

CASE STUDY INFORMAL BUILT ENVIRONMENT AND INCLUSIVE URBAN COMMUNITIES IN ARCHITECTURAL CURRICULA IN INDIA

Nagaraju Kaja – 2019



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ABSTRACT

The image of a city is captured largely by its very own informal settlements and neighbourhoods and also, to an extent, the historically significant monuments, practices and culture. The paper discusses the impact of the existing architectural curricula on its urban communities and the pedagogy adopted in the architectural education system. Urban communities in India are largely occupied by informal built environments like informal markets, settlements, etc. The research focuses on establishing a relationship (if any exists) between the architectural curricula in various institutes across India and informal housing settlements. ♦

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PART 1 INTRODUCTION

Rapid urbanization is expected to lead to a housing shortage of about 30 million in Indian cities by 2022, which creates appalling conditions for the urban poor living in informal settlements such as slums, squatter settlements, and unauthorized colonies. The government of India has planned to address this problem by defining “Housing for All” by 2022 as its goal. This situation creates a huge demand for architects and urban planners able to deal with the complex challenges of affordable housing, focusing on sustainable social housing and the development of inclusive urban communities. Between 2001 to 2011, the urban population in India saw a growth of 32%, increasing to 377 million from 285 million. Experts predict this growth to reach 900 million by 2050. India is already facing a housing shortage and if this comes true, it will aggravate the stress on urban infrastructure, creating an even bigger housing shortage. To further complicate the problem, the urban and rural population mix is increasing (currently 30%) and will increase further. The reasons for this growth are migration of rural population to cities for better employability, internal growth of cities, reclassification of rural areas to urban areas etc. Many organizations predict that by the middle of the 21st century, urban population will reach the 50% mark. As per the 2012 Ministry of Housing and Poverty Alleviation’s (MHUPA) report on housing shortage, about 18.78 million housing units are lacking, of which 96% are in the LIG and EWS sectors. On examining the housing shortage report by the technical group (11th year plan: 2007 – 12) the

maximum urban housing shortage was in the year 2007 in the EWS and LIG categories, with about 24.67 million housing units compared with 0.04 million housing units in the MIG and HIG sectors.

At present, in most countries, architecture students are undergoing intensive training in educational institutions to become competent and effective practicing architects (Mazumdar, Sanjoy, 1993). The ground realities are many times more different, with more complexities in societal requirements, than what is taught in classrooms. The essence of architectural education is not only to teach skills needed to practice as an architect, but should also include society’s needs from time to time. It was once predominantly believed that the skills and abilities required to practice as an architect could only be acquired by apprenticing to a master architect (Meister, Michael W, 1990)

In the context of the constant stress on urban infrastructure, and inadequate housing for the informal sector, this paper discusses the issues of architectural education around the world in general and in India in particular. It presents the evolution of architectural education, starting from the western world through to southern countries. This paper argues that a change is required in the curriculum of architecture studies, that content and pedagogy should be more inclusive to cater to the needs of society in the 21st century, and to underscore its relevance in dealing with present and future societal needs. ♦

PART 2

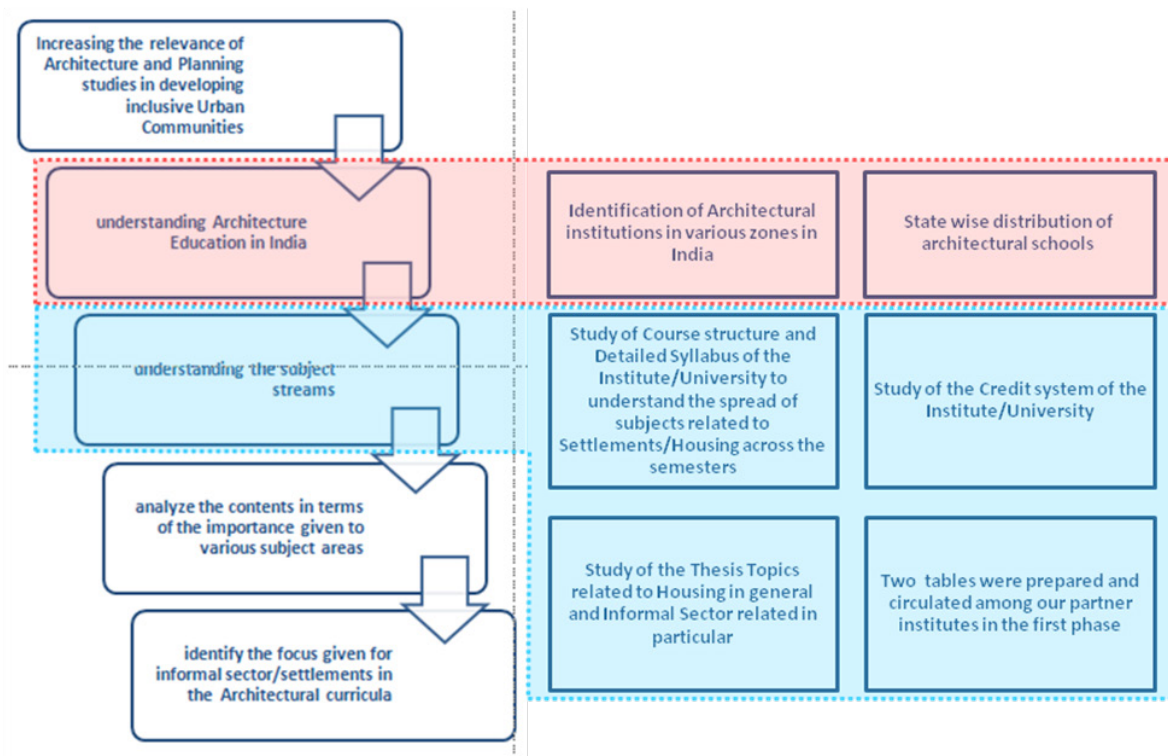
METHODOLOGY OF THE STUDY

To achieve the objective of assessing architectural education in India and to increase its relevance to developing inclusive urban communities, a study of architectural education in general and its curriculum across various public and private educational institutions was conducted. A structured survey of literature about the evaluation of architectural education and

professions around the world was carried out in the first step. In the second step, a systematic survey covering major architectural educational institutions in India was conducted to understand the syllabi and to further assess the amount of informality being taught at various levels of education. It further assesses the teaching methodologies adopted in the process. ♦

Figure 1

Methodology chart



PART 3

ARCHITECTURAL EDUCATION: ORIGIN, TRAINING AND PRACTICE

3.1 Origin of architecture as profession

The modern-day term ‘Architect’ dates back to the mid-16th century, from the French ‘architecte’ and Italian ‘architetto’, originating from the Greek *arkhitekton*, where *arkhi* means ‘chief’ and *tekon* ‘builder’. ‘Architects’ first began to develop as a distinct discipline in Italy during the Renaissance period. Until this time, the practice of architecture, as we understand it today, was not a recognized profession, and unlike the painter or sculptor, the designer of buildings did not have a clearly defined place within the trades. There was no standard training for those wishing to engage in architecture, there was no guild devoted specifically to the professional interests of architects, and the men who made the plans for churches and palaces were ranked alongside humble artisans.

The French writer Philibert Delorme was influenced by the movements in Italy and by the idea of the architect as a profession. He envisaged a self-governing profession of specialists with accepted standards of training and clearly defined responsibilities and privileges. In his “Premier tome de l’architecture”, published in 1567, he said that patrons should employ architects instead of turning to “some master mason or master carpenter as is the custom or to some painter, some notary or some other person who is supposed to be qualified but more often than not has no better judgement than the patron himself” (Designing Buildings, Wiki, 2018).

3.2 Architecture; Governing Bodies

It was realized that without establishing governing bodies, the architecture of a place cannot be logical, functional, aesthetic or have a unique identity of its

own. Hence all the nations formed their respective governing authorities for architecture starting with the formation of the Royal Institute of British Architects (RIBA) in 1834 and the American Institute of Architects (AIA) which started in the USA in 1857. In Asia, The Japan Institute of Architects was established in 1887, followed by the Union of Architects of Russia (UAR) in Russia in 1992. The list of the governing bodies and institutes and their establishment in other countries is presented in Annexure 1. With current EU regulations and various international agreements, there are now also many other ‘umbrella’ organizations that interlink architectural bodies.

3.3 Architectural Education and Schools of Architecture

Historically, architecture was seen as one of the arts, and there was no formal training. Architecture is also a social art, a practical art, an engineering art and a spatial environmental art (Mustakeem Raza Khan et al, 2017). But architecture is neither a branch of engineering nor arts, it required a special identity. There were architectural workshops in Italy in the sixteenth century, but very little was known about them and they were not recognized by academics. This set the standard and curriculum for the first school of architecture, “The École des Beaux Arts” established by the French state. The École des Beaux Arts later acted as a model for America, which sought to create its own identity and style by improving the practice of architecture through better education. This influence became particularly strong towards the end of the nineteenth century when architects were recognized as specialists in their own right, with many wanting to be not just professional practitioners but also academics in the same field.

America recognized that the success of École des Beaux Arts was based on a wellorganized curriculum, government patronage and a rational design theory. The long-established French system was backed by American architects who had been rallying at this time for their own state licensing laws. A number of architectural schools began to appear and would often seek École des Beaux Arts graduates as lecturers and teaching staff. However, not all supported this system: Louis Sullivan, who had studied at the Ecole in 1874, and Frank Lloyd Wright, who turned down Daniel Burnham's offer of four sponsored years in Paris, being the most influential detractors. They called the École des Beaux Arts' teachings artificial, superficial, and totally unsuited to American society's requirements.

Parts of Europe also adopted the academic method of training. However, Britain continued with its natural mode of education through the self-controlling mechanism of apprenticeship. "This was a modification of the medieval apprenticeship system. But where an apprentice exchanged his labour for instruction from a master, an articulated pupil paid cash to be taught. Probably something like one-half of all

entrants to the occupation were trained through apprenticeship by 1800, rising very quickly in the opening decades of the nineteenth century to displace other entry points into the occupation, such as through the building trades. Apprenticeships usually lasted five or six years, and often included attendance at a local arts academy, and perhaps foreign travel".

The first major academic institutions starting with architecture as a specialization are listed below:

- 1671 – France:
made independent by Napoléon III 1863 - The École des Beaux Arts
- 1772 – Austria:
Academy of Fine Arts, Vienna - Institute of Art and Architecture.
- 1832 – Germany:
Building Academy (Bauakademie)
- 1868 – USA:
MIT School of Architecture and Planning
- 1889 – UK:
The Architectural Association (AA) offered the first full time course in Architecture, but the first degree in architecture was offered by The Cambridge School of Architecture in 1912. ♦

PART 4

ARCHITECTURAL CURRICULUM AND PROFESSIONAL PRACTICE

The governing body for builders and masons in France, the Royal Building Administration, influenced the organization of the modern architectural office, its delegation of the tasks, business administration, drafting, planning, site inspection, and engineering. The study and practice of architecture varies in different countries and regions of the world. In most countries it is a 5-year degree program that includes a mandatory internship ranging from 16 weeks (in India) to 3 years (in USA). In other countries like Norway, Netherlands, Russia and China, internship is not mandatory and therefore is not included in their course curriculums. India and U.S.A outnumber the other countries as to the number of schools of architecture. India has about 450 schools of architecture and U.S.A. has 224, as compared to 35 in Italy, 61 in Germany and 79 in U.K. Five other countries have very few schools running courses of architecture: 3 architectural schools in Norway, 8 in Netherlands, 11 in Switzerland and Russia respectively, and 16 in China.

It is also evident from the example of the U.S.A. that there are more public institutions for architecture (70) than private ones (41). While there are various procedures involved to become an architect, the most common across all the nations is a mandatory five-year course, which could be a continuous degree or a combination of a three years degree with two years of work experience, accompanied by internships or an additional work experience (3 years in USA) or just graduating from universities recognized by the nation's established architectural governing body (as in countries like Switzerland, Norway, China and India). As to practical training, while most nations include it as a part of the curric-

ulum, USA focuses on an additional three years of internship post five years of theory and studio classes (without internship) with another mandatory 3 years of practical work experience accredited by NAAB to be registered and called architects. Similarly, U.K. has an internship duration of 2 years after the final exams of a 5-year course, with additional 12 months mandatory practical work experience which has to be recorded in PEDR (Professional Experience Development Record) to register and serve as architects in the country. In contrast to the stringent requirements imposed by these countries, certain countries like Norway and Russia have very informal and soft conditions to practice as an architect which includes a bachelor's degree in architecture without any mandatory credits for internship and practical work experience, even though they have a nationally established architectural governing body that lays down and regulates norms to become an architect in the country. On the other hand, China has set norms for the required minimum duration of practical field experience as an architect as per the duration of degree completion (3 years work experience for 5 years bachelor's course, 4 years for 4 years course duration and 5 years for junior college course).

While in some countries a bachelor's degree in architecture is compulsory to become an architect, in a few countries like U.K. and India, graduates with degrees other than architecture (BSc/BA, Diploma/Masters for U.K. and Civil Engineering for India) can practice as architects if they fulfill the additional requirement of a minimum period of work experience in a practical field. The study on the comparison of the pedagogy and execution of architecture in 10 countries include inferences such as (a) the duration of the courses of

architecture offered by different institutes or schools in various countries have a specified range of 3 to 5 years with additional requirements of internship (ranging from 16 weeks to 3 years) and/or professional work experience (ranging from 12 months to 3 years), accredited by certain architectural governing bodies

established in the nations, and (b) degree holders other than a bachelor's degree in architecture can also practice as architects professionally if they hold the desired degree/diploma of another course (differs according to the countries) plus a minimum duration of professional work experience (with certain rules and guidelines). ♦

PART 5

ROOTS OF ARCHITECTURAL EDUCATION IN INDIA

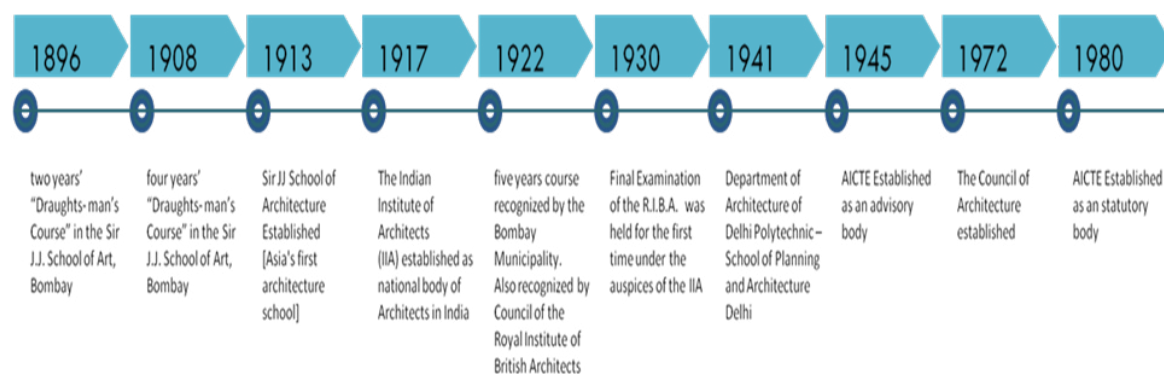
Although Indian architecture is rich and diverse in character, formal architectural education in India before independence was very limited. A shift in perception can be observed in architectural education, from times when there was no clear distinction between architectural and engineering work until relatively recently (S. H. Parelkar, 1959). Narwekar (1959) categorizes architectural education in India in three parts, viz (i) Ancient Architectural Education, (ii) Medieval Architectural Education and (iii) Modern Architectural Education. Through stories, parables, info discussions and intimate dialogues, the Upanishads were the basic means of imparting architectural education in ancient times. The evidence of constructed buildings and monuments implies a thorough understanding of the principles of design, and Narwekar states that architectural education was scientifically imparted during the medieval times. Indian artisans and temple sculptors laid the foundations for the greatest architectural masterpieces in the country. The vernacular architecture of each region made Indian architecture an expression of regional and local climate, culture and traditional identities. In preindependent India, the building design and construction activities in cities and towns were based on the European architectural style. Consequently there was a great demand for tracers and draughts-

men as support services. During this time, the British neglected the already existing body of knowledge and imposed its own structure and philosophy. However, people like Lockwood Kipling (1865), James Ferguson (1887) and Swinton Jacob (1890) tried to highlight Indian architecture to some extent (Vridhhi Prasad, 2016). Many western master architects like Le Corbusier, Louis I Khan, Edward Lutyens paved a way for modern Indian architecture, whereas greats like Charles Correa, B. V. Doshi and Raj Rewal etc. influenced Indian architecture immensely in later periods.

In 1896, the Government of Bombay took the lead and started a twoyears “Draughts-man’s Course” in the Sir J.J. School of Art, Bombay, with greater emphasis on arts and construction. This hailed the beginning of modern architectural education in India. The chronology of architectural education in India is shown in Fig 2. The nascent stage lasted until 1908, when it was extended to a four-year course and then to a full five-year course, marking the beginning of a new era in architectural education in India. This was followed by many profound and cardinal changes in terms of quality of curriculum, professional practice and defining minimum standards for the architectural educational system. (Narwekar, 1959).

Figure 2

Chronology of Architectural Education in India



5.1 Architecture as a Profession in India

Architecture as a profession has been practiced in India for centuries, with master architects or craftsmen passing their wisdom on from one generation to another. Architecture as a profession, when compared with other professions, is relatively new and requires a different pedagogical approach. The modern education system in India was established by the British, and architecture is no exception. The issue is the missing cultural identity of the country. Western inclinations missing the local context have made the profession more complicated. Architectural education at present is not able to keep up with the fast pace of urban growth. u (Ar. Mahendra H et al, 2016). Primarily, architecture is a design activity achieved with the help of context, environment and technology. Today, the architectural profession is viewed as an extension to new technologies in materials and construction (Jit Kumar Gupta, 2017).

5.2 Regulatory Bodies

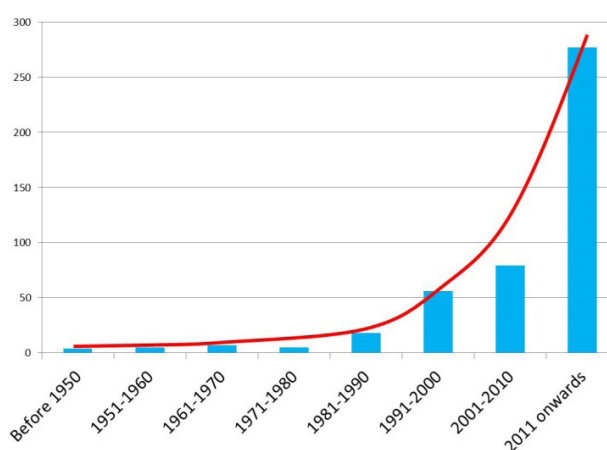
As the profession of architecture and the numbers of schools of architecture grew, a regulatory body to overlook architectural education became vital. Therefore the Government of India, under the provisions of the Architects Act, 1972, enacted by the Parliament of India, established a regulatory body 'The Council of Architecture (COA). It regulates the architectural education and the profession throughout India. (Mehta, 2006) In addition, the All India Council of Technical Education (AICTE), established in 1945 as an advisory body and given statutory status in 1987, is responsible for regulating the technical education system in India. The architecture discipline was by then predominately considered a technical discipline, which clearly caused friction between the two statutory bodies on how the discipline is perceived. The conflict was resolved through a Memorandum of Understanding between the two Councils, which defined that setting minimum curricular standards and registering architects is handled by the Council of Architecture, whereas the AICTE is responsible for financial concerns and postgraduate programs approval. (Mehta, 2006)

5.3 Status at present

Architecture education in India has undergone a positive transformation since postindependence, not only in terms of setting standards and norms for the education system in the architecture discipline, but also in terms of the increase in the number of schools of architecture across India (Fig 2). There are 464 colleges in India that are accredited to offer professional degrees in architecture in undergraduate and post graduate courses (Source: CoA website as on 22 February 2018).

Figure 3

Number of Architectural schools in India (COA, 2016)

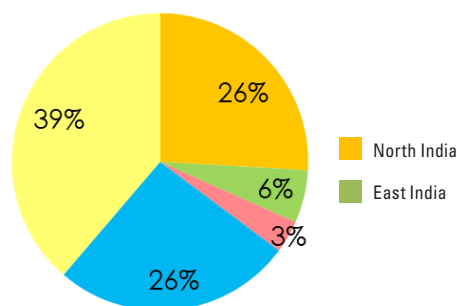


The number of architecture schools gradually grew until the late eighties, after which the growth surged significantly. Figure 3 clearly shows the steep increase from 2011 onwards, which indicates the significance of architectural education recognized by the country. It further indicates the need for academic and technological input towards architectural education and professionals in the building industry. The interesting phenomenon of the spatial distribution of architecture schools in the regions of India is also worth mentioning. Figure 4 shows the zonal percentages of the number of architectural schools across India.

It consists of four zones, which include (a) North Zone with the states/UTs Chandigarh, Delhi, Himachal Pradesh, Haryana, Jammu & Kashmir, Punjab, Rajasthan, Uttarakhand and Uttar Pradesh; (b) East Zone with the states Arunachal Pradesh, Assam, Bihar, Jharkhand, Meghalaya, Mizoram, Manipur, Nagaland, Orissa, Sikkim, West Bengal and Tripura; (c) Central Zone with the states of Chattisgarh and Madhya Pradesh; West Zone with the states of Goa, Gujarat and Maharashtra; and (d) South Zone with the states/UTs of Andhra Pradesh, Karnataka, Kerala, Pondicherry, Tamil Nadu and Telengana). A large number of schools are located in North, South and West India, out of which South India has more than one-third (39%) of the architecture schools in India.

Figure 4

Percentage of Architectural schools per region (COA, 2016)



Out of 452 schools of architecture approved by COA, all the institutes offer the undergraduate program B.Arch. (Bachelor of Architecture) and about 16 percent of the institutes offer postgraduate programs M. Arch. (Master of Architecture) (Fig.5). which indicates India's focus on higher architectural education. The specializations include sustainable architecture, architectural conservation, theory and design, landscape architecture, interior design, urban design, environmental architecture, construction management, etc.

Figure 5

Percentage of Institutes offering B. Arch and M. Arch Programs (COA, 2016)

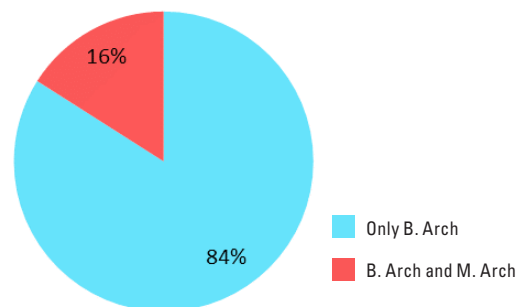
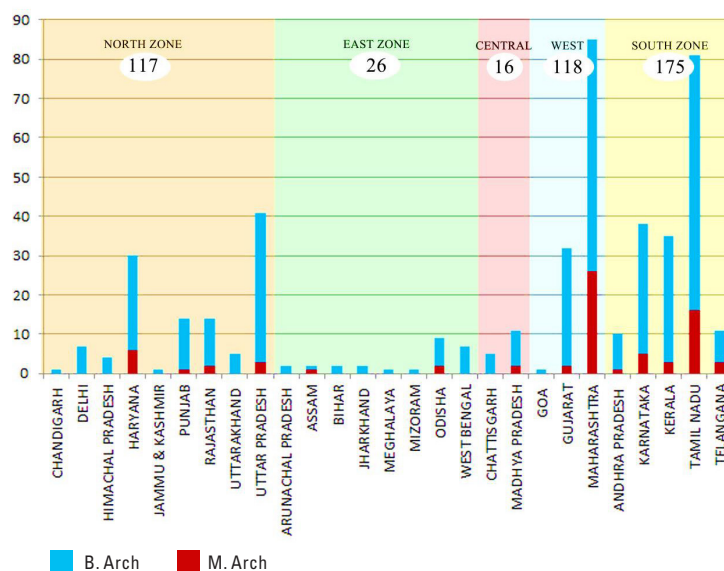


Figure 6 presents the distribution of architectural schools in India by state. The states of Maharashtra and Tamil Nadu have the highest percentage of architectural colleges in under graduation and post graduate studies. ♦

Figure 6

State/& Zonewise distribution of B. Arch& M. Arch programs in India (COA, 2016)



PART 6

ARCHITECTURE CURRICULA DEVELOPMENT

The Council of Architecture Regulations, 1983, governs the standards of architectural education taught in architectural institutions in India. These minimum standards of architectural education include the course content development and course duration along with various responsibilities. The suggested list of subjects defined by COA are primarily based on three major aspects such as a) technological, b) environmental and c) social concerns. The COA regulations give the institutions flexibility in terms of choice of courses from the suggested list, detailing the course content and introducing new courses. In order to understand the component of informality in the courses offered by various institutions, the syllabus of 25 institutions of architecture in India were closely examined and a detailed analysis of 10 institutions has been carried out. The courses offered in these institutions are divided into three broad categories based on the nature of courses viz., a) Core courses, b) Technical courses and c) Humanities courses.

Core courses include subjects such as architectural studio, architectural graphics, etc. These subjects provide an introduction to the basics of architectural science: drawing, formulation & conceptualization and structural component design. The drawing and model workshops predimension physical and actual modeling.

Technical courses include subjects which impart technical knowledge such as communication skills, software-based skills etc. Structures, climatology, working drawings, energy-efficient building-systems etc. are categorized as technical subjects. Technicality may involve the use of scientific working principles behind concepts related to the above subjects. It also

involves precisely assessing the underlying principles that govern the ideas/theories.

Humanities courses include subjects related to art and architecture, history of architecture, theory of urban settlements, town planning etc. and deal with civic society and how it has influenced architecture over time. It gives an overview of how lifestyle and culture and various other factors have played a role in the planning of settlements. Since these subjects delve into human constructs and concerns, they fall under the category of 'humanities'.

6.1 Survey of Existing Curricula

This survey was undertaken in 5 steps, to understand the pedagogy of architectural education taking place across the country, and to establish a connection, if any, to the existing scenario of informal housing in Indian Cities. Out of the 452 recognised institutions imparting architectural education, 25 colleges were selected for the study, as per the zonewise distribution across the country. The South zone, having the highest number, was selected to represent 30% of the study, whereas the North, West and East zones each formed 20% of the study. Central zone colleges represented the remaining 10 percent. Half of the selected colleges are centrally funded, whereas the other half either state or privately funded. The aim was to establish if the type of funding affects educational pedagogy or not. The selected colleges were evaluated according to the following parameters: relative ratio of humanities subjects to core and technical subjects, duration of study on informal settlements (studio and/or lecture), and weightage (credits) of studies within the entire syllabus related to informal settlements. The evaluation was conducted after sourcing the latest syllabus and course patterns as obtained from the respective colleges.

6.2 Selected colleges for survey

Architectural colleges selected for the purpose of the survey are BIT Mesra, IIST Shibpur, IIT Kharagpur, NIT Calicut, IIT Roorkee, SPA Bhopal, JNAFAU Hyderabad, MANIT Bhopal, MANIPAL University, Goa College of Arch., VNIT Nagpur, GCAP Guwahati, SPA Vijayawada, DCRUST Murthal, CEPT Ahmedabad, Sir JJ College of Arch., Mumbai, NIT Trichy, Jadavpur University Kolkata, GCA Lucknow, MNIT Jaipur, PMCA Cuttack, NIT Patna, DIT Dehradun, DY Patil College of Arch. Pune, RV College of Arch., Bangalore. The scenario onpaper, obtained by studying the syllabi, was verified by 100 student surveys and interviews, (4 from each selected institution). Earlier batches of students claimed to have included informal settlement topics informally when not provided for in the syllabus. Recent batches of students followed the updated syllabi, which had provisions for informal settlement topics in both studio and lecture classes, keeping up with the evolving need to address this issue. Following this, a survey and interviews were conducted with experts from both academic and professional practice. These reputable individuals either had more than 25 years of experience and belonged to one of the study institutions, or were in the industry and were visiting faculty in one of the 452 recognised architectural institutions. This step was to identify the practical gaps in effective education about informal settlements, and to bring to light some innovative, inclusive ideas and practices which would lead to better collaboration between academics (ideal scenario) and the professional world (realtime, practical scenario).

6.3 Evaluation of Syllabus as per streams

After breaking the course subjects down into technical, core and humanities, each of the subjects were categorized as Architecture, Engineering, Planning, Mathematics, Sociology/Economics, Environment, Computer Applications, Communication/Art Skills. The relative percentage of subjects under each category highlights the essence of preparation for each of the institutions' syllabi.

Core subjects such as architecture have the least weightage in SPA Bhopal, and the most in JJ College of Architecture; planning has the least weightage in SPAV, CEPT, JJ and PMCA and the most in VNIT Nagpur and SPA Bhopal; communication/ art skills have the least weightage in JJ College and the most in DIT and CEPT. JJ therefore has the highest quantity of core subjects as shown in Fig 7.

Technical subjects such as engineering have the least weightage in MNIT Jaipur and GCA Lucknow and the highest in JNAFAU and SPAV; mathematics has the least weightage in JNAFAU, MANIT and Manipal and the highest weightage in IIT KGP and DCRUST; computers has highest weightage in NIT Patna and Calicut, and the least in Goa College, IIT Roorkee, DY Patil and Sir JJ. As evident in Fig 7, SPAV and JNAFAU have the highest weightage of technical subjects.

Humanities subjects such as sociology/ economics are highest in Sir JJ and lowest in NIT Calicut, Patna and PMCA; environment has the highest weightage in DIT Dehradun and the lowest in Roorkee, MANIT, CEPT and DY Patil. Sir JJ, MNIT Jaipur and DIT Dehradun thus have a greater variety of humanities subjects, as presented in the table on the next page:

INFORMAL BUILT ENVIRONMENT AND INCLUSIVE URBAN COMMUNITIES IN
ARCHITECTURAL CURRICULA IN INDIA

PART 6 – ARCHITECTURE CURRICULA DEVELOPMENT

Table 1

Percentage distribution of subjects in curricula of various universities/Institutes

INSTITUTE COLLEGE	ARCHI- TECTURE		ENGINEERING		PLANNING		MATHE- MATICS		SOCIOLOGY/ ECONOMICS		ENVIRON- MENT		COMPUTER APPLI- CATIONS		COMMUNI- C.ATION/ ART SKILLS		TOTAL
	Score	%	Score	%	Score	%	Score	%	Score	%	Score	%	Score	%	Score	%	
BIT, Mesra	33	49.2	18	26.8	4	6.0	2	2.98	1	1.4	1	1.4	2	2.98	6	8.9	67
IEST, Shibpur	52	64.2	10	12.35	4	4.94	4	4.94	2	2.47	1	1.23	5	6.17	3	3.7	81
IIT, Kharagpur	18	26.87	25	37.31	3	4.48	4	5.97	5	7.46	2	2.99	3	4.48	7	10.45	67
NIT, Calicut	18	41.86	15	34.88	2	4.65	2	4.65	0	0.00	1	2.33	3	6.98	2	4.65	43
IIT, Roorkee	14	42.4	11	33.3	1	3.03	1	3.03	2	6.06	0	0.00	0	0.00	4	12.1	33
SPA, Bhopal	18	29.03	22	35.48	5	8.06	1	1.61	2	3.23	2	3.23	7	11.29	5	8.06	62
SPA, Vijayawada	26	59.09	18	40.91	0	0.00	1	2.27	2	4.55	3	6.82	9	20.45	1	2.27	60
JNAFAU, Hyderabad	18	33.33	23	42.59	4	7.41	0	0.00	1	1.85	3	5.56	2	3.70	3	5.56	54
MANIT Bhopal	37	59.67	15	24.19	1	1.61	0	0.00	4	6.45	0	0.00	1	1.61	4	6.45	62
Manipal University	40	65.57	12	19.67	1	1.63	0	0.00	2	3.27	1	1.63	0	0.00	5	8.19	61
Goa college of Arch, Panaji	41	69.49	5	8.47	2	3.39	1	1.7	1	1.7	2	3.39	0	0.00	7	11.86	59
VNIT, Nagpur	25.4	39.94	17.4	27.36	5.6	8.81	0	0.00	2.4	3.77	2.2	3.46	2.8	4.40	7	11.01	63
GCAP, Guwahati	37	57.81	12	18.75	2	3.125	1	1.56	2	3.125	1	1.56	3	4.69	6	9.38	64
DCRUST, Sonipat	19.2	44.86	12	28.04	1.6	3.74	2.4	5.61	1.2	2.80	1.2	2.80	1.2	3.74	3.6	8.41	43
CEPT	32	61.54	7	13.46	0	0.00	2	3.85	3	5.77	0	0.00	1	1.92	7	13.46	52
JJ College of Arch, Mumbai	55	74.32	6	8.10	0	0.00	0	0.00	9	12.16	4	5.40	0	0.00	0	0.00	74
NIT, Trichy	39	66.1	11	18.64	1	1.69	0	0.00	2	3.38	1	1.69	2	3.38	3	5.08	59
Jadavpur, Kolkata	45	63.38	15	21.13	1	1.41	3	4.22	2	2.82	1	1.41	1	1.41	3	4.22	71
GCA, Lucknow	60	70.5	6	7.05	1	1.17	1	1.17	5	5.88	1	1.17	3	3.52	8	9.41	85
MNIT, Jaipur	45	62.5	5	6.94	4	4.7	1	1.38	0	0.00	1	1.38	3	4.16	8	11.11	72
PMCA, Cuttack	46	71.8	12	18.75	0	0.00	1	1.56	0	0.00	2	3.12	1	1.56	2	3.1	64
NIT, Patna	36	56.25	15	23.43	1	1.56	1	1.56	3	4.68	1	1.56	4	6.25	3	4.68	64
DIT, Dehradun	39	55.71	11	15.71	1	1.43	1	1.43	1	1.43	3	4.29	3	4.29	11	15.71	70
DY Patil COA, Pune	38	62.3	13	21.31	2	3.28	2	3.28	2	3.28	0	0.00	0	0.00	4	6.56	61
RV COA, Bangalore	38	61.3	11	17.74	1	1.63	1	1.63	3	4.84	1	1.63	2	3.23	5	8.06	62

Figure 7

Chart showing distribution of core, technical and humanities courses

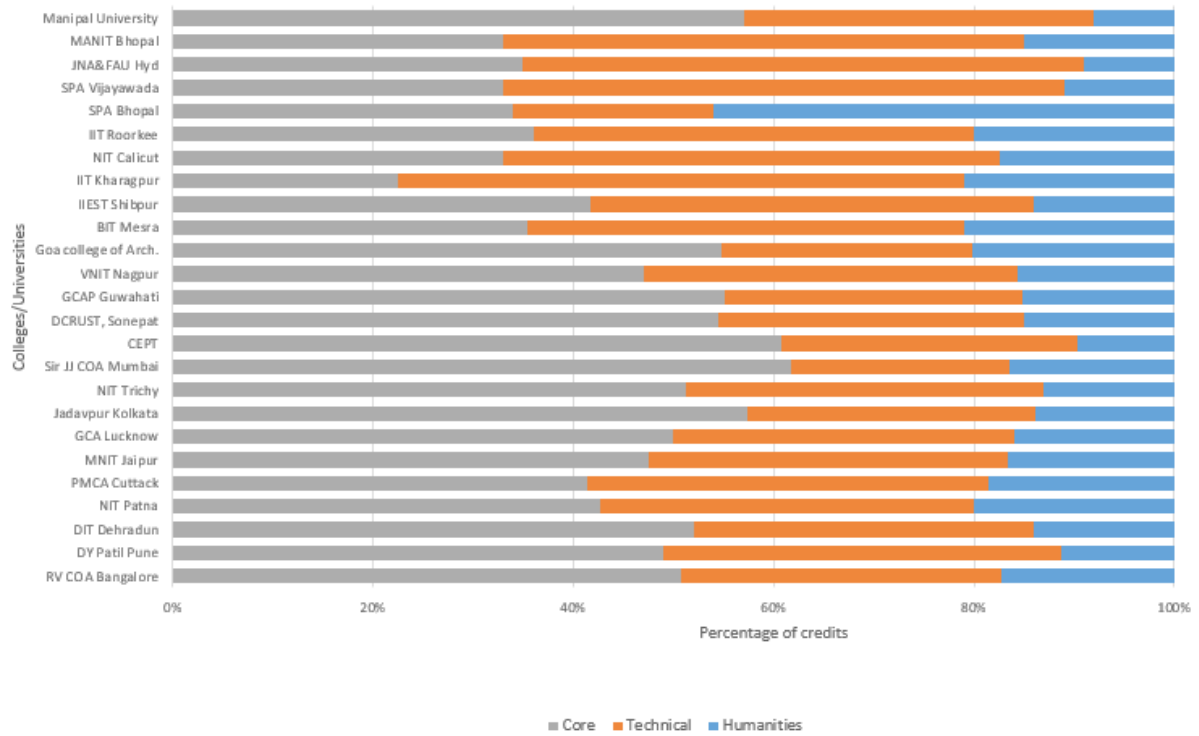


Figure 8

Chart showing credit distribution in core, technical and humanities courses

6.4 Course and Credit distribution of informality component

The distribution of these course categories – core, technical and humanities - with the informality component in them, was compared through certain graphical charts and bar graphs on the basis of the number of subjects with the informality component and the credits of those subjects. The total credits of the subjects with the informality component were compared with the total credits of the courses of all 25 colleges to understand the importance of informal settlements in the architecture course curriculum.

The course distribution graph clearly shows that the percentage of humanities courses – i.e. courses which have reference to ‘informality’ – of the total number of courses taught in the entire architecture course curriculum is just 21% (average) compared with core and technical subjects, which are given larger significance and mention in the curriculum. Also, technical courses are given more emphasis on average as compared to core and humanities courses. A further comparison of credit distribution reveals that, although the core courses are fewer, the credit allotted to them are higher, which indicates more contact hours in core courses. The comparison also shows that there are fewer credits for humanities courses, emphasizing the low relevance the schools give to humanitiesbased courses.

Out of the humanities courses, the credits for courses which include the subject of housing directly or courses with topics related to informality, housing or inclusivity are on average 6.5% of total credits. Furthermore, the total credits for courses that include

informality is 15% on average at all the 25 colleges, compared to the total number of credits offered by the curriculum. Similarly, around 10% of the courses offered by the schools include informality topics. Moreover, it was observed that some schools offer more credits for courses with the informality component whereas around 40% of the 25 colleges offered fewer credits for these courses. On average, 20% of the total credits for all courses are for courses with the informality component.

To understand in which semesters the courses with informality, housing or inclusivity components are taught, a semesterwise distribution of courses has been plotted:

Table 2

Semesterwise distribution of courses

NO	NAME OF INSTITUTE	I	II	III	IV	V	VI	VII	VIII	IX	X
1	BITS, Mesra										
2	IEST, Shibpur										
3	IIT, Kharagpur										
4	NIT, CALICUT										
5	IIT, ROORKEE										
6	SPA, BHOPAL										
7	SPA, Vijayawada (SPAV)										
8	JNA&FAU, Hyderabad										
9	MANIT, Bhopal										
10	Manipal University										
11	Goa College of Arch, Panaji										
12	VNIT, Nagpur										
13	GCAP, Guwahati										
14	DCRUST, Sonapat										
15	CEPT, Ahmedabad										
16	JJ College of Architecture, Mumbai										
17	NIT, Trichy										
18	Jadavpur, Kolkata										
19	GCA, Lucknow										
20	MNIT, Jaipur										
21	PMCA, Cuttack										
22	NIT, Patna										
23	DIT, Dehradun										
24	DY Patil College of Arch., Pune										
25	RV College of Arch., Bangalore										

■ Lecture ■ Studio ■ Lecture and Studio

The studio courses with informality, housing or inclusivity components are predominately taught in semester VI or VII. . Also, a few schools appear to offer lectures that support the related studio courses

either in the previous semester or in the same semester. This ensures the practical implementation of tools in the studio which are taught in theory courses. ♦

PART 7

INFORMAL SETTLEMENTS AND HOUSING SECTOR

Surveys were conducted at some of the reputed universities to examine the correlation between the courses taught and the universities' pedagogy concerning the housing sector in India. The four survey groups were from 25 selected colleges and divided into students, young faculty, senior faculty and field professionals. The aim of the survey was to understand the changing trend of architectural education with respect to informal settlements in India. These surveys were conducted online and in personal interviews. The classification of the stakeholders involved in the survey of architectural education is presented in the Table 3:

Table 3

Stakeholders involved in the survey of architectural education

STAKEHOLDER (S)	NO. OF RESPONSES	OBJECTIVES OF INTERVIEW
Students	100	<ul style="list-style-type: none">• To understand the current scenario of the degree of the inclusivity of informal settlements taught them• teaching methodologies adopted
Young Faculty	50	<ul style="list-style-type: none">• To understand the differences in the way they teach informal housing subjects they were taught and the way they are handling them
Senior Faculty	50	<ul style="list-style-type: none">• To understand the evolution of architectural teaching techniques in handling the subject• Changes in the teaching methodology of conducting studio subjects over the span of their careers.
Practicing Architects	25	<ul style="list-style-type: none">• To understand the degree of involvement of practicing architects while guiding theses or handling teaching the topic of informal housing in studio courses studios• opinion about the way such subjects should be taught shall be conducted

The students survey was to understand how and to what degree the inclusivity of informal settlements is currently taught, and the related teaching methodologies. 100 responses were collected by online survey and personal interviews from the 25 colleges. 50 young faculty members were interviewed to understand how architectural education with respect to informal studio courses changed from their time as students to the time when they became faculty members. Senior faculty members from the 25 selected colleges, with more than 15 years of experience as academics, were interviewed to assess the evolution of architectural teaching methodologies and the way studio courses were taught. The interrelation between what is taught in colleges and the application in real world scenarios can be understood from the surveys conducted with the 25 field experts and practicing architects from all over the country. The summare of survey responses from each group is presented below.

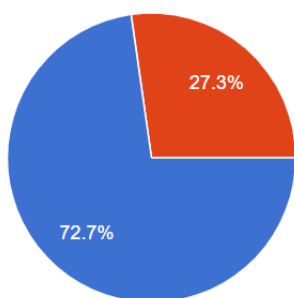
7.1 Survey responses from Students

The questionnaires designed for students contained questions about the subjects included in their studies and the design briefs of the studio projects. Other questions related to the teaching methodology of design studios including whether live case studies were used or not. Surveys included the initial background studies with theory classes, literature reviews and desktop case studies carried out during studio classes. 72.7% of the students said that low cost informal settlements were taken up as studio projects and 45.5% stated that the same topics were encouraged as thesis topics. When asked about the kind of housing projects they were given, 59.1% said formal housing projects, 66% said redevelopment of existing projects, 66.7% said the projects were hypothetical. The common methodology adopted in many of these projects is primarily surveys conducted to learn about the actual concerns of the informal settlements followed by site studies to understand the appropriate response to the requirements. Finally, a design solution is produced after analysing the issues at an urban level.

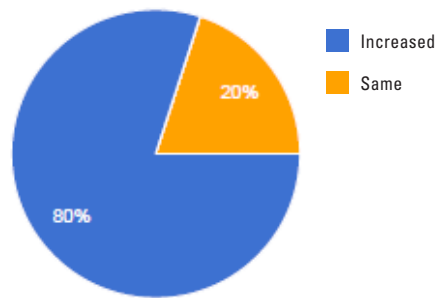
7.2 Survey responses from young faculty members

The questionnaires served to young faculty members included how the courses related to housing projects have changed over the years, and the frequency of informal settlements as thesis topics. The change in the methodology of housing studio courses since their time as students is not great. The survey states that various new factors and parameters are being looked into in the present scenarios and that there are more relevant government real world proposals. 80% of them opined that informal settlements as studio subject has increased over time. Only 40% of the young faculty members have handled housing projects related to informal settlements both as students and as teachers. 40% of them said that informal settlements as thesis topics has increased over time, and that most of the housing design studios are now more urban design oriented. The opinions given by these young faculty members concerning informal settlements studio classes include using live case studies, selecting appropriate typology for settlements and including extra subjects for proper understanding.

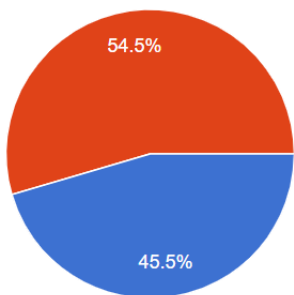
Informal settlements as part of housing theory subjects



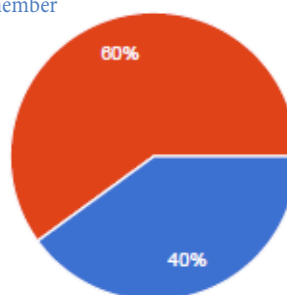
Theory of informal settlements in course curriculum over the years



Thesis topics related to informal settlements encouraged?

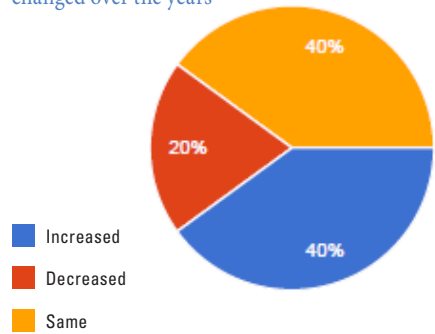


Addressing informal housing in studio classes as a student and as a faculty member

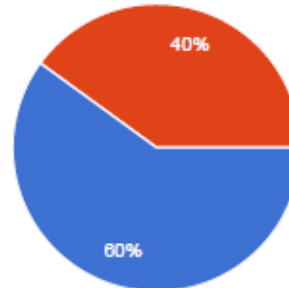


■ Yes
■ No

How the frequency of informal settlements as thesis topics changed over the years



Frequency of visits by experts from the industry

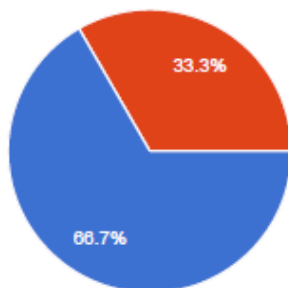


7.3 Survey responses from Senior faculty members

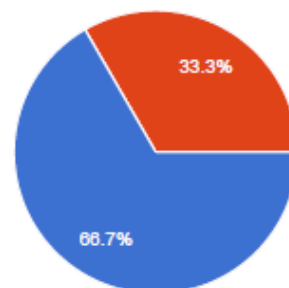
The questionnaires served to senior faculty members included questions on how the methodology of teaching studio subjects has changed over the years and whether the studio exercises given can be related to society's real time demands. 66.7% of the faculty members said that theory lectures and studio subjects focus on informal settlements. 44.5% of them said that informal settlements have been taken up as part of curriculum and 88.9% said that students are

encouraged to take up housing-related thesis topics. The opinions given by the senior faculty about what informal settlement studio classes should include are literature reviews so as to understand facts and concerns, primary surveys and case studies, expert inputs and participatory insitu redevelopments. They suggested a semester dedicated to learning about informal settlements, in a research and experimentbased studio.

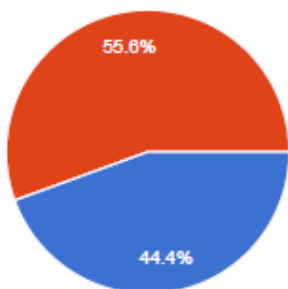
Theory subject lectures for housing



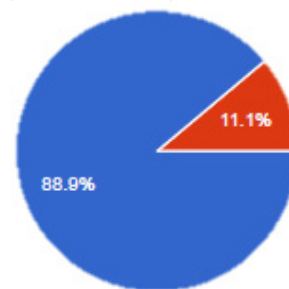
Addressing the topic of informal settlements in theory lectures



Informal settlements theory as part of the course curriculum



Course curriculum encouraging students to take up thesis topics regarding informal housing



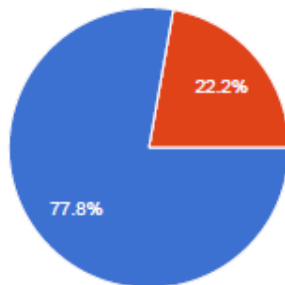
Yes
No

7.4 Survey responses from practicing Architects

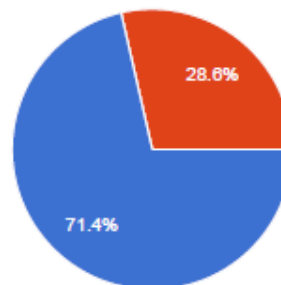
71.4% of the field experts responded that the studio classes they teach as guest/ visiting professor include case studies as part of the course curriculum. They suggest that the methodology of studio subjects should keep the stakeholders in mind and be based on macro to micro analysis. Based on comparative theoretical understandings, expert

inputs should be given to contextual issues. The survey also reveals that the field experts suggest reevaluating the curriculum so as to include the subject as a mandatory part, not assuming a pre-designed solution and rather thinking from a user perspective. Their opinion is that there should be a semester dedicated to a studio project to study informal and affordable housing. ♦

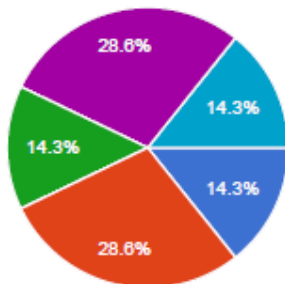
Addressed any informal housing projects in the housing studio



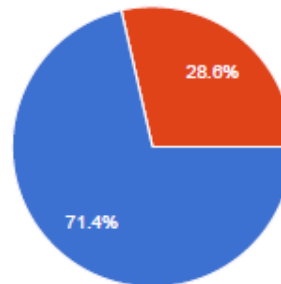
Case studies for the studio



Nature of the present housing studio projects changed over the years



Studio exercise as per the course curriculum (or as per real time demands)



- Live to hypothetical
- Hypothetical to Live
- Relocation
- New Projects
- Not much

- Yes
- No

PART 8 DISCUSSION

The inferences from the study of the architecture education curriculum implemented by architecture schools at the national level reveals that there is (a) an increase in the number of architecture schools and (b) architectural specializations have been offered at the graduate and post graduate level over the last decade. This situation has created a large pool of specialized courses that in turn benefit the architects who deal with the multifarious challenges of sustainable and inclusive development. The surveys conducted with the research stakeholders brought to light different perspectives about the architectural curriculum and pedagogical issues in India with respect to the study of informal settlements.

The suggestions by the faculty and field experts, if followed and implemented by academia, may help in creating effective solutions and better living conditions for the stakeholders. At this juncture, as written by Prem Chandavarkar, it is necessary to train our students to be able to think critically and rigorously about life at a level where they are not bound solely by the paradigms of the past, and can innovate in order to constructively respond to the new challenges and contexts that life keeps throwing at them (Prem Chandavarkar, 2018). ♦

PART 9 CONCLUSION

The pedagogical considerations may focus on structured and unstructured ways of understanding the concept's inclusiveness and informality in the local context by unlearning the conventional method of teaching. Nonetheless, it is essential and a prerequisite to reexamine the minimum curricular standards and syllabi followed in architecture schools and colleges all over India. These aspects should be adequately considered by the Council of Architecture, from the novel perspective of concepts such as 'inclusivity' and 'informality' and incorporated into architecture education and profession. This will open avenues to building responsiveness to societal needs in architecture education, particularly formal education, by restructuring the course curriculum at different levels.

Reform in architecture education could be achieved through inclusion of societal concerns into architecture courses and curricula that concentrate on subjective and practical aspects. The intervention is required at (a) the theory and elective level, design studio, field visits, dissertation and students' thesis work, and (b) qualitative and quantitative professional support training for architects, specifically those practitioners not exposed to inclusiveness and informality aspects in the shape of short term courses and workshops which strengthen the concepts related to inclusiveness and informality while designing inclusive communities. On the one hand it will enhance (a) the teaching and learning environment of the architecture teachers and students and on the other hand (b) facilitate professional practice, contributing to building sustainable communities for the people living in our cities and towns. ♦

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