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BRIDGING GAPS IN ARCHITECTURAL EDUCATION: DEVELOPING A PROFESSIONAL AND CAREER-ORIENTED CURRICULUM

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Abstract

The concern about the future of architecture education has been growing in the last few decades. This phenomenon is powered by the sensation that the existing models of teaching and practicing architecture may not be appropriate enough to address the challenges of tomorrow. The aim of this research paper is to explore the missing links between the continuous chain of architecture education and the current state of the profession that leads the future. The research conducted a comprehensive review of literature, surveys of academics and Heads of School in Architecture, and the development of some case studies of the existing models of teaching and practicing architecture, in several major universities in the Middle East. It is argued that a consequence of outdated academic curricula must be changed in order to support a paradigm shift. This change would be from the "architect provider" to the "architect enabler". As a result of this issue, a new educational methodology is introduced to support: (1) building bridges between the different disciplines in order to reach integral education, and (2) building bridges between the academia and practice in order to ensure graduates have the necessary technical and social skills. Finally, the paper concludes a set of recommendations that enhance the interaction between academia, practice and the other disciplines. This develops better architectural education future that steers the goals, curricula, research, and service of academia towards the arising new realities.

Keywords

Architectural Education, Curriculum, Workplace Learning, Professional Development, Work-Integrated Learning, University-Industry Partnership

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ABSTRACT

The concern about the future of architecture education has been growing in the last few decades. This phenomenon is powered by the sensation that the existing models of teaching and practicing architecture may not be appropriate enough to address the challenges of tomorrow. The aim of this research paper is to explore the missing links between the continuous chain of architecture education and the current state of the profession that leads the future.

The research conducted a comprehensive review of literature, surveys of academics and Heads of School in Architecture, and the development of some case studies of the existing models of teaching and practicing architecture, in several major universities in the Middle East. It is argued that a consequence of outdated academic curricula must be changed in order to support a paradigm shift. This change would be from the "architect provider" to the "architect enabler". As a result of this issue, a new educational methodology is introduced to support: (1) building bridges between the different disciplines in order to reach integral education, and (2) building bridges between the academia and practice in order to ensure graduates have the necessary technical and social skills.

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1. INTRODUCTION

"These are incredibly crucial times for an exploration into the nature of professional education and practice in architecture. The profession as we know it today has undergone extensive growth and rapid change. The dramatic changes in the way practice are conducted in the last few decades that require students and practitioners alike to develop a survival strategy" (Habraken, 2003).

The best way to face the global challenges of the 21st century is with a well-rounded education that establishes a foundation for lifelong learning. This can be established by developing the capacity in students to be able to understand and realize the act of built environment within a context of the practice of architecture.

However, not only has there been little consideration of the future of architecture as a profession but even less about the inclusion of the futures thinking within the architectural education (Boyer & Mitgang, 1996). Therefore, this paper highlights the substance of architectural education that would create professional architects who would be able to deliver and implement highly creative,

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responsible and responsive solutions that address the challenges of tomorrow. It is argued that it is a consequence of outdated academic curricula which must be changed in order to support a paradigm shift. This change would be from the "architect provider" to the "architect enabler". As a result of this issue, a new educational methodology is introduced to support: (1) building bridges between the different disciplines in order to reach integral education, and (2) building bridges between the academia and practice in order to ensure graduates have the necessary technical and social skills. This includes policy level changes to revitalization in the curriculum, which is the focus of this research, in order to ensure that the future professionals are equipped to respond to the existing and future challenges.

This research is going to explore the missing links in what should be a continuous chain of architecture education, the current state of the profession, where the field may head in the *future*, and, consequently, in what ways should this impact and change *architectural school curricula* to prepare graduates for the practice of Architecture. A systematic examination of the continuum of practice in architecture education was aimed at informing curriculum development, future practice, and professional development for architecture educators, and helping to shape university policy with regard to appropriate resourcing. A further aims were: (1). to make brief pedagogical recommendations on the content of the curriculum. (2). to encourage a culture of reflection on the architectural teaching response to these changes.

2. RESEARCH METHODOLOGY

Research involved a comprehensive review of literature, an online survey of academic staff, a survey of Heads of Schools at Architecture and Design faculties in several universities in both Jordan and Egypt (as case studies of two important neighboring Middle eastern countries) and the development of case studies of good practice including innovative approaches to architectural education. A total of 150 academics completed the online survey and 50 Heads of Schools from Art, Architecture and Design Schools in the period between Oct. 2014 and Oct 2015.

3. ARCHITECTURAL EDUCATION

"Architecture is a discipline which draws knowledge from the humanities, the social and the physical sciences, technology, environmental sciences, the creative arts and the liberal arts" (UIA, 2005b). Architectural education is defined as: "that education should ensure that all graduates have knowledge and ability in architectural design, including technical systems and requirements as well as consideration of health, safety, and ecological balance; that they understand the cultural, intellectual, historical, social, economic, and environmental context for architecture; and that they comprehend thoroughly the architects' roles and responsibilities in society, which depend on a cultivated, analytical and creative mind"(UIA,2005). Architectural education develops "the capacity in students to be able to conceptualize, design, understand and realize the act of building within a context of the practice of architecture which balances the tensions between emotion, reason and intuition, and which gives physical form to the needs of society and the individual" (UIA, 2005b).

3.1 Higher Education in Both Jordan and Egypt

According to the General Conference of UNESCO at its 27th Session (Nov. 1993), higher education includes all types of studies at the postsecondary level, provided by universities that are approved as institutions of higher education by the competent state authorities.

In both Jordan and Egypt, higher education refers to a level of education that is provided by universities and community colleges. Reform in its broadest view is the modification of existing conditions in response to *present forces* or *future needs*. Specifically, reform in education is a plan which attempts to bring about a systematic *change* in educational *theory* and *practice* across a nation.

A critical study submitted by Dr. Fakhri Khader (2011) on "Strategies and Roadmap for Effective Higher Education " highlighted the challenges and difficulties that are facing institutions of higher education in Jordan, and could be applied in Egypt as well, which are

related, inter alia, relevance, management, finance, access, professional development, quality of teaching, research, community service, accountability, autonomy and academic freedom.

As these challenges have been affecting the vision, mission, processes, and outcomes of the higher education system, researcher suggested few recommendations for possible consideration and implementation by all parties involved in the area of higher education at a time that concern for higher education is increasingly becoming more and more serious.

1. Developing a culture in which awareness of and commitment to quality insurance and conceptual framework is a norm.
2. Providing for modern communication technology in order to ensure unconditional access to accumulated human knowledge.
3. Placing stakeholders and their needs at the center of the decision maker's concern.
4. Expanding student capabilities focusing on analytical skills, team–based activity and computer literacy in order to enhance the quality of higher education.
5. Establishing a center for the professional development of teaching staff.
6. Creation of a robust culture of accountability and transparency throughout higher education.
7. Introducing a new form of management which strengthens collective responsibility.
8. Calling for greater institutional autonomy and mitigating government constraints.
9. Putting in place effective methods for the assessment of the acquisition of higher – level skills.
10. Introducing measures to evaluate the outcome of higher education on campuses on a recurring and comprehensive basis.
11. Developing adequate programs to serve local communities.
12. Setting up programs to produce well–equipped graduates to participate in the rapidly evolving global market.

We can conclude that the current trends and new challenges facing the institutions of higher education in both Jordan and Egypt entail the need to rethink its vision, mission, approaches, and priorities for *future development*. Furthermore, a very hard work should be tackled in order to improve the quality of higher education and make it more accessible, manageable, and accountable to the community as a whole.

3.2 Broad Framework

It is evident that increased globalization and outsourcing of architectural work entail a need to improve the quality of architectural education and professional practice. Therefore, international and national organizations, professional associations, e.g., licensing boards in different countries such as National Council of Architectural Registration Boards (**NARB**), Royal Institute of British Architects (**RIBA**), International Union of Architects (**UIA**), the American Institute of Architects (**AIA**) etc. were established to raise the overall architectureal professional standards. Those professional associations and licensing boards have pushed for agendas that require **curriculum development** to ensure the quality of architectural education outcomes. In addition, they have pushed for agendas that require **practical training** as a part of the educational process professionals have to complete before their registration.

In Jordan, **Jordan Engineers Association** (**AEJ**) is one of the leading professional organizations that lately has started to work with the ministry of higher education to develop the quality of engineering and the architecture education and practice. **AEJ**'s vision of architecture is that of a broad and complex field that encompasses important realms of humanities, science, art and technology, each complementing and supporting the other. Therefore, it emphasizes the importance of networking and associating with experts from these fields reiterating the significance of responsive built environment that meet people and place changing needs and challenges.

Another Jordanian organization, that is devoted to architecture, is the Jordanian Architects Society (**JAS**), which is a nonprofit educational organization dedicated to cultivating the

public's understanding of architecture and the human experience. **JAS** initiates outreach efforts which promote alliances between architects and the communities in which they live and practice.

Another Jordanian foundation that was founded with the aim that science and technical application are crucial to developing education is the Royal Scientific Society (**RSS**). The focus of much of RSS work speaks of their commitment to security and stability through science. RSS have led the way in water and renewable energy technology in Jordan from their inception. **RSS** encourages innovate research in order to promote the expertise of Jordan's finest scientists and technicians for the benefit of the wider community.

In Egypt, the **Egyptian Engineers Syndicate** is the official leading professional organizations that work with the Egyptian Higher Education Ministry to develop the quality of engineering and the architecture education and practice.

Another Egyptian organization, that is devoted to architecture, is the Egyptian Society of Engineers (**ESE**), which is a nonprofit educational organization dedicated to cultivating the public's understanding of engineering and architecture. It initiates as well outreach efforts that promote interaction and practice between engineers and architects and the community.

4. PROFESSIONAL SCENARIO

Employment in the architectural field is strongly tied to the level of local construction, particularly new residential structure such as office buildings, shopping centers, schools and health care facilities. The boom in new construction in the region is expected to continue for a considerable time in the future.

4.1 Construction Industry in Jordan

During the period of 2008 – 2012, the economy of Jordan was affected by the global financial crisis. Foreign and local investments in projects such as those related to hospitality and housing, were shelved resulting in the construction industry reaching its lowest activity level. This shortfall in construction activities led to the downfall of many construction or construction related entities in the country and the reduction of the number of operating construction companies. The construction industry managed to relatively revive in 2013, with the return of large-scale international investments in building works (i.e., residential, commercial and hospitality projects) and the increased governmental infrastructure projects that led to an overall increase of 8.3% from the year 2012. Such a revival in building works is evidenced from the total number of building permits issued in the Kingdom (i.e., 10,975 licenses during the first third of the year 2013 as compared with 9,450 permits for the same period of 2012, an increase of 16.1%), (Department of statistics annual report, 2013 Jordan).

International investments in construction projects (private or public) have recently been directed towards the port city of Aqaba where major construction projects are currently on-going such as the $10 billion mixed-use development of Marsa Zayed project, the $1billion mixed–use beachfront Saraya Aqaba project, the high-end Ayla Oasis development located on the waterfront, and the oil terminal which will be used to import gas from Qatar and other sources. To account for these projects, the population of Aqaba is expected to increase from the current level of 100,000 to 250,000 over the next 10 years which will expand the need for housing, commercial and retail space as well as infrastructure projects in order to meet the demand of the increased population (http://www.marcopolis.net). Over the coming decade, it is expected that the construction sector in Jordan will continue to prosper as a result of the continuous growth of economic development currently taking place in Jordan and the consistent flow of investments as a result of the country being a major investment safe haven. Therefore, building construction sector in Jordan has been one of the main pillars of the economy, as the third largest employer next to industry sector. Construction Industry represents 15% of the Jordanian national GDP, employing 6.4% of the total average of the

workforce encompasses unskilled workers without any formal education (as shown in Table 1).

4.2 Construction Industry in Egypt

Regarding to the Egyptian case, construction is considered one of the most important sectors in the Egyptian economy, contributing 7% to the country's GDP. Egypt's construction industry registered low growth during the period of political turmoil in the country. As per the Central Bank of Egypt (CBE), the construction industry's output (in real terms) rose by only 11.4% in 2010 and 11.8% in 2012. (as shown in Table 1). As per CIE (2014), According to the political and social instability and high unemployment rates, the GDP real growth rate was only 2.2% in 2012, slumping to 1.8% in 2013. The construction industry is predicted to grow slowly in the short run. However, the overall outlook for construction in Egypt over the forecast period remains positive. The residential construction market in Egypt is expected to expand over the coming period, mainly driven by a rising population and increasing levels of urbanization. Egypt is one of the most populous countries in Africa and the Middle East, driving up the demand for new housing.

Table 1. The Distribution of the workforce by Economic Activity in Jordan & Egypt
Reference: Ministry of Labor, Annual Report, for the years (1990-2010).
http://www.mop.gov.jo
http://www.dos.gov.jo CAPMAS, Egypt in Figures,
http://www.tradingeconomics.com/egypt/unemployment-rate

Year	Workers in the economy		Agriculture				Industry				Construction			
			Jordan		Egypt		Jordan		Egypt		Jordan		Egypt	
	Jordan	Egypt	No.	%	No	%	No.	%	No	%	No.	%	No	%
2009	1220.5		34.2	2.8			156.2	12.8			81.8	6.7		
2010	1235.9	238,292	24.7	2.0	67276	28.51	152.0	12.3	28816	12.21	79.1	6.4	26940	11.42
2012		235,958			63,855	27.06			26,190	11.10			27,948	11.8

4.3 Workforce Demand and Supply

Unemployment is one of the biggest threats which face the Middle East. The Unemployment rate was estimated 22% during the First Quarter of the year 2014 (ILO, 2005). Unemployment rates among university graduates reached 45% in Jordan, 43% in Saudi Arabia, and 30% in Lebanon which has resulted in a twin challenge stemming from a surplus of university graduates alongside a shortage of relevant technical skills required by the local labor market, OCEMO, 2015.

Recent statistics have highlighted that the registered numbers of Jordanian architects are 1180 Engineer while in Egypt the number exceeds 60800. (http://www.dotmsr.com/details)

The number of engineers in Jordon is expected to reach 1 engineer per 83 inhabitants in 2020, and 1 engineer per 50 inhabitants in 2040, (http://www.jib.jo/IndustrySectors) while the number in Egypt is estimated to be 1 engineer per 149 inhabitants.

This highlights the need for significant efforts to be made to increase the ratio between practicing architect to student enrollment for a degree in architecture to meet the current and projected demand.

4.4 Migrant Workforce

On one hand, Jordan is suffering from unemployment with a rate that fluctuate between 12.8% and 11.8% between years 2010 and 2014, (Table 2). Several hundred thousand Jordanians left their country to work in neighboring Arab nations. About 60 percent of Jordanian emigrants are working in Saudi Arabia, about 30 percent are working in Kuwait, and most of the remainder found employment in other Persian Gulf states.

(http://www.gulftalent.com/repository/int/Construction_Sector_Employment_Trends.pdf)

On the other hand, Egypt is suffering from an increase of unemployment rate from 9.0% in 2010 till 13.37% in 2014, (Table 2). About 40 percent of Egyptian engineers are working outside the country; 70,000 are working in Saudi Arabia, about 35,000 are working in Emirates, while 15,000 to 20,000 working in Qatar (http: //www. http://www.dotmsr.com/details).

Table 2. Unemployment Rates in Jordan and Egypt
Reference: http://www.dos.gov.jo CAPMAS, Egypt in Figures,
http://www.tradingeconomics.com/egypt/unemployment-rate and
http://www.statista.com/statistics/377343/unemployment-rate-in-egypt/

Years	2010	2011	2012	2013	2014
Jordan	12.4%	13.1%	11.4%	12.8%	11.8%
Egypt	*9.0%*	*12.0%*	*12.7%*	12.99%	13.37%

A recent workshop on accreditation conducted by JEA and the ministry of higher education indicated that unemployment in engineers and architects can be attributed due to the low quality of significant portions of the educational program and its limited ability to impart practical skills. Studies conclude that the education of an architect should be a responsibility shared by the academia and the profession to produce well–equipped graduates to participate in the rapidly evolving global market. Thus, higher education institutions should establish guidelines and benchmarks for developing educational quality assurance standards to enhance the value, relevance, and effectiveness of the architectural profession.

Rising economic growth would result in a transformation of the built environment that is, in turn, placing new demands on architects and professionals involved in the building construction industry. As such, significant efforts should be made to make the balance between the current and projected demand for more skilled architects and engineers. This suggests essential restructuring for architectural and engineering education. Academic bodies, schools and departments, with institutional support, should establish guidelines and benchmarks for developing a responsive curriculum that would enhance students' diverse technical skills, and develop a concrete knowledge, and promote work integrated learning - developing graduate skills and attributes appropriate to the disciplines. Accordingly, a

professional development process would be needed to focus on aligning the curriculum content and practical training to the international standards in order to allow the graduated engineers and architects to avail opportunities of working in various multinational companies.

5. INVESTIGATION STRATEGIES

The paper has so far discussed how the complex world we are living today is resulting in a transformation of the built environment that is also placing new demands on higher education institutions that are responsible for ensure the quality, relevance, and accountability of the education.

In order to achieve the objectives of the study, which is to assess architectural education in the middle east academic institutions, an empirical investigation of architectural education was conducted according to the conceptual model in Figure 1.

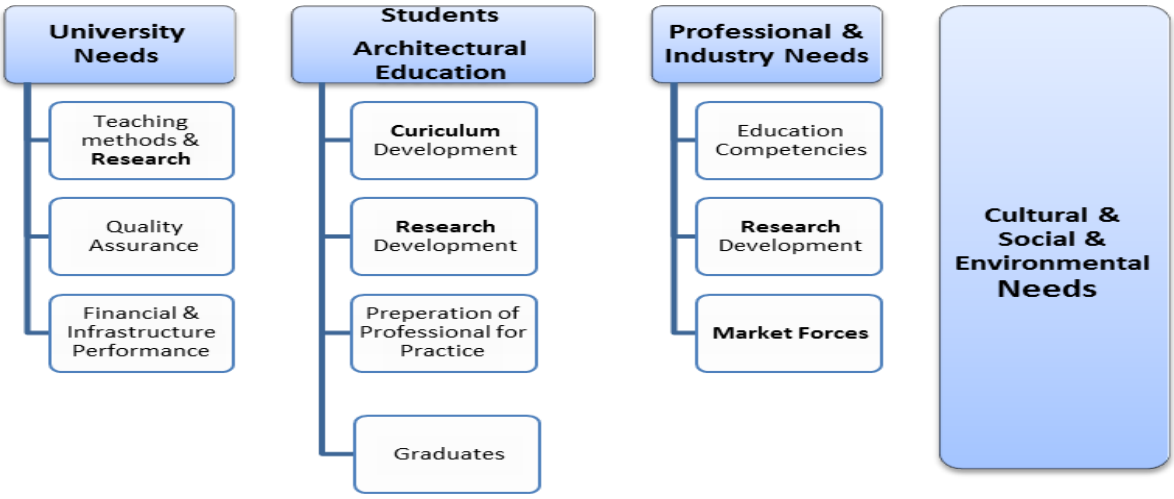

Fig. 1 Needs Analysis and Impact Diagram for Architectural Education

5.1 Curriculum Survey

A detailed survey was conducted to assess the current architectural education program and curricula capabilities in academic institutions in both Jordan and Egypt. The survey was sent to 12 universities in 2015 and responses were received from all. Architectural education was analyzed with respect to the curriculum: content, structure, courses, and to the areas of knowledge covered by the curriculum (Table 3).

5.1.1 Academic Contexts

Architecture is an interdisciplinary field that encompasses several major components: humanities, social and physical sciences, technology and the creative arts. Like other branches of professional education, architectural education is part of the university system that must, on one side, join the research with the professional practice within the context of society and sciences on the other side. The following sections demonstrate the distribution and contribution of the different areas of knowledge to other disciplines.

5.1.2 Curricular Capabilities

Commonly, schools of architecture curricula focus on the development of the following capabilities of design, knowledge and skill to develop students' ability to integrate a range of capabilities listed under "Knowledge" below (Table 3). It is this ability that distinguishes architects from other providers of built environment services.

Table 3. Curricular Capabilities Qualitative Survey
Reference: UIA (2011). Charter for Architectural Education. The International Union of Architects. http://www.uia-architectes.org/image/PDF/ CHARTES/CHART_ANG.pdf , accessed 3 Oct 2015.

Areas of Knowledge	Skills and Competence
A. Design	• Ability to engage imagination, think creatively, innovate and provide design leadership.
	• Ability to gather information, no problems, apply analyses and critical judgment and formulate strategies for action.
	• Ability to think three dimensionally in the exploration of design.
	• Ability to reconcile divergent factors, integrate knowledge and apply skills in the creation of a design solution.
B. Knowledge	**B1. Cultural and Artistic Studies**
	• Ability to act with knowledge of historical and cultural precedents in local and world architecture.
	• Ability to act with knowledge of the fine arts as an influence on the quality of architectural design.
	• Understanding of heritage issues in the built environment
	• Awareness of the links between architecture and other creative disciplines.
	B2. Social Studies
	• Ability to act with knowledge of society and to work with clients and users that represent society's needs.
	• Ability to develop a project brief through definition of the needs of society, users and clients, and to research and define contextual and functional requirements for different types of built environments.
	• Understanding of the social context in which built environments are procured, of ergonomic and space requirements and issues of equity and access.
	• Awareness of the relevant codes, regulations and standards for planning, design, construction, health, safety and use of built environments.
	• Awareness of philosophy, politics, and ethics as related to architecture.
	B3. Environmental Studies
	• Ability to act with knowledge of natural systems and built environments. • Understanding of conservation and waste management issues. • Understanding of the life-cycle of materials, issues of ecological sustainability, environmental impact, design for reduced use of energy, as well as passive systems and their management. • Awareness of the history and practice of landscape architecture, urban design, as well as territorial and national planning and their relationship to local and global demography and resources. • Awareness of natural systems management of taking into account natural disaster risks.
	B4. Technical Studies
	• Technical knowledge of structure, materials, and construction. • Ability to act with innovative, technical competence in the use of building techniques and the understanding of their evolution. • Understanding of the processes of technical design and the integration of structure, construction technologies and services systems into a functionally effective whole. • Understanding of services systems , transport, communication, maintenance and safety. • Awareness of the role of technical documentation and specifications in design realisation, and of the processes of construction cost planning and control.
	B5. Design Studies
	• Knowledge of design theory and methods. • Understanding of design procedures and processes. • Knowledge of design precedents and architectural criticism.

	B6. Professional Studies
	•Ability to understand different forms of procurement of architectural services. •Understanding of the fundamental workings of the construction and development industries, such as finance, real estate investment and facilities management. •Understanding of the potential roles of architects in conventional and new areas of activity and in an international context. • Understanding of business principles and their application to the development of built environments, project management and the functioning of a professional consultancy. • Understanding of professional ethics and codes of conduct as they apply to the practice of architecture and of the architect's legal responsibilities where registration, practice and building contracts are concerned.
C. Skills	•Ability to work in collaboration with other architects and members of interdisciplinary teams. • Ability to act and to communicate ideas through collaboration, speaking, numeracy, writing, drawing, modelling and evaluation. • Ability to utilize manual and electronic graphic and model making capabilities to explore, develop, define and communicate a design proposal. • Understanding of systems of evaluation that use manual and/or electronic means, for performance assessments of built environments.

Next, the contents of architectural education in Table 3 will be weighted according to both the research questions and the UIA's criteria which are shown in Table 4:

Table 4. Criteria used to weight the contents of architectural education

	UIA's Criteria	**Research Questions**
1.	aim to be as comprehensive in its coverage as possible, hence, be *generalist*;	Does the current system of **architectural education introduce and** *integrate* **different types of knowledge** needed for the successful creation of built environments?
2.	aim to *integrate* areas of knowledge, know-how and skills from allied professions, such as engineering, arts, economics, etc.	
3.	try to *specialize* in areas where particular foci and accuracy are essential;	Has it reacted effectively to the demands placed in the *profession by society*?
4.	allow *higher* levels of knowledge or specialization through postgraduate programmers, multi-professional courses, research or short courses;	Does the **current system of architectural education** place high value on *research* and **knowledge acquisition**?
5.	Take care *not to be fixed*, but respond to emerging forms of practice and to *changes* in the construction industry, in universities and in society at large.	Has it responded to the **dramatic changes** the profession is witnessing?
		Has it responded to the knowledge content transformations?

5.1.3 Educational Background of the Teaching Faculty

Survey questions specific to the architectural faculty's educational background revealed that most of the faculty members at the schools of architecture are either PhD holders or senior lecturers with master degree in architecture, with no or little real professional practice. Only one state university, The German Jordanian University, has an effective interdisciplinary paradigm through which "industrial professors" play a crucial role in the interdisciplinary learning. Traditionally, "industrial professors" are excluded from the teaching process. Consequently, gaps between theory, practice and society are widening in most of the Arab universities.

5.1.4 Domain Knowledge and Need for Skills Enhancement

A set of questions was designed to understand the domain expertise possessed by faculty members revealed that there is a shortage of faculty members who are specialized in some important fields such as environmental science and technology (e.g., dealing with 'low-energy and green buildings', ' building physics',), digital media , acoustics, computer skills (Revit, BIM, etc.) and building services. Meanwhile, the majority of the faculty members are specialized in urban planning and conservation. The perceived degree of difficulty in recruiting faculty for the environmental sciences and building services courses was cited as one of the major reasons for institutions' inability to lay more emphasis on environmental design and technology courses.

5.2 Curriculum Analysis

5.2.1 Areas of Knowledge

A survey has been conducted to investigate the curricula of the selected architecture schools in Jordan and Egypt. This.is an efficient and effective way to identify the ratios of knowledge areas and skills that are included in them (table 5 & figure 2).

Table 5. Different Topics in the Curriculum

Knowledge Domains	Jordanian Universities							Egyptian Universities				
	The University of Jordan	German Jordanian University	Jordan University of Science & technology	Al Ahliyya Amman University	Petra University	Applied Science University	Jordanian Uni. Total Avg. %	Cairo University	American University of Cairo	German University of Cairo	Misr International University	Egyptian Uni. Total Avg. %
Architectural Design	31.4	64.2	40.8	36.7	33.3	33.5	40	21.6 28.9	30.2	29	27-31.9	30
Materials and Methods of Construction	8.7	3.2	5.3	5.4	4.8	4.8	5.4	13.3 - 17.2	9.8-11.7	9.1	12.3-15.3	13.3
Engineering system	3.5	9.6	10.1	11.4	8.5	8.4	8.6	11.6	5.5-7.5	7.3	6.7-7.9	8.5
History & Theory of architecture	12.2	15.5	16.0	12.7	12.7	4.8	12.3	4.4-7.8	7.5-9.2	9.1	9.2-11	9.3
Urban Studies	10.5	8.6	20.7	12.0	9.1	10.2	11.9	2.2-5.5	3.7	7.3	3.6-5.5	5.5
Project management & practice profession	8.1	4.8	3.6	3.6	3.6	10.2	5.7	3.3-5	3	7.3	1.3-3	11.3
Environmental studies	3.5	3.2	5.3	5.4	4.8	10.2	5.4	6.1-18.1	1.8	1.8	3-4.9	6.65

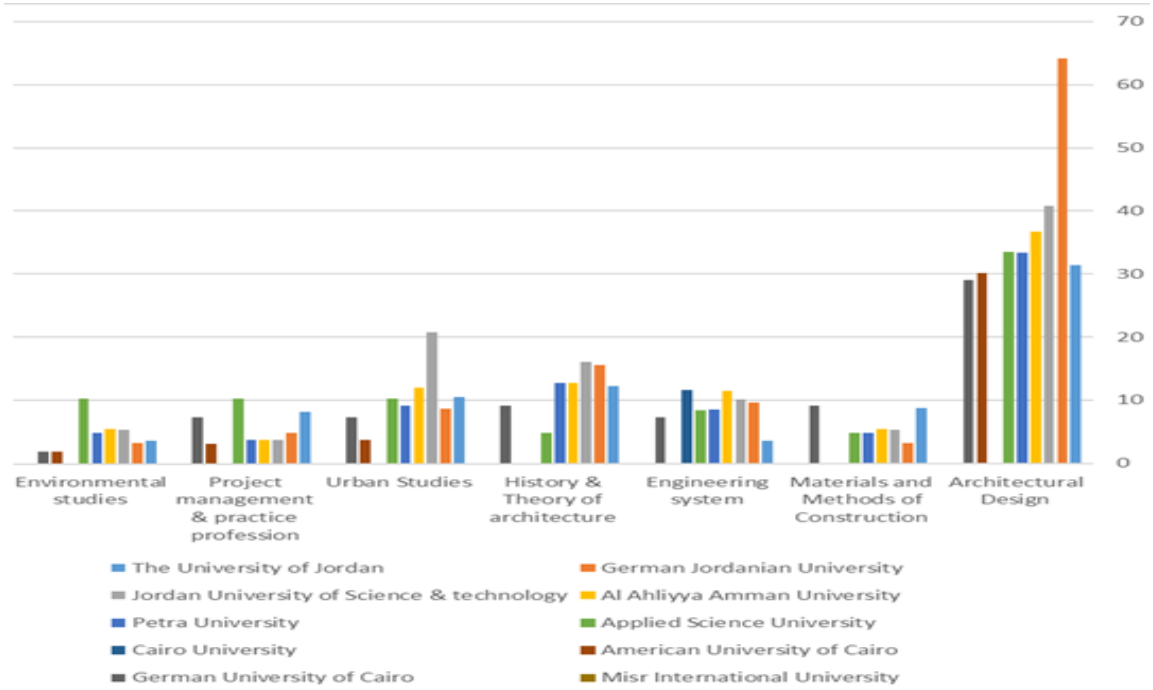

Fig. 2 Different Topics in the Curriculum

5.2.2 Course content and delivery

While, the present architectural curricula offer considerable flexibility to all architectural schools and provide high level guidance on structuring various subjects, it has been noted that few or no courses were upgraded with relevant content to address people and environs present and future needs and challenges. Very little effort is made to incorporate the practical aspects of design into the teaching methodology. This results in limited integration of environmental science and technology classes (dealing with 'green architecture', ' energy efficiency concepts', 'digital media' or other seemingly cutting-edge subjects) with the overall building design sensibility.

It is necessary to note that the present architectural curriculum model offers enough flexibility to include or exclude any course or change course credit structure. Thus, advantage of this flexibility should be taken in order to enhance the 'futures' component within the architectural curricula. This should be included within existing courses' content, delivery and methods as well.

5.2.3 Research

There is a shortage of rigorous research work in the field of architecture in general in the country. Although international and national research and projects grants are available through educational institutions and international organization (e.g., Erasmus, TEMPUS, etc.), but they are not invested by either faculty members or practitioners.

The survey revealed that the shortage of research work can be explained due to the teaching workload that is assigned to the educators, since each should have not less than 12 credit hours to teach on weekly basis. The problem become worse when courses that have to be taught are studios, since the load in this case will be doubled. Practical courses and studios have contact hours that are double of the theoretical courses credit hours. This means that educators' time is mostly consumed in teaching process and no time for research. Thus, institutions should identify and implement strategies to find a viable balance between teaching and research workloads and productivity. Making additional time for academic research will require effective prioritization of teaching and learning and research practices and processes. Funding researches and facilitating

the accessibility to international journals would improve research performance of Architecture educators, which will enable them to be more updated and equipped to address the challenges that are facing architecture education.

5.2.4 Educational Background of the Teaching Faculty

The survey showed that only one State University (German Jordanian University) out of the surveyed universities included "industrial professors" within their academic teaching staff. Meanwhile, the inclusion of expert industry mentorship and input adds a further dimension to the pedagogic approach as the theoretical and simulated academic projects would be supplemented by expert industry knowledge and experience. Industry and expert professional input further exposes students to the professional, legal and ethical frameworks in which professionals practice. "Industrial professors" add valuable cultural layers of engagement to the interdisciplinary learning environment, and thereby stimulate the creation of regional identity in built form. Hence, an interdisciplinary learning space emerges, which integrates multiple disciplines, practice and society. This interdisciplinary paradigm could effectively bridge the existing gaps between theory, practice and society.

6. RECOMMENDATIONS

Community Enlightenment:

Architecture and the environment should be introduced as part of the general education at primary and secondary schools, in order to understand the profession of architecture and the role of the architect in society. An early awareness of the built environment is important to future architects, clients and users of buildings.

Bridging the Existing Gaps between Academia, Practice and Society:

The present landscape clearly shows the need for establishing fruitful interactions between education and practice in building design, which have to be addressed creatively in order to bridge the disciplinary domains of the numerous stakeholders that participate in creating the built environment. Institutions, schools and departments should recognize that their staff needs to encompass, in aggregate, a mix of industry/professional and academic skills in order to meet the Architecture and Design discipline learning objectives (Cuff, 1991). Aligning education pathways to meet national and international industry needs. This can only be achieved through: (1) a constant and continual partnership with industry and other stakeholders to create courses and programs that could potentially bridge the gap and provide interdisciplinary education (2) Collaborating with industry to anticipate the future needs of the workforce. (3) Building hands-on and work-integrated learning opportunities and internships for students through partnerships with industry. (4) Encouraging globally portable graduates through internationalization of the curriculum and study aboard opportunities.

Conferences and publications:

Continuous curriculum renewal needs to focus on key skills or attributes, and authentic learning experiences acquired either externally to the institution. Conferences and publications shall be designed to bring many of the innovative educational works such as the AIA, UIA, etc. experiences in curriculum development in the open so that communal learning could take place.

7. CONCLUSION

This research focused on evaluating the existing Jordanian and Egyptian architectural curriculum in order to highlight how an effort can be initiated, incorporated and sustained to include *future needs* as an integral part of the architectural education. However, the current architectural curriculum is overwhelming discipline-specific and *introverted*, which goes against the intentions of an *interdisciplinary learning environment*. Architectural education therefore, has to *epistemologically transform from an introverted, intuitive silo* to expose itself in order to respond to the *realities* and *challenges* facing the built environment at the social, economic and

environmental levels. This suggests *extroversion* in order to engage the allied disciplines as well as relevant representatives of society, in order to produce meaningful and relevant solutions to the problems plaguing the built environment. A re-conceptualization of the architectural curriculum as well as learning spaces is necessary in order to achieve this epistemological balance.

Regarding the role of the accreditation process and its impact on the curriculum and its components, it is essential to the viability and sustainability of an institutions architectural programme. Criteria for accreditation are almost invariably expressed in terms of minimum standards, of domain specific core technical abilities acceptable to the accrediting authority that must be achieved by all graduates. In practical terms this means the accreditation criteria are the abilities of the weakest passing graduate.

An "accreditation imperative" dominates most such programmes, and the minimum standards set by the accreditation criteria often become "criteria for assessment". In the worst situations the minimum standard core competencies become the whole curriculum, with teaching confined to the minimum necessary to "pass" the accreditation criteria, and passing all the accreditation criteria is often claimed as "excellence".

Finally, it can be concluded that key changes in contemporary architectural education should be generated by developing the accreditation criteria of existing curriculum in response to present forces or *future needs*. Higher Education in both Jordan and Egypt should establish clear and consistent articulation agreements between education providers, other organizations and courses that recognize the types of learning opportunity distinctive to industry/professional practice as well as standard academic tertiary entry ranking indicators. The challenge for every institution is to understand the competing needs of this paradigm shift. Some of the ways to achieve this is through an informed and systematic curriculum renewal.

REFERENCES

- Ackoff, R., L. (1974). Redesigning the Future: A Systems Approach to Societal Problems, John Wiley, New York, USA.
- Becher, T. (1989). Academic Tribes and Territories: Intellectual Inquiry and the Culture of Disciplines, the Society of Research in Higher Education, Milton Keynes, United Kingdom.
- Boyer, E. & Mitgang, L. (1996). Building Community- A New Future for Architectural Education and Practice. Carnegie Foundation for the Advancement of Teaching, New Jersey, USA.
- CAPMAS (2014), Central Agency for Public Mobilization and Statistics
- CIE, (2014). Construction in Egypt – Key Trends and Opportunities to 2018, Timetric Ltd.
- Cuff, D. (1991). Architecture: The Story of Practice, MIT Press, Cambridge, Mass, USA.
- Fakhri Khader (2011)."Strategies and Roadmap for Effective Higher Education in Jordan". https://www.uop.edu.jo/download/research/members/111_1548_khad.pdf, accessed 3 Oct 2015.
- Department of statistics, Jordan , http://www.dos.gov.jo/
- Habraken,J. (2003). Questions that will not Go Away: Some Remarks on Long Term Trends in Architecture and their Impact on Architectural Education, Keynote Speech: Proceedings of the Annual Conference of the European Association of Architectural Education-EAAE, Hania, Crete, Greece. pp. 32-42.
- Fethi, Ihsan and Others (1993): Towards Bridging the Gap between Theory and Practice: The Status of Construction and Affiliated Courses in Arab Architectural Education Today. Published in Open House International, Newcastle, vol. 18, No 4, pp.11-18.
- Kumar, Satish, Anurag Bajpai, Rajan Rawal, Sudha Setty. 2009. "A Need for Curriculum Enhancement in Architectural Education to Promote Sustainable Built Environment and Mitigate Climate Change". In *Proceedings of International Conference of Education, Research and Innovation.* Madrid, Spain.
- Kumar, Satish, Narayan Shruti, Manu Sanyogita, Tulsyan Ankur. 2010. "Role of Architectural Education in Promoting Sustainable Built Environment". New Delhi, India.
- LaConte, R. 1975. Teaching Tomorrow Today, in Bermudez Julio's The Future in Architectural Education. 1999. University of Utah, USA.

- McKinsey & Company. 2005. The Emerging Global Labor Market: Part II—The Supply of Offshore Talent in Services. San Francisco, USA.
- [UIA] International Union of Architects. 2005a. Survey on Architectural Profession around the World.
- [UIA] International Union of Architects. 2005b. UNESCO/UIA Charter for Architectural Education. Paris, France.
- UIA (2011). Charter for Architectural Education. The International Union of Architects. http://www.uia-architectes.org/image/PDF/ CHARTES/CHART_ANG.pdf , accessed 3 Oct 2015.
- Waits, Mary Jo, and Judith A. Vandegrift. 1998. The Achilles Heel of Future Economic Growth: The Workforce Development Challenge. Morrison Institute of Public Policy. ASU, USA.
- http://eng.cu.edu.eg/en/credit-hour-system/credit-bachelor-programs/ accessed 15 Jan 2016
- http://catalog.aucegypt.edu/preview_program.php?catoid=20&poid=2924&returnto=839 / accessed 15 Jan 2016
- http://www.dotmsr.com/details/نقابة-الم-هندسين-ن-ساند-الدولة-بخ-طتها-التنموية / accessed 1 Jan 2016
- http://www.miuegypt.edu.eg/academics/faculty-of-architecture/ accessed 15 Jan 2016
- http://www.statista.com/statistics/377343/unemployment-rate-in-egypt// accessed 1 Jan 2016
- http://www.tradingeconomics.com/egypt/unemployment-rate / accessed 1 Jan 2016