Gap Analysis between Architectural Education and Practice in Sindh, Pakistan

[1]**Ar. Irfan Ali Brohi,** [2]**Dr. Bhai Khan Shar,** [3]**Ar. Fahad Shams Nizamani**

[1]Lecturer, Department of Architecture & Planning, Center of Excellence in art & design, MUET, Jamshoro, Pakistan
[2]Director, Center of Excellence in art & design, MUET, Jamshoro, Pakistan
[3]Asst. Prof. Department of Architecture & Planning, Center of Excellence in art & design, MUET, Jamshoro, Pakistan

Abstract - **To engage the architect in the design and construction process of any project, an important role is played by training and field experience. This research focuses on the two aspects, the architectural education and practice by analyzing the gape in between. The gap between the profession and the academy is not totally unhealthy, it has some natural, unavoidable and even desirable differences.[7] The main aim of this research is about finding the gap between academia and profession in public institutions of Sindh Pakistan and explore various pedagogical approaches in the field of architectural education. This research is based on two parts, first is the comprehensive literature review regarding the architectural education, role of architect, teaching methodologies and curriculums in 5 year B.Arch. program. The second part of the research is further divided into 2 parts, a web-based survey of selected architectural institutes in Sindh Pakistan and two survey questionnaires as research instrument to investigate and evaluate the relevance and effectiveness of Skills and knowledge imparted by the institutes and the expectations of professional architects/firms. The first questionnaire survey is used to collect the data from selected institutes faculties perceptions and reviews about the architectural education and the second one is used collect the data from the practicing architects and fresh graduates. The research concludes that main issue identified in the architectural education of Sindh is that everything in the curriculum of the selected samples universities are relevant to the practice and mostly according to HEC and PCATP guidelines. What is found is the lack of application, Methodology, and updated curriculum according to real world needs and practices.**

Keywords: Architectural Education, Architectural Practice, Architectural Curriculum, Pakistani Architectural Institutions.

I. INTRODUCTION

Education is a contiguous and consecutive process. Thus, In order to gain skills and knowledge in context, a strong and powerful academic foundation is needed.[13].The student's level of learning and decision-making about later stages of education seem essential. Architectural education is very complex like other professionals. The students have to learn many other things relevant to the practice and compose all the knowledge he/she learnt in the architectural school. We are in the era of a huge social and economic transformation [17]. The establishment of limits defines professions by the acquisition of a diploma/degree or an accredited professional license, which specifies the knowledge and skills of their members outside the general public. Numerous reports and studies have described how society and the construction industry have an impact on architecture and other construction professions over last decade. (David Nicol and Simon Pilling, 2005)[15]They both in their book, "Changing Architectural Education: Towards a New Professionalism" indicated the need for greater client awareness and greater responsiveness to the needs of users in architecture. In their book, they focused on the architectural students and their approach to mainstream architecture after graduations. It is likely that Students must update their knowledge and skills several times in their lifetime. With the growth of construction industry, Architectural schools must respond to these changes. It must facilitate the acquisition of skills, approaches and attitudes necessary for the professional practice and must be beached constantly studying throughout life [16].

II. BACKGROUND

In order to coherently discuss the gap between architectural theoretical knowledge and Practice with a view to making proposals for a synergy, it is important to define the term, "Architecture" from starting principles. Architecture has evolved over the years but the fundamental principle remains steadfast. Over the years, masters of architecture, particularly modem Architecture, have attempted to define the profession from various perspectives. However, through all the definitions a common theme can be deducted. Frank Lloyd Wright (June 8, 1867 — April 9. 1959), the great American Architect defined architecture as; *"Architecture is the triumph of the human imagination over materials, methods and men".*

This presupposes that Architecture is about imagination or creativity and the Architect utilizes available materials and methods of construction to triumph in providing the shelter needs of man. The great French Architect. Le-Corbusier explained it as *"The masterly, correct and magnificent display of masses brought together in light"*. The mention of "light" in his definition shows the importance of interactivity of Architecture with nature. The German-American Architect called Ludwig Mies van der Rohe defined Architecture by saying, *"when technology reaches its ultimate fulfillment, it transcends into Architecture"*. This suggests that Architecture reflects the technology of the day. We see this impact of technology, new discoveries in materials and methods of construction greatly influencing developments in Architecture through the ages. The Royal Institute of British architects defines Architecture as a multidisciplinary field of study involving the arts, sciences and social sciences. (RIBA, 1997).

From the above definitions, we can deduct that Architecture is a scientific art or an artistic Science. Architecture (from Wikipedia.org) is derived from the Latin word architectura" after the Greek word "arkhitekion" (derived from "archi" meaning "chief" and "tekton" meaning "builder, Carpenter or mason". An Architect is therefore primarily a Chief Builder.

An architects job can be defined as (by the international union of architects), "A qualified professional and academic person authorized to practice architecture in the jurisdiction in which he/she is responsible for the practice and promotion of equitable sustainable development, welfare and cultural expressions of habitat society in terms of space, forms and historical context.."[9]

III. ARCHITECTURAL EDUCATION AND PRACTICE IN PAKISTAN

The Pakistani architectural and industrial environment has steadily deteriorated. We try to understand the causes of this before to improve it. (Ar. Kausar Bashir Ahmed, 1986).[1] These two aspects of training must be given priority when formulating a future education policy in Pakistan. Namely, the architect's role as a form-giver and designer, and secondly, his role as the coordinator both on planning as well as construction operations. (Zahir ud din Khuwaja , 1984).[1]

Architect Shahab Ghani Khan, expresses his view on the situation of architectural profession during the construction boom in a developing country like Pakistan, he suggests that it has become more urgent than ever to equip our architects with the right tools to participate in this very competitive industry. (Ar. Shahab Ghani Khan, 2008). Pakistani architects reached the modern technical and professional stage after a long

journey after independence; still there is a gap, which needs to be bridged. (Ar. Manzoor Mehdi. 2017)[2]. He further argued about the fact that architectural education is deteriorating in Pakistan like in other disciplines. He explained that it might be because of the commercialization of educational institutions in general, the lack of commitment and zeal of most teachers.

There is a huge difference between the basic Approach in architectural study between private and public institutions like in other disciplines in our country. It seems that creating an architecture department in each university is more insistent than working on the right academic methodology. (Ar. Kamran Haider, 2016)[5]. He suggested cultivating students' minds with reasoning and being able to make responsible decisions are the two goals we must aim for to have a better future in this field of architecture. Ar. Fawad Abbasi expressed his thoughts to describe the era as alarming where there has been mushroom growth in architectural schools in Pakistan. (Ar. Fawad Suhail Abbasi, 2015)[3].

According to a survey published on topstudyworld.com[12] on august 2019, the following skills that lack in fresh graduates in Pakistan:
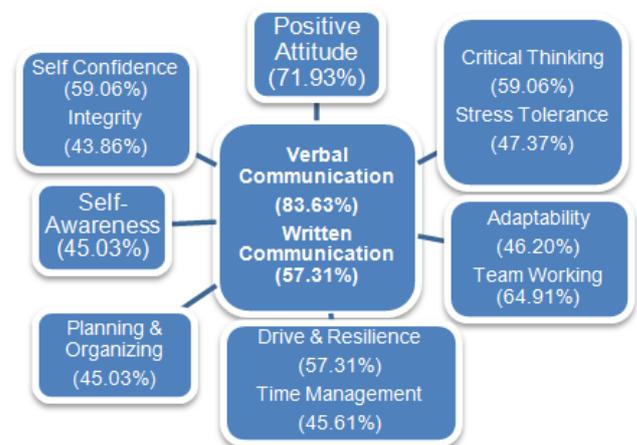

Figure 1: Skills that lack in fresh graduates of Pakistan

IV. PROBLEM STATEMENT

The research focuses on the basic two aspects, the architectural education and practice by analyzing the gape in between. From the literature review and the published interviews of practicing architects, it is found evident that there is some gap between the practice and education of architecture in Pakistan. The problem is severe or moderate, made this proposal to investigate the issue. The gap between the profession and the academy is not, totally, unhealthy. It has some natural, unavoidable and even desirable differences. However, they should work as complementary to each other[13]. The main aim of this research is about finding the

gap between academia and profession in public institutions of Sindh Pakistan and explores various pedagogical approaches in the field of education.

V. RESEARCH STRUCTURE

Mixed methods research combining qualitative and quantitative research methods is applied as major components. Five public institutions were selected which offers 5 years B.Arch. program namely,

1. Department of architecture & Planning, NED University of Engineering & Technology (**DAP-NED UET**), Karachi.
2. Department of Architecture & Planning, Dawood University of Engineering & Technology (**DAP-DUET**) Karachi.
3. Department of Architecture, Mehran University of Engineering & Technology (**MUET**) Jamshoro.
4. Department of Visual Studies, University of Karachi, (**UOK**) Karachi.
5. Department of architecture & Planning, Center of Excellence in art & Design, (**CEAD MUET**) Jamshoro,

As the primary source of basic data of and analysis of the relevance and effectiveness of knowledge and skills imparted in students during 5-year architectural program.

This process is passing through the following stages:

Step 1: To understand the architectural education present scenario and role of architect. This exploration includes a thorough review of previous research related to architectural education and practice and the needs of gap analysis in between.

Step 2: Problem identification from step 1 and web based data collection was adopted to list out the PCATP accredited public architectural universities found in province of Sindh. This process includes the development of architecture education in public sector along with their course contents

Step 3: From above study of stage 1 and 2, theoretical based questionnaire were designed to investigate the current status of public sector architecture universities of Sindh. The questionnaires have the two parts i-e Perception of Faculties and Practicing architects along with fresh graduates also.

Step 4: The Structured survey questionnaire was prepared to evaluate the Pakistani architects and institutions' faculty's views and perceptions about the current situations and to list down the technical skills required during architectural education. This group is termed as the focus group while a

similar survey was conducted to investigate the perception, experience and knowledge of students those had recently graduated and striving for job or work to start.

Step 5: Final stage is to analyze the results of data collected from each university in order to identify the gaps by comparative analysis of results obtained from faculties and Architects and the comparative analysis of curriculum of the universities with HEC and PCATP suggested curriculum and guidelines.

Step 6: Concludes the results and to suggest the recommendations for improving the quality of Architectural Education in Pakistan for future development, also few suggestion for PCATP as well regarding the accreditation process.

The main objectives of this research are:

- To understand and analyze the relation between architectural education and practice and the skills required to be an architect.
- To analyze the relevance and effectiveness of knowledge and skills imparted in students during 5-year architectural program of public Institutes of Sindh.
- To identify the knowledge and skills expected by the professionals in the field of architecture.

VI. HIGHER EDUCATION COMMISSION (HEC) ARCHITECTURAL CURRICULUM IN PAKISTAN

The Curriculum Division of HEC undertakes the revision of curricula after every three years through respective National Curriculum Revision Committees (NCRCs) which consist of eminent professors and researchers of relevant fields from public and private sector universities, R&D organizations, councils, industry and civil society by seeking nominations from their organizations. In order to impart quality education which is at par with international standards, HEC NCRCs have developed unified templates as guidelines for the development and revision of curricula in the disciplines of Basic Sciences, Applied Sciences, Social Sciences, Agriculture and Engineering in 2007 and 2009.[21]
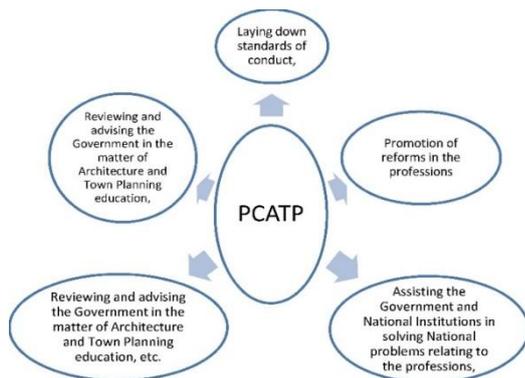
a) Framework for B.Arch. Program by Higher Education Commission (HEC), Pakistan

Architectural education needs are different for different regions within Pakistan. The curriculum provides a broad outline and framework of knowledge areas with a built-in flexibility for it to be adapted by different schools of architecture according to their specific needs**.** Institutes/Schools/Universities are advised to follow PCATP

studio guidelines/policies for architectural design studios and dissertation/thesis requirements for final year thesis. The proposed template is for individual Institute/ School/Department to interpret it in view of their ideology and broad objectives of their architectural education. (See Figure 2). In addition to the mentioned core courses in figure 2, required for the curriculum design of any architecture institution for the bachelor of architecture, the curriculum revision committee of Higher Education Commission also provides a list of elective subjects and institution can adopt among the proposed elective courses to include with their curriculum beside the major courses defined in the above table. The list of such electives course is given in the Figure 3.

b) The Pakistan Council Of Architects And Town Planners (PCATP)

Architectural profession in Pakistan is under supervision and guidance of Pakistan Council of Architects and Town Planners Ordinance 1983.

Figure 2: Framework architectural curriculum by HEC Pakistan
Source: www.hec.gov.pk

The council has wide ranging powers and is authorized to perform all functions and to take steps connected with or ancillary to all aspects of the two professions (Architects & Town Planners) including;[24]

Figure 3: Optional/Elective Subjects for architectural curriculum by HEC Pakistan
Source: www.hec.gov.pk

The above figures 2 and 3 shows that there is a comprehensive plan for architectural curriculum in Pakistan for architectural education. The overall courses framework, core courses and optional or elective courses mentioned in above tables gives the comparative data, which will be used to compare with the selected universities program, broke down in the same framework so that a comparative analysis could be achieved. Following are the findings of the above data.

TABLE 1
Summary of Courses Recommendation of Architectural Curriculum by HEC Pakistan[21]

QUERY	FINDING
Curriculum summary of B.Arch. program according of the recommended template by HEC curriculum review committee.	
Recommend Number Of Courses To Graduate	55
Recommended Number Of Credit Hours To Graduate	170-180

Recommended Semester Load	17-18 Credit Hours
Recommended Core Courses	142 Credit Hours
Recommended Optional Elective Courses	30-40
Recommended Studio / Workshop Based Learning	82 Credit Hours
Recommended Allied Sciences And Technologies	22 Credit Hours
Recommended History, Theory And Critical Analysis	20 Credit Hours
Recommended Professional Practice And Communication Tools	18 Credit Hours

VII. DATA COLLECTION

The Web based data was collected from the web sites of selected institutes of Sindh analyzed and compared with the guidelines given by HEC Pakistan to identify any gap or difference between the architectural education and skills imparted by these institutes. Furthermore, a survey questionnaire was designed to understand the effectiveness and relevance of all the skills and knowledge imparted by public institutes of Sindh with the skills demanded and expected in the practice. Therefore, two questionnaires were distributed among sample groups i.e. practicing architects, fresh graduates having at least 6 months of practice in the field and the faculty of the institutes. The sample population was determined using the Robert V. Krejcie and Daryle W. Morgan "Determining the sample size for research activities. The questions asked from the faculty gave the basic sketch of the current scenario of architectural education in the country and their concerns towards the future of the profession, also they were asked to compare the relevance of the skills imparted by their institute with the professional practice. The second questionnaire was distributed to the practicing architects and they were asked about the education and knowledge they got during their 5-year architectural learning and what the field and market expected from them.

a) List of Sample Institutes for Data Collection

Following institutes are selected for the collection of data on web-based method. The samples which are accredited public institutes by PCATP were selected to analyze Architectural institutes of Sindh's input and contribution in architectural education.

S. #	NAME OF UNIVERSITIES/ INSTITUTIONS	Degree	Program Started in (year)
01	Department of Architecture & Planning NED University of Engineering & Technology (DAP-NED-UET), Karachi.	B. Arch. (5 Year)	2000
02	Department of Architecture & Planning, Dawood University of Engineering and Technology (DAP-DUET), Karachi.	B. Arch. (5 Year)	1954
03	Architecture Program, Department of Visual Studies, University of Karachi (UOK), Karachi.	B. Arch. (5 Year)	1999
04	Department of Architecture, Mehran University of Engineering & Technology (MUET), Jamshoro.	B. Arch. (5 Year)	1980
05	Department of Architecture & Planning, Centre of Excellence In Arts & Design (DAP-CEAD), Jamshoro.	B. Arch. (5 Year)	2006

VIII. DATA ANALYSIS OF ARCHITECTURAL PUBLIC INSTITUTES IN SINDH PAKISTAN

As it is mentioned earlier that the web based data collection was carried through, official websites of the selected institutes in order identify the current status of architectural education within the curriculum and compare their architectural education program with the recommendation of HEC Pakistan. Only those public institutes are selected which are accredited by the council responsible for regulating the architectural education in Pakistan, the Pakistan council for architects and town planers (PCATP). The focus of web-based survey was to identify the curriculum status and courses offered in 5 year architectural degree program related to HEC curriculum framework. Following are the main points of investigation of web-based survey of the selected institutes.

- Review of mission statement of all selected institutes
- Name of the Program Designated
- Total Number of courses taught in the program
- Total number of credit hours taught in the program
- Total number of credit hours for core course

- Total number of optional and electives courses
- Semester load in terms of credit hours

Following is the individual data analysis form all the five selected public institutes in Sindh Pakistan. The findings in are marked red and green. Green shows the positive range and red color shows the negative difference, which is below the minimum limits recommended being HEC Pakistan.

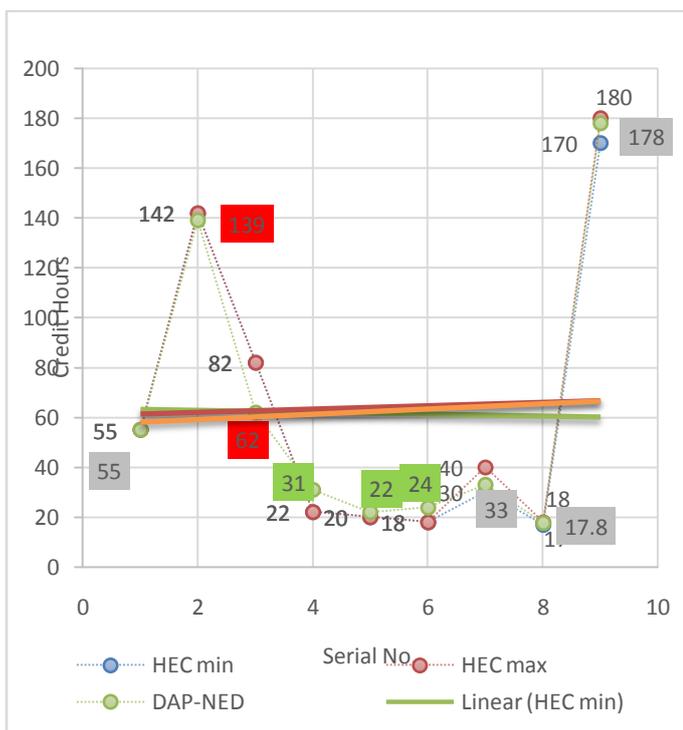## a) Scenario of Courses of DAP-NED UET Compared with HEC Framework

Chart 1: Scenario of courses of DAP-NED UET compared with HEC Framework

The chart 1 shows the exact scenario of curriculum of DAP-NED compared with HEC framework. The core courses of DAP-NED are 139 credit hours, which is three credit hours lower than the HEC recommendations. The total number of courses offered in DAP-NED is 55, which the same HEC recommends. The core courses bifurcation in A, B, C and D categories of DAP-NED shows almost the same numbers except the A category which has a difference of 20 credit hours, as we know from the table 4.7, the A category is the most important part of the curriculum which is about studio/workshops that is given more preference by all the institutes in the world but DAP-NED shows lacking in this realm which shows a less design and practical workshops for student learning in their degree program. Furthermore, the other finding such as Semester load is under the guidelines of HEC Pakistan. The total number of credit hours to graduate in architecture in Pakistan is recommended 170 to 180 by HEC

and PCATP that every institute has to design their curriculum accordingly, and DAP-NED has 178 credit hours in its program, which is under the limits of HEC Curriculum framework.

b) Scenario of Courses of DAP-DUET Compared with HEC Framework

Chart 2: Scenario of courses of DAP-DUET compared with HEC Framework

The core courses of DAP-DUET are 148 credit hours, which is six credit hours higher than the HEC recommendations, which is a good adaptation of selection of core courses. The total number of courses offered in DAP-DUET is 52, which is lower than what HEC recommends. The core courses bifurcation in A, B, C and D categories of DAP-DUET shows almost the same numbers except the A category which has a difference of +3 credit hours, which shows that this institute shows a good concern about the studio learning in their program as recommend by HEC/PCATP. Furthermore, the other finding such as Semester load is under the guidelines of HEC Pakistan. The total number of credit hours to graduate in architecture in Pakistan is recommended 170 to 180 by HEC and PCATP that every institute has to design their curriculum accordingly, and DAP-DUET has 176 credit hours in its program, which is under the limits of HEC Curriculum framework.

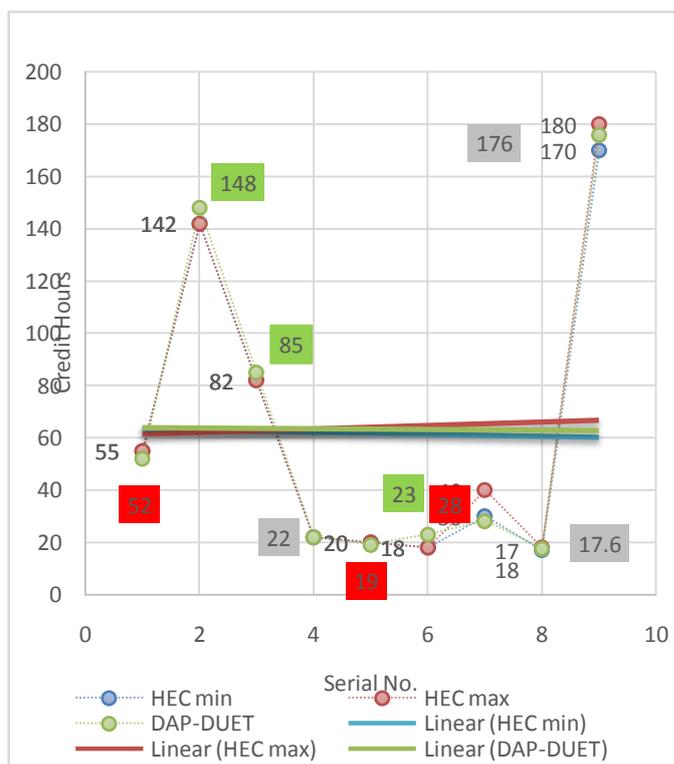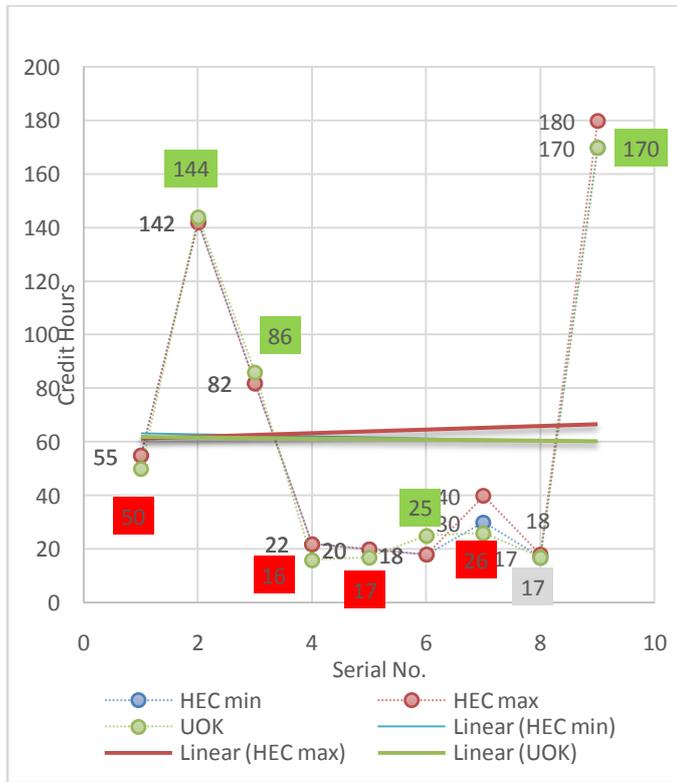### c) Scenario of Courses of UOK Compared with HEC Framework

Chart 3: Scenario of courses of UOK compared with HEC Framework

The core courses of UOK are 144 credit hours, which is 02 credit hours higher than the HEC recommendations, which is a good adaptation of selection of core courses. The total number of courses offered in UOK is 50, which is lower than what HEC recommends. The core courses bifurcation in A, B, C and D categories of UOK shows low number in 2 categories and 2 higher numbers except the A category which has a difference of +6 credit hours, which shows that this institute shows a good concern about the studio learning in their program as recommend by HEC/PCATP. Furthermore, the other finding such as Semester load is under the guidelines of HEC Pakistan. The total number of credit hours to graduate in architecture in Pakistan is recommended 170 to 180 by HEC and PCATP that every institute has to design their curriculum accordingly, and UOK has 170 credit hours in its program, which is under the limits of HEC Curriculum framework.

d) Scenario of Courses of MUET Compared with HEC Framework

The core courses of MUET are 140 credit hours, which is -2 credit hours lower than the HEC recommendations, which does not proves a good adaptation of selection of core courses. The total number of courses offered in MUET is 50, which is also lower than what HEC recommends. The core courses

bifurcation in A, B, C and D categories of MUET shows low number in the very important category of core architectural courses, the Studio and workshop, having a huge difference of -13 credit hours than other institutes analyzed till now.

Chart 4: Scenario of courses of MUET compared with HEC Framework

This shows that this institute does not show a good concern about the studio learning in their program as recommend by HEC/PCATP. Furthermore, the other finding such as Semester load is under the guidelines of HEC Pakistan. The total number of credit hours to graduate in architecture in Pakistan is recommended 170 to 180 by HEC and PCATP that every institute has to design their curriculum accordingly, and MUET has 172 credit hours in its program, which is under the umbrella of HEC Curriculum framework.

e) Scenario of Courses of DAP-CEAD Compared with HEC Framework

The above chart 5, shows that The core courses of DAP-CEAD are 141 credit hours, which is -1 credit hours lower than the HEC recommendations, which does not proves a good adaptation of selection of core courses. The total number of courses offered by DAP-CEAD is 56, which shows there is huge content of courses offered by this institute and adopted good number of total courses what HEC recommends.
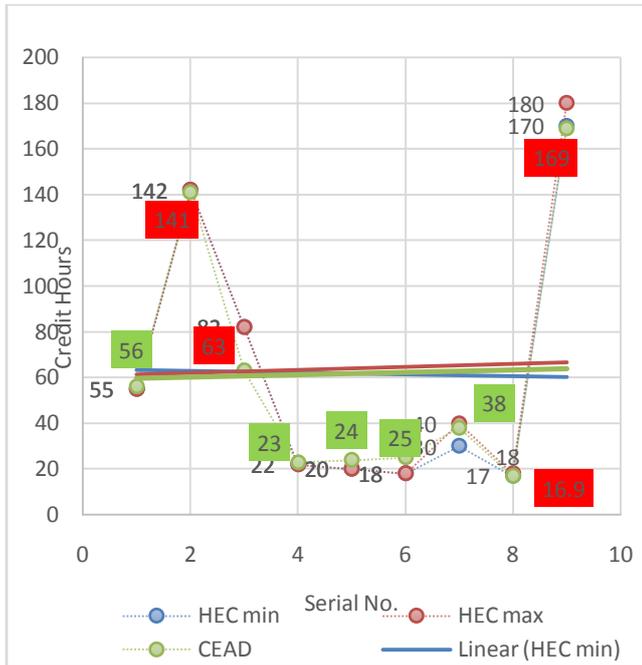
Chart 5: Scenario of courses of DAP-CEAD compared with HEC Framework

The core courses bifurcation in A, B, C and D categories of DAP-CEAD has good ratio of credit hours in all categories except it shows very low number in the very important category of core architectural courses, the Studio and workshop, having a huge diff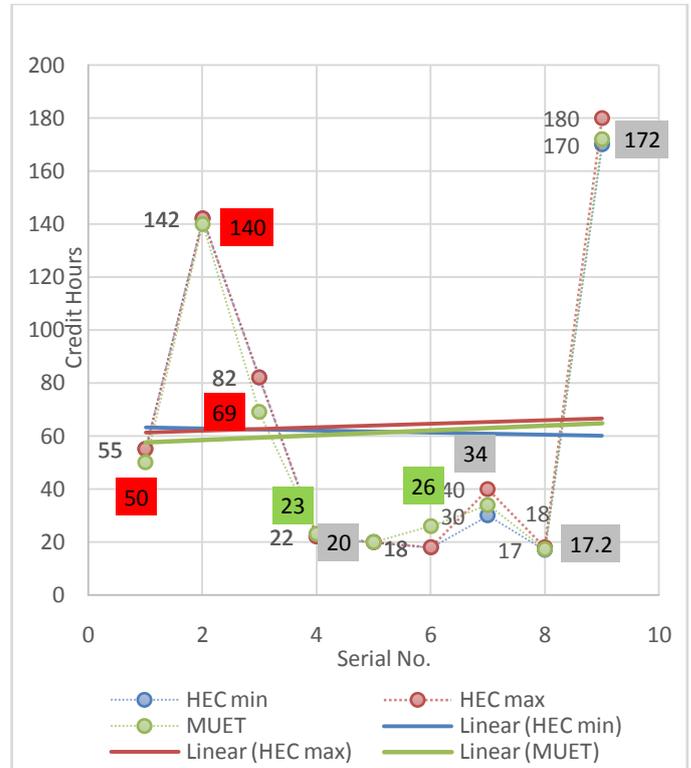erence of -19 credit hours than other institutes analyzed in this study. This shows that this institute does not show a good concern about the studio learning in their program in contest of credit hours as recommend by HEC/PCATP. Furthermore, the other finding such as Semester load is also below the guidelines of HEC Pakistan. The total number of credit hours to graduate in architecture in Pakistan is recommended 170 to 180 by HEC and PCATP that every institute has to design their curriculum accordingly, and DAP-CEAD has 169 credit hours in its program, which does not satisfy the HEC Curriculum framework.

f) Comparative Study of Selected Institutes

Chart 6: Graphical representation of Comparative data of selected Institutes

This chart shows the collective data of all the public architectural institutes of Sindh compared with the minimum and maximum curriculum Farm work quid lines of HEC Pakistan. The trend line shows the regressions in increasing and decreasing lines, which indicates the curriculum framework of selected institutes.
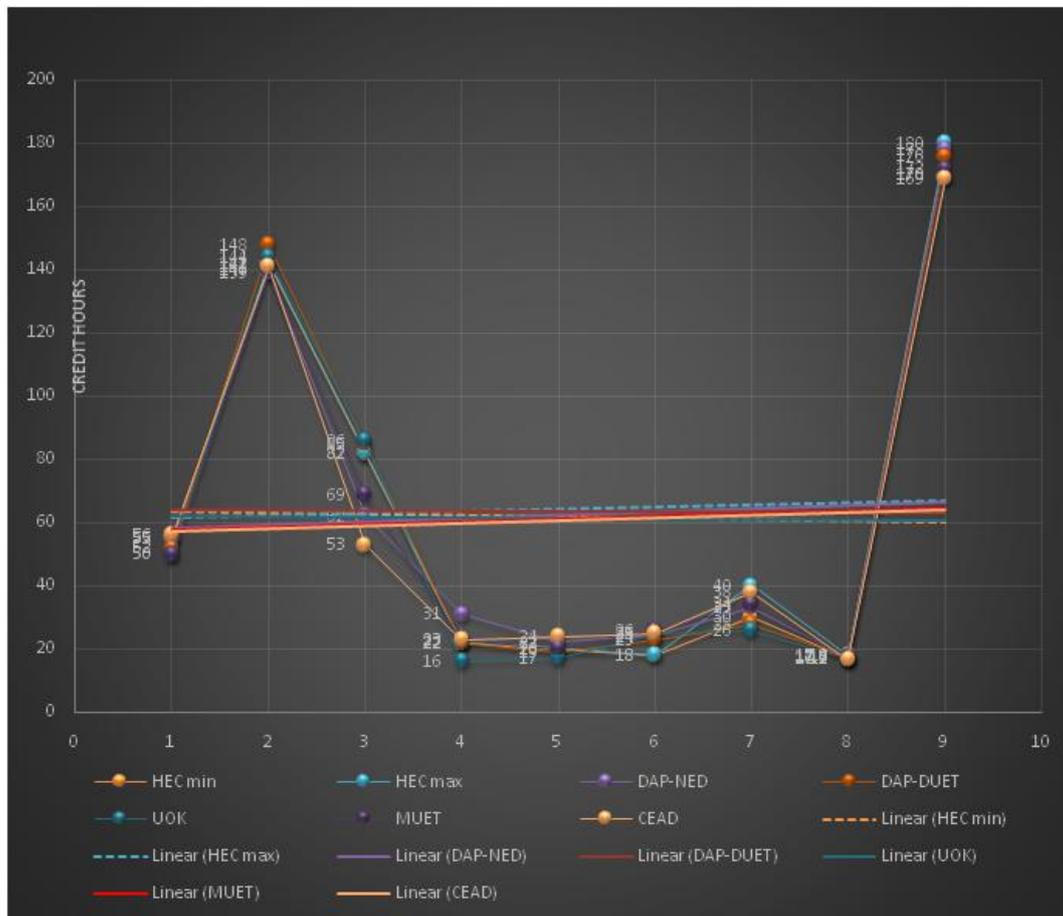
The increasing regression line of all the Institutes, Department of architecture and planning, NED University of Engineering & Technology, Karachi, Department of architecture and planning, Dawood University of Engineering & Technology, Karachi, Department of architecture and planning, Center of Excellence in art & design Jamshoro and Department Architecture, Mehran University of Engineering & Technology, Jamshoro, shows the more relevant courses as guided by HEC, and the Architecture program at Department of Visual Studies University of Karachi shows a slight decreasing regression, which is not chronic but need improvement in their curriculum according to HEC recommendations. This study showed that most of the architectural institutes of Sindh have a comprehensive course curriculum in form of studio and theoretical courses.

IX. ANALYSIS OF THE QUESTIONNAIRE SURVEY CONDUCTED FROM THE FACULTIES OF THE SELECTED INSTITUTES OF SINDH

The perception and the attitudes of the teachers and academicians play a great role in the development of the disciplines in all type of educational sectors. As the curriculum of the institutes is already studied and analyzed in the previous chapter which showed most of the institutes have a comprehensive set of courses providing basic skills and knowledge (figure 4.1), and 02 institutes namely, DAP-CEAD and MUET shows a big difference of credit hours needed to accomplish the core course of studio and workshop/practical courses recommended by the review committee of HEC Pakistan. Such type of other few gaps found in the previous study which now will be compared by the perception and view point of the teachers who are responsible to implement those courses in their institutes. Their point of view is very crucial to complete the objective of this research.

The questionnaire focused on the following major queries.

- To find out the perception of faculty members about the deterioration of architectural education in Pakistan as once coined by Ar. Kausar Bashir Ahmed in 1984.
- To find out how the faculty see the collaboration of construction industry and the institutes.
- Find out about the main focus of the institutes.

- Find out whether the teachers are aware of the courses and credit hours impact on students' learning and to know whether the specified credit hours are sufficient or not.
- To find out about the communication and software skills its importance in the field.
- The role of architect in the filed in context of teamwork and their perception about such knowledge and skills being imparted by the institutes.
- The perception of the faculty members about the relevance and effectiveness of collective skills of an architect in Pakistan.

The questionnaire was distributed to all faculty members and teachers of all the selected institutes of Sindh. The distribution was done by developing a web-Based questionnaire using Google forms. The email IDs / Contact No. were collected through various reliable sources such as Pakistan Council of architects & Town Planners (PCATP), Institute of Architects Pakistan (IAP), faculty profile of the universities and institutes websites. The questionnaire was then distributed to the acquired email IDs and Contacts.

After the passing of threshold time, 45 replies were recorded from Faculty members throughout all the selected institutes of Sindh. The cumulative characteristics of all respondents are shown by the following chart.
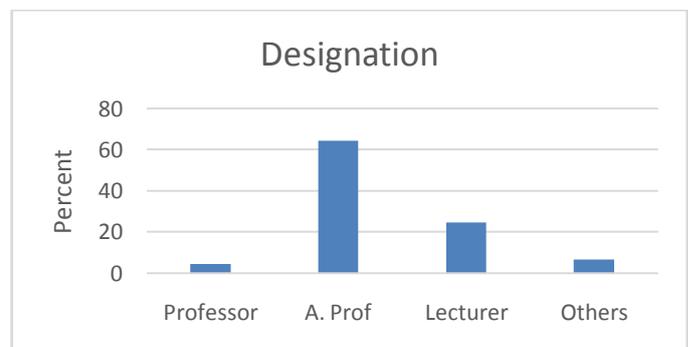
Chart 7: Responded Faculty Members' Designations

The above data shows that most of the responses are recorded by the Assistant/Associate professors, which is 64.4% of the total respondents. Then the lecturers, which has 24.4% of the total share of responding the survey. Two professors for the institutes also responded and three academicians also gave their opinion in this research. The fair share of A. professors satisfies the validity and reliability of the data. A. professor and professors are highly qualified and more experienced assets of an institute and their opinion makes a big contribution to the architectural education.

X. ANALYSIS OF THE QUESTIONNAIRE SURVEY CONDUCTED FROM PRACTICING ARCHITECS

After completing the questionnaire survey from the faculty member of architectural institutes of Sindh Pakistan, the second Questionnaire survey was distributed among the practice architects in Pakistan mostly in Sindh. The perception and the attitudes of the architects in the field play a great role in the understand and identification of skills and knowledge expected after the graduation. As the curriculum of the institutes is already studied and analyzed in the previous chapter which showed most of the institutes have a comprehensive set of courses providing basic skills and knowledge (figure 4.1), but the survey showed that the faculty members are not satisfied with the methodology of teaching the skills. This questionnaire survey will further enhance the data regarding the relevance and effectiveness of those skills and the knowledge that universities claim to impart in their degree programs in the discipline of architecture.

The questionnaire was distributed among various experienced architects with a focus on 40 to 50% fresh graduates and others with greater experience. This will further strength the reliability of data. The distribution was done by developing a web-Based questionnaire using Google forms. The email IDs / Contact No. were collected through various reliable sources such as Pakistan Council of architects & Town Planners (PCATP), Institute of Architects Pakistan (IAP), and Architectural Firms website. The questionnaire was then distributed to the acquired email IDs and Contacts.

After the passing of threshold time, 92 replies were recorded. The cumulative characteristics of all respondents are shown by the following chart.

Chart 8: Responded architects' Field Experience
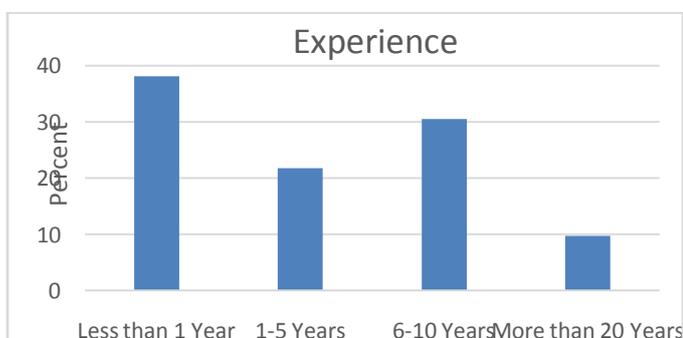
The above data shows that responses are recorded with 38% of Fresh graduate and 21.7% having less than 5 years of experience which increase the reliability of data as the fresh graduates can respond with much updated scenario of the architectural practice and education in Pakistan. Furthermore, 30.4% of the architects who responded have up to 10 years of

experience, which is quite a good range of architectural field experience needed for this survey. 9.8% have more than 20 years of practice. The whole scenario shows a diversity of defend experienced architects. The fair share of fresh and experienced architects satisfies the validity and reliability of the data.

XI. RESULTS AND DISCUSSIONS

The questionnaire survey was aimed to enquire regarding situation the knowledge and skills of an architect being imparted by the Public Architectural Institutes in Sindh and the relevance and effectiveness of those skills, which are expected by the architectural profession in Pakistan.

a) Perception about the deterioration of architectural education in Pakistan

It was found that faculties still see the architectural education in the same condition as it was in 1980s but also a fair percentage of other teachers disagree with this and it shows that architectural education and building construction industry is slowly getting better in terms of imparting skills in the institutes.

b) Main focus of Architectural Institutes in Pakistan

It was observed that architectural institutes focus on academic excellence than skills needed in the field. The majority of faculty members are of the views that the building construction and its field knowledge is not being significant emphasized by the mainstream architectural institutes of Pakistan. This indicator shows the architectural education in Pakistan must focus on building construction knowledge with more emphasis than other theoretical courses.

c) Impact of courses and credit hours on students' learning

The majority of the respondents agree that there is an impact of number of credit hours on courses. It also showed that the credit hours needed for their core course i.e. studio or workshops have enough credit hours to accomplish the course requirements. This concludes that the public Architectural institutes of Sindh provide enough core courses and credit hours which are recommended by HEC curriculum framework.

d) Comparison of Design Studio in Pakistan with the Real-world practice

The survey found that the common teaching of design studio in Pakistan is not what is practiced in the architectural firms. However, it is also found by a fair number of respondents that the design studio pedagogies practiced in

architectural institutes does relate to the real world practice. However, it is evident that the design studio pedagogies might need improvements and changes in order to reduce the difference with practice. It was also found that 82.6% of the respondents said that the design studio in architectural institutes of Pakistan does not take into account the socio-behavioral, economic, political, and technological issues, which the architects think is very important for practical point of view for an architect to be equipped with such knowledge and skills in their design process. In another question 87% of the practicing architects agree that a gap between what students learned and what they practice is due to not taking into account the real life situations of interaction with clients and users in the design studio teachings. Fresh architects face the issue of interaction and dealing the client and the users in the design process that must be addressed in the curriculum objectives of institutes.

Moreover, in the context of relation of education, curriculum and design process and teaching methodology with cultural needs, and socio-behavioral aspects of modern societies, 66.3% agree that our education system lack in this regard. An architect has to consider the cultural values in their design process and adds the aspect of socio behavioral in the real practical design that they feel is not being taught in the schools of architecture or the methodology is not appropriate or reconsidered. These findings questions the methods in the design studios of architectural institutes and shows that the institutes must revive their design studio pedagogy with problem based methods of design studios teaching.

e) Cause of Hurdles a Fresh Architect Faces

The architects were enquired about the hurdles they come across during their first time of entering the practice, 65.2% of them answered with the reason of lack of experiences and 32.6 % said they faced the issues of having skills which are now irrelevant or obsolete in the field. As the data shows that the majority face the experiences as hurdle, this means that the knowledge, skills and abilities are not enough for an architect to start his/her practice. PCATP also enforces a minimum one year of experience since few years for registration as an architect with the council and the skills they earnt in that period will be judged by Architects Competency Examination (ACE) by PCATP. In this context the architects were asked about the on job training like house job for MBBS graduates by their council and it is found that 89.1% of the respondents agree that PCATP and HEC Pakistan should provide an on Job Training for fresh graduates to enhance their learned skills and knowledge of architectural education.

f) The Collaboration of Construction Industry and the Architectural Institutes

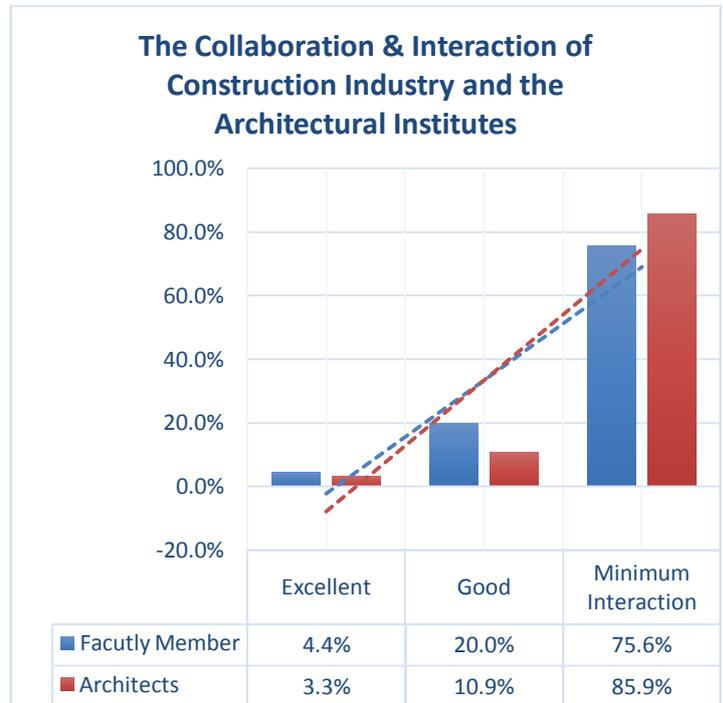|	Excellent	Good	Minimum Interaction
■ Facutly Member	4.4%	20.0%	75.6%
■ Architects	3.3%	10.9%	85.9%

Chart 9: Comparative Perception for interaction of Architectural education and Construction Industry

Respondent from both the survey groups agree that there is very interaction of the Architectural institutions and the building construction industry. The Chart shows that the majority of faculty members and practicing architects has gave their perception about the collaboration between the two factors. The finding shown here suggests that both the sectors should increase the collaboration and interaction in order to equip new architects with better knowledge of the profession.

g) Relevance and Effectiveness of Knowledge & Skills of an Architect

The respondents were asked how they see the relevance and effectiveness of skills imparted in a 5-years architectural education and the demand of skill and knowledge in the practice. Both the groups agreed with majority on 70% to 79% of the relevance of skills and knowledge of an architect in Pakistan. This data also shows that send majority of the responding architects agrees on 50-59% of relevance, which increases the concerns for architectural institutes to bridge the gap of architectural education and practice.

Relevance and effectiveness of theoretical and practical learning of skills in the 5 Year B.Arch Program with the professionals skills required in Pakistan

	90-100%	80-89%	70-79%	60-69%	50-59%
■ Facutly Member	0.0%	20.0%	33.3%	31.1%	16.5%
■ Architects	1.1%	15.2%	34.8%	22.8%	26.1%

Chart 10: Comparative Perception for Relevance and Effectiveness of Knowledge & Skills of an Architect

The trend line shows that practicing architects see the gap greater than the faculty members do.

XII. IDENTIFIED SET OF SKILLS FOR AN ARCHITECT

There is wide range of skills expected by the architectural practice in Pakistan. The most common of them that are found in this study are mentioned below.

- Different types of CAD software like, Sketch Up, and 3D studio max for visualization of design are needed the most in the market. BIM (building information Modelling) is very much important digital tool in this regard has been suggested by the respondents. Other skills they talked about the most is the communication skills. Our graduates lack in these criteria the most. Most of the institutes contain course regarding this but still we are facing this issue. Furthermore,
- Knowledge of Construction and building materials
- Technical or submission drawing skills
- Architectural Research
- Practical Designs
- Teamwork with other Professionals
- Presentation and communication skills
- Problem solving ideas
- Client Mentality, Market Values

- And building construction detailing are the skills the professional field demands

The institutes contain such type of courses in their curriculum but still if fresh architects are facing such skills related issues, this means the skills imparted form the institutes are not sufficient or outdated. Institutes need to reconsider their digital tools related course contents and methodology.

As the majority has raised the issue related about digital tools the most, the analysis of data shows that the curriculums of the institutes are obsolete in terms of digital tools and communications skills. This revels that despite of courses available at every institute, they fail to transfer the required skills thus creates a gap between the skills learned and the skills expected from fresh graduates.

XIII. CONCLUSION

The above discussions revealed that the profession must possess a set of skills and knowledge related to the real world demand and practice. The research concludes that main issue identified, as the gap is that virtually everything in the curriculum of the selected samples universities are relevant to the practice and mostly according to HEC and PCATP guidelines. What is lacking is the application, Methodology, and updated curriculum according to real world needs and practices in architecture.

REFERENCES

[1] Ahmad, K. B. (1986) 'Architectural Education in Pakistan and Problems of the Architectural Profession' in Architectural Education in the Islamic World. Ahmad Evin (ed.) Singapore: Concept Media/ Aga Khan Award for Architecture. *[Online]. Available from:* https://archnet.org/publications/3637 [accessed 22 Sep. 2019].

[2] Archi Times Interviews. 2016. Interview with ArManzoor Mehdi. Concerned for the Profession. *[Online]. Available from:* http://www.archpresspk.com/interview-architect-manzoor-mehdi/ [Accessed 8th September 2019].

[3] Archi Times Interviews. 2015. Interview with Architect Fawad Suhail Abbasi. Issue Oct. 2015. *[Online]. Available from:* http://www.archpresspk.com/excited-and-optimistic/ [Accessed 8th September 2019].

[4] Archi Times Interviews. 2015. Interview with Architect Ramiz Baig. Issue July. 2015. *[Online]. Available from:*

http://www.archpresspk.com/architect-ramiz-baig/ [Accessed 8th September 2019].

[5] Archi Times Interviews. 2016. Interview with Architect Kamran Haider. Issue April 2016. *[Online]. Available from:* http://www.archpresspk.com/interview-architect-kamran/ [Accessed 8th September 2019].

[6] Austin Poe. 2017. Mind The Gap. 28 April 2017. The Need to Bridge the Professional & Academic Divide. *[Online]. Available from:* https://www.metropolismag.com/architecture/mind-gap-need-bridge-professional-academic-divide/ [Accessed 7th September 2019].

[7] Bruner, J.S., 1996. The Culture of Education. *Harvard University Press.*

[8] Carlos Martinez. 2017. Bridging the Gap between Design Education and Practice. 03rd Oct. 2017. *[Online]. Available from:* http://www.gensleron.com/work/2017/3/10/bridging-the-gap-between-design-education-and-practice.html [Accessed 7th September 2019].

[9] COAC. 2005. Architectural Practice around the World. *International Union of Architects.*

[10] Hacer Mutlu Danaci. 2015. Creativity and knowledge in architectural education. *Procedia - Social and Behavioral Sciences.* 174.

[11] Ledewitz, S., 1985, Models of Design in Studio Teaching, *Journal of Architectural Education,* Vol. 38, No.2.

[12] Mohammad Abdullah Humayun. 2019. Scope of Architect in Pakistan. 31th August 2019. What Are the Required Skills in Architecture*?. [Online]. Available from:* https://www.topstudyworld.com/2019/08/scope-of-architect-pakistan.html [Accessed 11th September 2019].

[13] National Research Council 1999. How People Learn: Bridging Research and Practice. *Washington, DC: The National Academies Press.*

[14] Naz, N. (2007). Development of Architectural Education in Pakistan: A Historical Perspective. *GBER*, 7(2).

[15] Nicol, D & Pilling, S (2005). Changing Architectural Education: Towards a New Professionalism. *London and New York: Taylor & Francis Group.*

[16] Salama, A. (2005). New Trends in Architectural Education: Designing the Design Studio. (3rd ed.). New Jersey, USA: *International Standard Book Numbering,* United States Agency.

[17] Saxena S., Arora S., Shrivastava A. (2017) Gaps between Practice and Education of Architect—A Study of India. In: Kantola J., Barath T., Nazir S., Andre T. (eds) *Advances in Human Factors, Business Management, Training and Education. Advances in Intelligent Systems and Computing,* vol 498. Springer, Cham.

[18] Steven Holl. 2013. What is Architecture? (Art?). *[Online]. Available from:* https://brooklynrail.org/2013/09/criticspage/what-is-architecture-art?utm_medium=website [Accessed 10th September 2019].

[19] www.ceadedu.pk

[20] www.duet.edu.pk

[21] www.hec.edu.pk

[22] www.muet.edu.pk

[23] www.ned.edu.pk

[24] www.pcatp.org.pk

[25] www.uok.edu.pk

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