The Need to Include Sustainable Architecture in the B. Arch Curriculum as Per the Present Scenario

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Abstract— **This article oversees the growing relevance of the sustainability agenda to the professions of the built environment, one way to ensure that its mandates are effectively integrated in architecture and urban design is that certain measures and steps needs to be taken in the field of architectural education. The main agenda of the study is to provide an insight into the problem of climate change awareness in the process of architectural education. The aim of this paper is to analyze the needs of integrating sustainable environmental design in the practice of architecture by introducing certain measures in pedagogy in architecture curriculum from the foundation of architectural education.**

Keywords— Sustainable architecture, architectural pedagogy, climate change

I. INTRODUCTION

Buildings are accounted for around half of worldwide energy consumptions, significantly contributing to global warming and the alteration of natural ecosystems.(Climate Change 2007: The Physical Science Basis). Education for sustainability in the constructed condition is the need of modern times. All development experts have a commitment to guarantee that the structures and urban spaces that spill out of the configuration process are a result of watchful and mindful practice. But this has not generally been the situation, and the main concern has been towards the academics and pedagogical authorities of the scholarly community for not giving the instruction that would enable such experts to react to contemporary sustainability challenges.

Construction industry is represented by technological developments and digital advancements to make any fantasy of a completely overhauled building conceivable, independent of limited asset accessibility, natural decay and atmospheric modification.

The dire necessity to change the current architectural practice to the exceptionally proficient and ecologically reasonable building configuration administered by:

- Failure to respond to climatic changes due to the lack of sustainability concepts.

- Schools of architecture have been moderately insufficient in building up the state of mind for sustainability.
- The existing college course educational module does not address present day needs towards atmosphere responsive structure.
- Need to overhaul the demonstrations and building directions of expert bodies.

II. SUSTAINABILITY IN ARCHITECTURE

Sustainability is a multifaceted concept that strives to meet 'the needs of the present without compromising the ability of future generations to meet their own needs' (United Nations, 1987). It comprises multidimensional views and sustainable practices ranging from the technological to socio-political, economic and cultural endeavours.

Policy makers have a great task in integrating sustainable pedagogy into the existing curriculum. Recognising the challenges, the curriculum can be reworked teaching sustainability without flattening its complexity, totalising its concepts or emptying its creative potential.

Teaching sustainability requires first of all an understanding that sustainability is not a monolithic concept but a network of ideas. Even though these ideas may seem contradictory or opposing, as in the case of technological and ecological sustainability (Orr 1992, 24–5; Van Der Ryn and Cowan 2007, 20),

A. Sustainability – A part of Architectural pedagogy

Architectural schools have been teaching climate responsive designs along with energy efficiency in buildings for many years, but the main issue is that these programs have to compete with the other core subjects. Adding to this, students need incorporated structure process as the subject courses are divided and the use of the course work isn't completely utilized. The affectability towards environment responsive plan is moving marginally from a particular module to more critical position in the compositional structure. Be that as it may, however this wisdom has not yet found a deserving place in architectural education. We need a reliable instructional method completely embedding sustainable

architecture courses in the core of architectural educational modules. The professional and educational blockades that limit the teaching of the sustainable architecture and environment responsive subjects in architectural education need to be defeated.

The syllabus needs to be revised and updated as per the current need of time and it is highly important to introduce the students from the very first year towards sustainable environmental design, so as to make them well prepared for the upcoming challenges that excessive construction activities have posed on the entire environmental balance.

Instead of considering as just an elective module of the entire course, Sustainable architecture needs to be an integral part throughout the architectural curriculum. This can be very well executed during the design studios.

This process should not be limited to just architecture students and certain measures should be ensured for the present architectural practitioners and educators to get introduced to this new vision. With organizing Training camps and virtual lessons for the whole architectural fraternity.

In order to improve the learning process in architectural schools and incorporate all the important elements related to climate change adaptation and mitigation, it is necessary to consider some case studies and learn from the contextual analysis contemplating environmental issues and thus reacts to environmental changes.

In the case of developing countries there are certain contextual limitations like the absence of assets in education and professional practice, incompetent legal system, inefficient governance and policies, slow economic and structural development which requires an all-encompassing way to deal with learning. This will help prepare the upcoming future professional for the environmental challenges and to overcome it through their acquirement of knowledge.

During the case studies done in developing countries like Serbia various studies have found that according to this approach, cognitive process in the context of climate change adaptation and mitigation should be conducted in four steps, while perceiving a city as a living organism

- Detection and investigation problems in the selected urban area;

- Assessment of vulnerable areas, based on the data obtained through survey of terrain;

- Observation of local experiences—what others do in order to adapt urban areas to climate changes (case studies, terrain analysis etc.);
- Proposals/solutions for the emerging changes (in the form of sketches, diagrams, drawings and guidelines). [5]
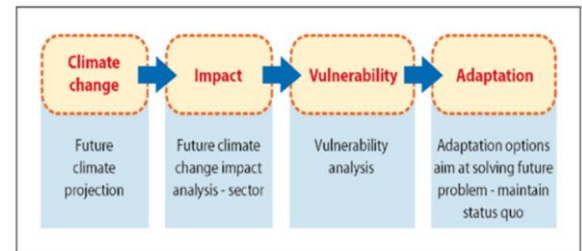

Fig.1 The framework for identifying and solving climate sensitive problems in urban structure [5]

III. BARRIERS AND OPPORTUNITIES FOR SUSTAINABLE DESIGN OF THE BUILT ENVIRONMENT

- Lack of a legislative framework that creates real drivers and demands.
- Need for clearer standards, whose application is more strictly verified.
- Lack of a long-term vision and financial incentives to promote innovation in design. Knowledge/Education.
- Insufficient training for architects, builders, consultants and policy-makers.
- Lack of multidisciplinary and knowledge transfer between professional domains.
- Cultural norms that ignore the possibilities offered by sustainability, which is still considered as complex, expensive and lying within the domain of the specialist.
- Misleading claims and conflicting information on performance
- Misconceptions on costs, prejudices and mind-sets that prioritise saving money at the time of investment rather than looking at costs of ownership.

The issue of environmental change and concept of sustainability in architectural design and urban planning has become a topic of consideration in the last few years, especially at educational and architectural pedagogical curriculum level. At the same time, the difficulties produced by environmental change have forced new goals to Architects and planners, who need to make or rebuild open air spaces and structures with the end goal to accomplish a higher strength of urban spaces to future atmospheres. This procedure of adjustment should also look into consideration such as better quality of life to incorporate in the vision of a more sustainable development.

IV. ROLE OF GOVERNING BODIES IN INDIA- COUNCIL OF ARCHITECTURE (COA)

COA is responsible for maintenance of quality education in architecture. The standards of Architectural Education being imparted in these institutions (constituent colleges/departments of universities, deemed universities, affiliated colleges/schools, IITs, NITs and autonomous

institutions) are governed by Council of Architecture (Minimum Standards of Architectural Education) Regulations, 1983.

These standards as provided in the said Regulations are required to be maintained by the institutions (COA April-2017).

Minimum Standards of Architectural Education Regulations, 1983 comprises of the following criteria:

1) Duration and stages of the course
2) Admission to the Architecture Course.
3) Intake and Migration.
4) Courses and periods of Studies.
5) Professional examination, Standards of proficiency and conditions of admissions, qualification of examiners.
6) Standards of staff, equipment, accommodation, training and other facilities for technical education.

A. *Suggested list of courses for B.Arch degree as per COA (source COA website)*

Professional Core (Pc)
1. Basic Design and Visual Arts
2. Architectural Design
3. Architectural Design Thesis
4. Architectural Graphics and Drawing
5. History of Architecture and Culture
6. Principles/ Theory of Architecture
7. Urban Design
8. Human Settlements Planning
9. Housing
10. Landscape Design
11. Site Planning
12. Carpentry and Model Making Workshop
13. Specifications, Cost Estimation and Budgeting

Building Sciences And Applied Engineering (Bs& Ae)
14. Building Materials
15. Building Construction
16. Applied Mechanics
17. Structural Design and Systems
18. Climatology
19. Building Services
20. Surveying and Leveling
21. Acoustics
22. Environmental lab
23. Environmental Science for Architecture

Professional Elective (Pe)
24. Theory of Design
25. Vernacular Architecture
26. Interior Design
27. Art Appreciation
28. Art in Architecture
29. Graphic and Product Design
30. Contemporary Processes in Architecture
31. Architectural Journalism
32. Disaster Mitigation and Management
33. Green Buildings and Rating Systems

34. Sustainable Cities and Communities
34A. Building Performance and Compliance
35. Architecture of South East Asia
36. Architectural Design with Steel
37. Architectural Design with Glass
38. Furniture Design
39. Appropriate Building Technologies
40. Earthquake Resistant Architecture
41. Architectural Conservation
42. Building Systems Integration and Management

If we take a look at the course list for B.Arch course as suggested by the COA, subject of sustainable cities and communities is listed but it is covered under Electives which a college/Institution or the faculty has to decide if that is to be taught to the students or not.

Though the subject such as climatology and environmental science for architecture are listed in compulsory Professional core subjects list, there is an urgent need to add subjects such as Sustainable Architecture/Sustainable development in the compulsory Professional core list of B.Arch curriculum so that the future architects can be well equipped with the knowledge and solutions to the climatic and environmental challenges.

These subjects should be prioritized and synchronized with other core subjects such as design, building construction so as the budding architects can help in making the environment sustainable with their profession.

V. CONCLUSION

This study reported a review of existing studies related to role of sustainable architecture in architectural pedagogy. Architecture as a profession should be at the forefront of this war against climate change, as the profession is accountable for the built environment and the energy use in buildings all over the world is one of the biggest contributors to the green house gases. The need to feel a certain level of comfort and ownership of a space has given birth to the issue of sustainability in terms of architecture and the construction of buildings.

The study concludes that architectural education needs to teach basic energy conservation and sustainably concepts for designing energy efficient and eco sensitive buildings specially in the B.Arch course as it is the foundation for any architectural education. As education lies at the core of our professions, it is hoped that learning how to properly design buildings will permeate to the real world of practice. By utilizing new opportunities offered through digital applications such as simulation, animation, and visualization technology, the educational material can become more effective.

ACKNOWLEDGMENT

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