed the "*Shilpas*" or the rules of craft, a miscellany of religious formulas and astronomical proportions. It is therefore clear that architectural education on systematic lines was received by the

architects of India during Medieval times.⁵ The subjects such as principles of design, plain and solid geometry levelling, building materials, practical and theoretical construction, painting, modelling and sculpture were definitely taught to them as can be evidenced from the numerous marvellous buildings constructed by them. The education available then was mainly directed as aesthetic considerations and it went on developing from this point of view only as the method of construction was very simple. It can therefore be well deduced that architectural education was scientifically imparted during the medieval times.

Methodological Considerations

This Historical Interpretative Research involves two major areas of research. The first part is the study and identification the methods of teaching temple construction in medieval period, including critical reviews by contemporary researchers. A literature review of Adam Hardy is important. This helped to enlist bare essential methods of teaching the construction of medieval Hindu temples. The second part of the research is relating the teaching methods of medieval period with the contemporary teaching methods and investigation of the extent to which the philosophy, skill and design have been followed by actually visiting the sites of Ashapuri and Bhojpur for collecting evidences.

Pedagogical Strategies of Hindu Temple Architecture of Early Medieval Period:

The people involved in construction of the temple were taught about the Philosophy of the patron or architect for the particular temple; carving, sculpting, etc skills and about the design of particular temple.⁶ The knowledge of various subjects like art, sculpting, light and sound, religion, social sciences, astrology, etc was required for temple construction in medieval period (Refer Figure 3). There was an association which

⁴ Brown, Percy. 1942. "*Indian Architecture: Buddhists and Hindu Period.*" Bombay: Taraporevala & Sons

⁵ Narwekar, S. J... "*Architectural Education in India.*" seminar on Architecture, edited by Achyut P. Kanvinde, 89-96.

⁶ Building Science of Indian Temple Architecture by Shweta Vardia Portugal I 2008 Supervisor(s): Dr. PAULO JOSE BRANDAO BARBOSA LOURENCO University: Universidade do Minho Advanced masters in structural analysis of monuments and historical constructions

conducted on-site training for the workers and involved them in actual construction of temple⁷

The historical information about construction of temples which is available today is mostly inscribed on Stone Slabs, Metal Plates, and Palm Leaves. One of the most important surviving records about the construction of temple is in the palm leaf manuscript which explains the details of the building operation of 13th century Sun Temple at Konark, Orissa.⁸ According to the past records and existence of families and groups who still continue the tradition of temple construction we can say that there were various aspects of temple construction. These groups functioned as guild or society. The techniques and skills of these associations were passed on verbally and practically from one generation to next generation to those in the same family or household.

The growth of an architectural tradition happens not literally like the flow of a river but through the transmission of knowledge and ideas and the movement of people. According to Hoysala inscriptions some artists travelled extensively, these are no records of wholesale migrations of entire workshops. It is known that most craftsmen were not specialists but worked in various materials.⁹

The Association functioned as follows¹⁰:

- Members of association travelled one region to another
- Worked on different projects and spread the artistic and architectural traditions

⁷ Hardy, Adam. 2015. *"Theory and Practice of Temple Architecture in Medieval India."* New Delhi: Indira Gandhi National Centre for Arts, Deve publishers and distributors.

⁸ . Michell, G. 1988. *The Hindu Temple: An Introduction to its Meaning and Forms.* Chicago and London: The University of Chicago Press.

⁹ Hardy, Adam. 1995. *"Indian Temple Architecture: Form and Transformation."* New Delhi: Abhinav Publications.

¹⁰ Building Science of Indian Temple Architecture by Shweta Vardia Portugal I 2008 Supervisor(s): Dr. PAULO JOSE BRANDAO BARBOSA LOURENCO University: Universidade do Minho Advanced masters in structural analysis of monuments and historical constructions

throughout the history of temple construction

- Association provided training to the young generation and students, not in a separate school but right on the field where the projects were being executed under the supervision of experienced heads
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- The training time lasted for almost 10 years and when they had acquired the knowledge they were sent to work on the bigger or prestigious projects
- They were taught all the theoretical instructions in the ancient manuals. They were given the knowledge of
 - Geometry
 - History
 - Measurements
 - Drawings
 - Dance
 - Music
 - Yogaⁱ

ii The Transmission of different forms of Architectural knowledge among the Patrons, Designers, Masons and Viewers in the later 12th and 13th Centuries was aided and advanced by different forms of memory in Architecture. Memory is both a form and a means of transmission that not only produces the ability to recall the past but also provides building blocks for innovation. Architectural historians like Satish Grover, Percy Brown, Adam Hardy, etc. Often discuss a practical architectural transmission that communicates designs through the use of plans and drawings whether made on paper, on palm leaves, on stones, on cloth.

Contemporary Pedagogical Strategies of Architecture Education:

The construction of temple requires knowledge of various subjects like art, science, techniques, sculpting, etc. as mentioned earlier (Refer Figure 3). These subjects can be broadly divided into three following subjects named under contemporary education system as Design, Construction and Structure. Core of today's architecture education is also nothing but the blend of Design, Construction and Structure. Hence these three subjects are considered for further research. The contemporary pedagogical strategies involve the methods or ways to materialise an architectural idea using the construction materials and construction

technologies. Teachers carefully explain and demonstrate the relationship between construction and architecture. The technological part of the education blends with the imagination of the architect which results into architectural experimentation in various forms and construction techniques which eventually produce an

architectural masterpiece. This is the demand of today's architecture education system where the blend of theory and practice is must and each and every student is able to understand the application of construction technology in his/her design and similarly the best suitable construction technology to be adopted for his/her design (Refer Figure 6).

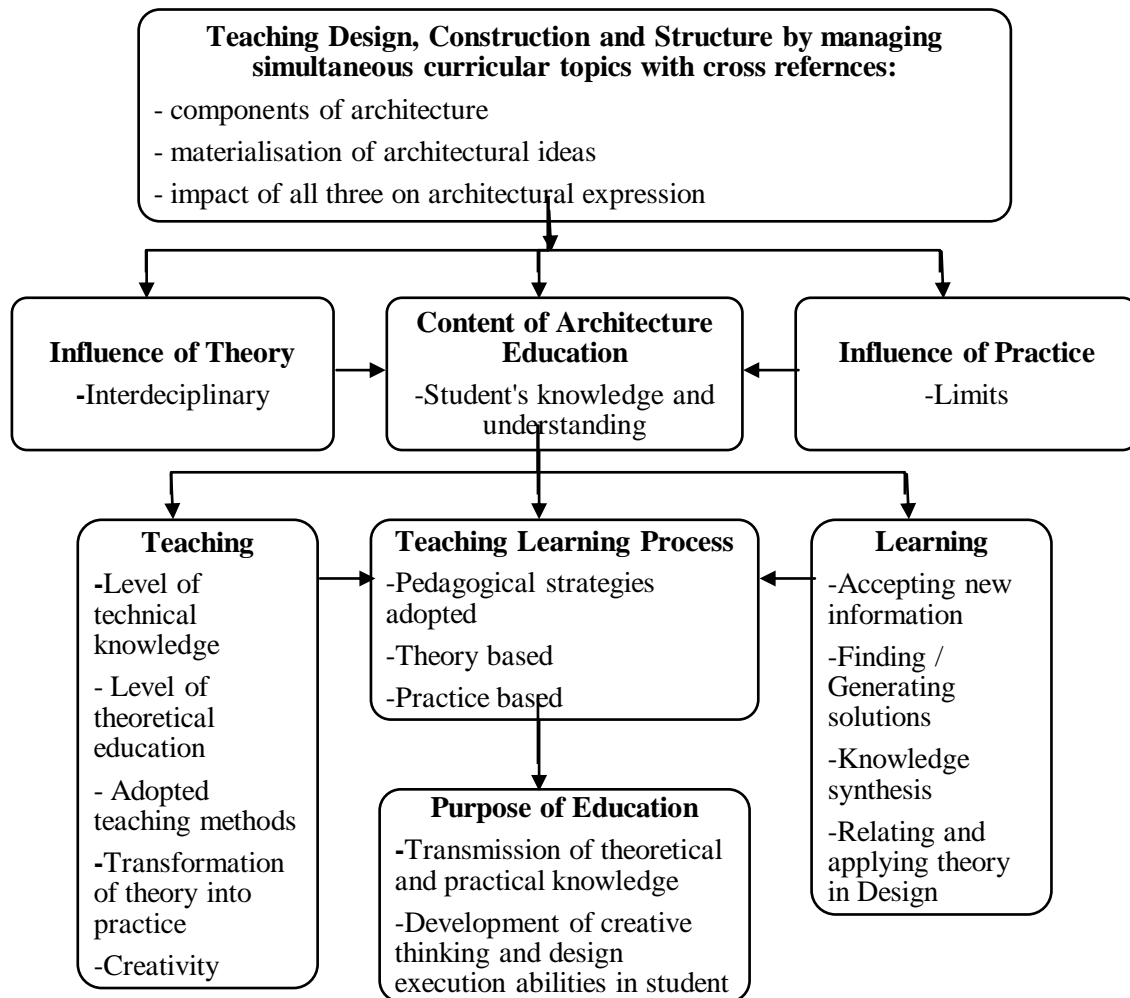


Figure 6: Contemporary Architecture Education
 (Source: Author)

Design, Construction and Structure are inevitable parts of architecture which are intertwined with each other and also act as parameters to analyse and interpret architecture. The knowledge of these three subjects include knowledge of technical

information, design principles, architectural expression, aesthetics, construction technologies, functionality of space, application of material and technology, symbols, theory and practice, etc. the knowledge is given to the students according to the level of difficulty set for the particular year of students. The theoretical subjects are taught in a specific manner (Refer Figure 7)

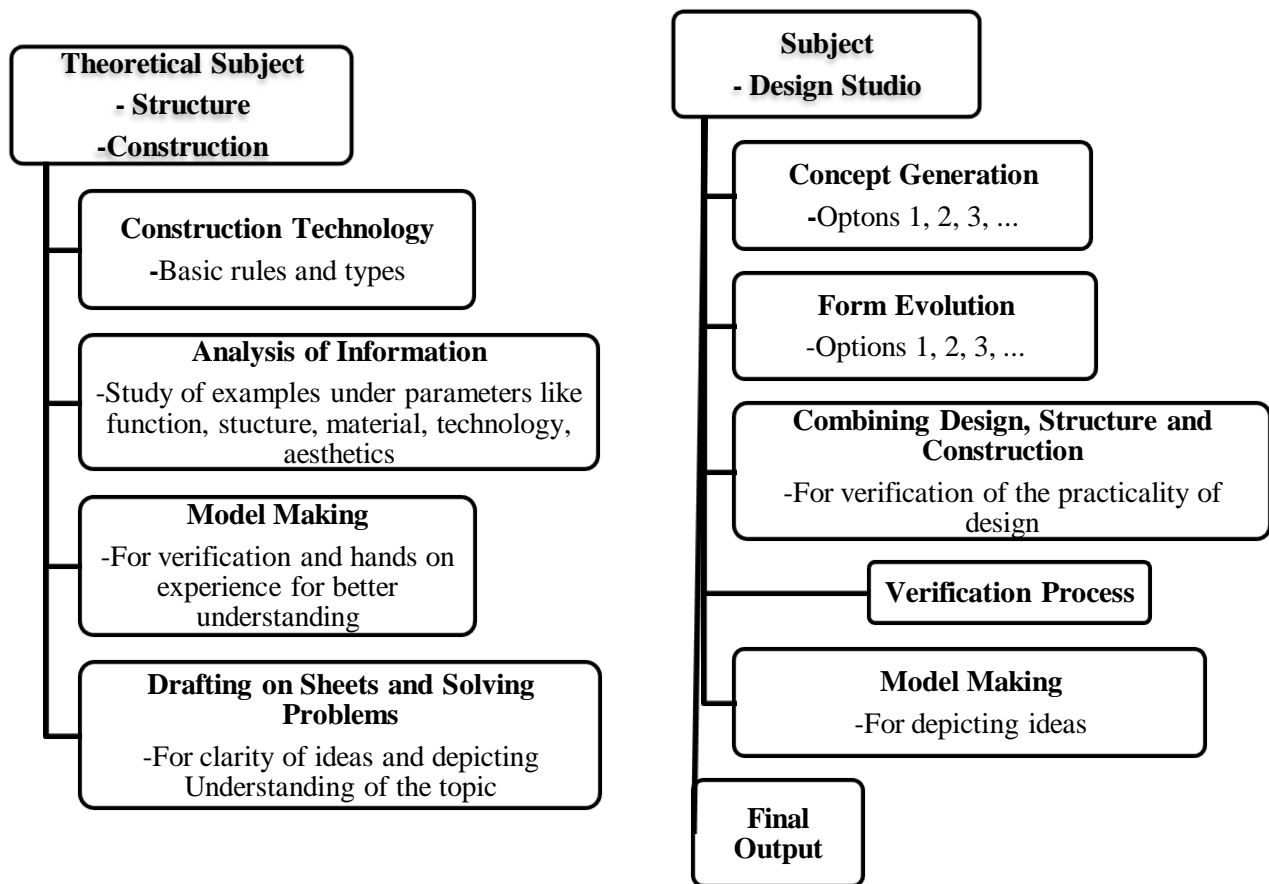


Figure 8: Pedagogical approach for teaching Design Studio (Source: Author)

Figure 7: Pedagogical approach for teaching theoretical subjects (Source: Author)

The design studio is handled in a different way than theoretical subjects. It gives equal chance to the students to express their architectural ideas through design. It encourages creativity and lateral thinking in the students. Students generate their own alternatives for design proposal with a specific concept behind that design (Refer Figure 8). Design is never just a linear process it has interdependent

The contemporary education system encourage self study and inspire creativity unlike traditional education system which was based on following the instructions of the chief and not asking the reasons behind those instructions and design decisions.

Interpretation:

Traditional pedagogical strategies of early medieval Temple Architecture are different for

and cyclic processes along with the linear steps. Repetitive verification of design by considering structure and construction happens during the design process. Such steps help to constantly trigger the creativity and problem solving capacity in the student which helps him / her in future, unlike contemporary education system where the chief architect generated a concept and design proposal and others just made the working drawings for the execution under chief architect's guidance.

three different sub-domains of architecture called Philosophy, Skills and Design (Refer Figure 9). These include verbal instructions, memorisation, referring written text, practical demonstration, drawings, etc. The experiential learning through hands-on experience helped students to understand the details of the topic and other technicalities. Contemporary Architecture education system is having relevance with the traditional Architecture education system including the methods of teaching learning, training of student architects, content and

curriculum, etc. The following diagram depicts the interpretation of pedagogical strategies adopted in

traditional architecture education system:

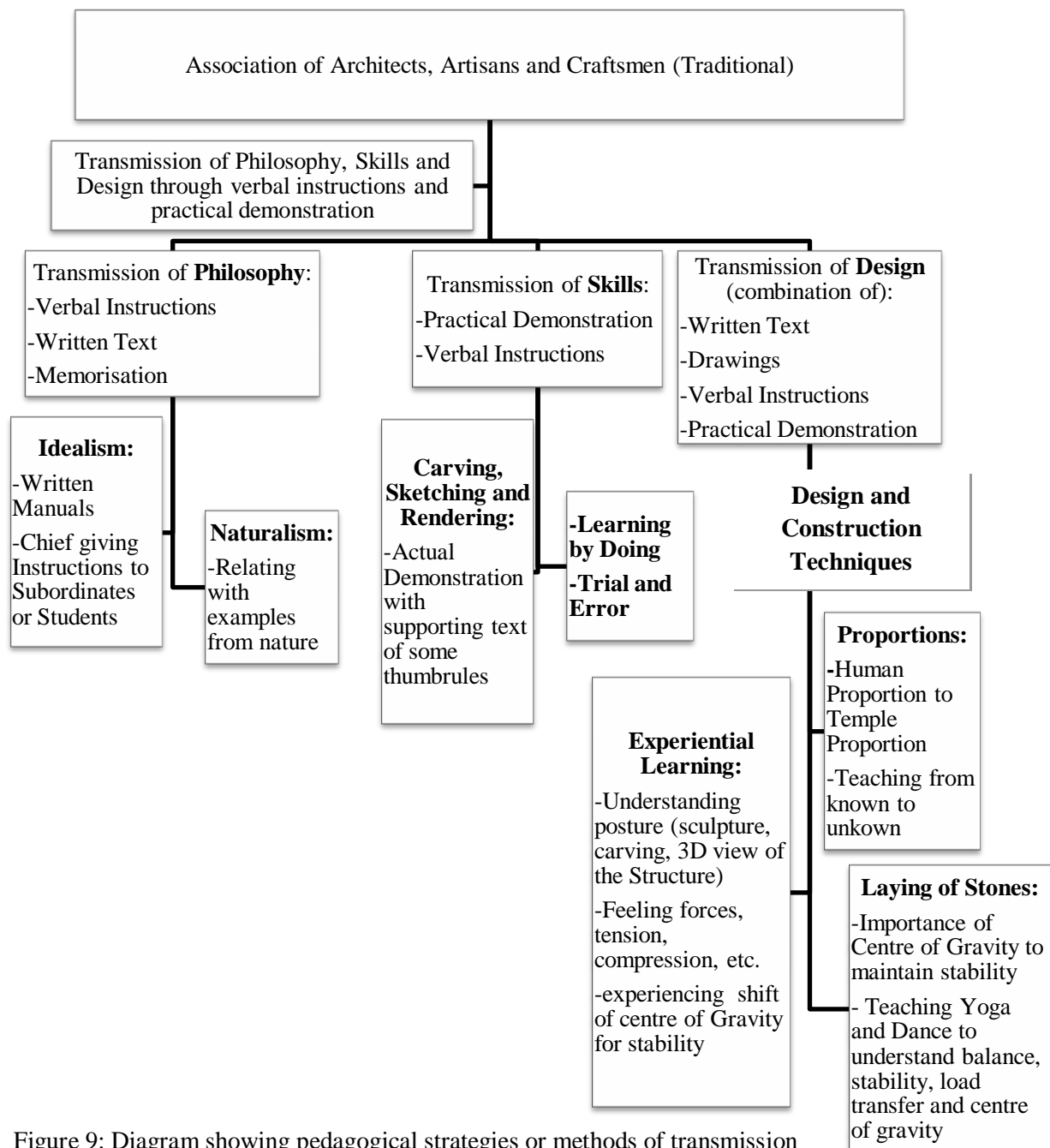


Figure 9: Diagram showing pedagogical strategies or methods of transmission for teaching philosophy, skills and design (Source: Author)

Training on site for 10 years and then moving to larger prestigious site to work and learn further to become experts (Refer Figure 5) is learning and proceeding from simple to complex which includes experimentation which resulted in different styles

of temple architecture(Traditional) and different architectural styles(Contemporary). This is nothing but proceeding from analysis to synthesis (Gained Knowledge→ Experimentation and Modification→ New Style). On-site training and hands-on

experience is a combination of Philosophy (of chief architect / patron / king, referring standards, philosophy developed by experience), Skills (of chief craftsman and artisan for stone selection, cutting, carving, laying stones) and Design (demonstration, text, drawings, prototypes / models, verbal instructions / design brief).

The teaching learning process adopted in medieval temple architecture is related to contemporary teaching learning process as follows (Refer Figure 10):

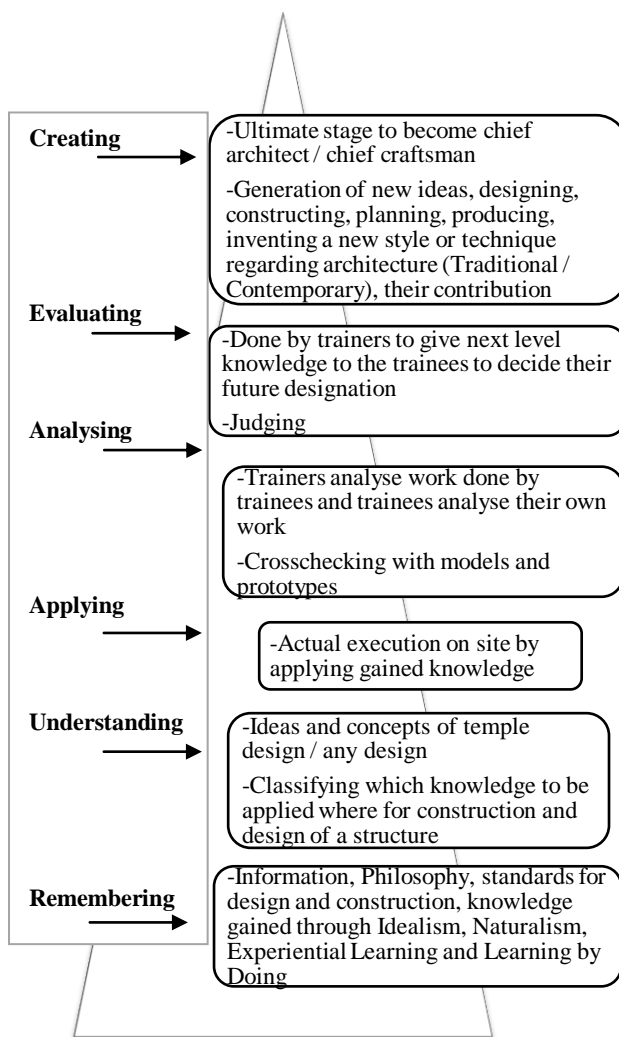


Figure 10: Co-relation of traditional pedagogical strategies with contemporary pedagogical strategies (Source: Author)

The Pedagogical strategies used in medieval temple architecture and Contemporary architecture education are; learning through concrete experience (training), reflective observation, abstract conceptualization, active experimentation (on-site). This includes initial imitation of master's skills and

techniques, later processing of information and developing skills and then finally developing a characteristic or a signature style to become the master architect and develop own Philosophy and carry on this cycle of teaching learning process. Strategies such as proceeding from known to unknown; simple to complex; concrete to abstract; particular to general, whole to part were used in medieval architecture education and is also used in contemporary architecture education.

Drawings as one of the major methods of transmission of knowledge:

Design is the core of architecture education and was transmitted using methods such as written text (instructions and basic rules), verbal instructions, Drawings (on stones and palm leaves for explaining design) and Practical demonstration (plan drafting). Drawings are very peculiar in Architecture Education. Drawings are the tool for communication between the architect and the client/patron/king. Drawings are divided into two types according to their specialized purpose. The first type is design drawing or now-a-days presentation drawing to express the architect's ideas and the second type is the drafted drawing or now-a-days working drawing to give instructions to the builder. The drawing requires the combination of four skills namely; observation, perception, imagination and discrimination. The combination of verbal instructions and visual thinking and observation helps to produce drawings conveying clear ideas of design. Drawing involves co-ordination of hand, eyes and mind; with the mental process of fine-tuning the perception and visual memories.



Evidences of drawings on stone at Ashapuri and Bhojpur temple complex:

Evidences of carved drawings on the stones at Bhojpur Temple Site (refer images below) which are protected with the fencing were carved for transmission of knowledge on site during the construction from the chief architect to the craftsmen and artisans for explaining the design and acted as a working drawing. The carved drawings acted as a common stencil for equal proportions of all elements to be repeated to avoid the variation from craftsman to craftsman. Temple construction continued for few decades depending upon the scale of temple hence to maintain the sizes and proportions of the temple throughout the construction these drawings were carved which was nothing but a way of transmission of knowledge from one generation to another. These preserved carved drawings (refer images below) are transmitting the knowledge to the recent generation and will be transmitting the knowledge to our future generations as well.



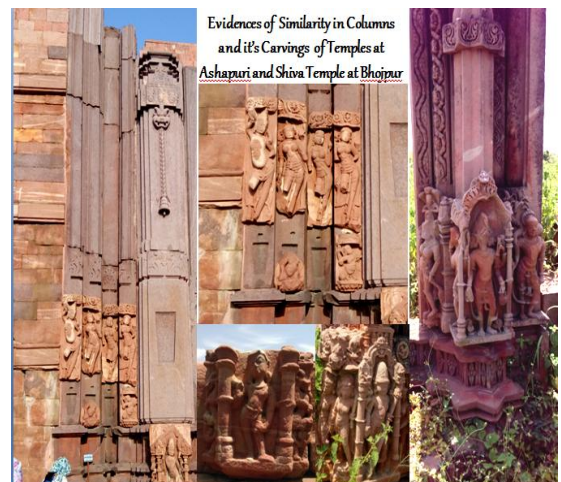
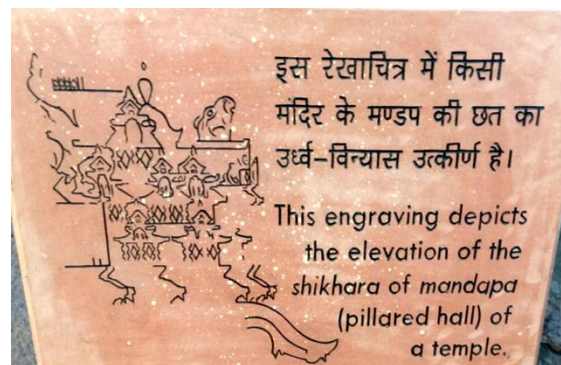
Evidences of Similarity in Plinths as well as in Joinery of Stones of Temples at Ashapuri and Shiva Temple at Bhojpur



The Bhojpur temple site is a good example of transmission of Philosophy, Skills and Design during Early Medieval Period.¹¹ It still unanswered that the drawings were carved before the construction of temple or after the construction of temple i.e. were they carved for on-site teaching purpose or for the documentation purpose, but in either case these were for the transmission of knowledge. Another type of transmission of knowledge happened in early medieval period was from one generation of artisans and craftsmen of one place or location to the same generation of

artisans and craftsmen of another place or location, this was the result of conquering of land or kingdom after the victory in the battle and taking the artisans, craftsmen, etc. with them to their kingdom. The interaction and competition between the artisans and craftsmen of two different places resulted in creativity due to modifications which was a teaching learning process for both the groups.

The drawings are still used as a method of transmission and will be used for ever in architecture education system being the most effective method for transmission of design. The design and drawings come under the psychomotor domain of teaching learning process and having similar approach in traditional and contemporary architecture education (Refer Figure 13).



¹¹ Hardy, Adam. 2015. "Theory and Practice of Temple Architecture in Medieval India." New Delhi: Indira Gandhi National Centre for Arts, Deve publishers and distributors.

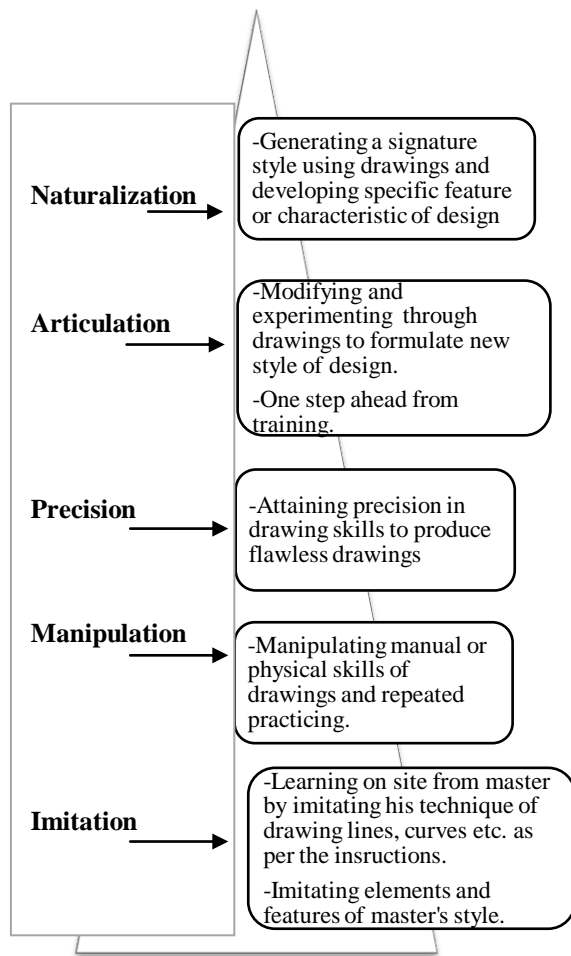


Figure 13: Co-relation of traditional Drawing as a method of transmitting design with contemporary methods of teaching drawing for design (Source: Author)

Discussion:

The pedagogical strategies identified of medieval temple architecture are nothing but the concept of Design Build Studio. The concept of Design Build Studio is not new to Indian architecture education system. It has been integral part of the Gurukul System wherein Guru and Shishya communicate with each other through demonstration. Knowledge

Endnotes:

ⁱ Among all the member of the association the most foremost person involved in the construction of temple was the chief architect. Every region in the country had their chief architect and association which are called as *sompuras* in the west, *mahapataras* in the east and *sthapatis* in the south. The north of India too had their chief architect but they do not exist anymore. The architect's work was a team work which was also bounded by the rituals performed before, during and after the construction. The construction team consisted of the four classes, *sthapati*, *sutragrahin*, *taksaka* and *vardhakin*. The team followed the instructions of the *sthapaka*, the Brahmin architect priest. Several workmen worked under these four heads in the erection of the temple (Dagens, Bruno.

transmission in Hindu Temple Architecture is a perfect example of Design Build Studio where training, learning, design, demonstration and execution was carried out at the construction site under the supervision of experts. The contemporary pedagogical strategies are having relevance with the medieval pedagogical strategies. In larger perspective this research proves to be fruitful for contribution towards contemporary pedagogical strategies in architecture education which can be referred for using these pedagogical strategies in present teaching learning processes. This helps to nurture the sense of Indianness in contemporary education system. There is a need for futuristic architecture education system which will be the blend of plus points of traditional and contemporary architecture education system. This newly proposed architecture education system should be adopted hence forth by the architecture institutes to provide the quality education to produce architects having complete knowledge of not only design but the parallel knowledge of construction, structures, services, etc. which are required to materialise the architectural ideas. This futuristic education system will contribute towards the great architectural identity of India and will shape great architectural history for the future generations as architecture education, architects and architectural history are intertwined with each other.

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ⁱⁱ Traditional literature seems to have been scattered within a diverse range of writings right from encyclopaedic works to technical manuals like *Manasara* and the *Mayamatam*. Later works like *Silpasarini* and *Silpaprakara* seemed to have been written by the artisans themselves, documenting all that was passed on through generations some of the ancient texts like the *Matsya Purana* (chapter 252-270), the *Agnipurana* (21-106, 263-272 and 317-326) discuss topics related to architecture and the *Mandala*.

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Masters Thesis Report :

Building Science of Indian Temple Architecture by Shweta Vardia **Portugal I 2008** Supervisor(s): Dr. PAULO JOSE BRANDAO BARBOSA LOURENCO University: Universidade do Minho Advanced masters in structural analysis of monuments and historical constructions.