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STAKEHOLDER'S PERSPECTIVES ON PROFESSIONAL COMPETENCIES OF ARCHITECTS IN NIGERIA: A CASE FOR CURRICULUM REVIEW

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***Abstract* - This paper examined the broad evidenced-based view of all stakeholders in the architectural profession on the knowledge, skills and attributes expected of architects in Nigeria with a view to identifying the major industry-relevant competencies necessary for the profession. Structured questionnaire was used to elicit information from practising architects, allied building professionals and contractors. Data were analysed using Relative Importance Index and Kruskal-Wallis test. Results revealed that computer-aided design skills and knowledge of sustainable design are the foremost significant new competencies required of architects in Nigeria. The paper concludes that architectural education curriculum needs to be reviewed to include these skills.**

Keywords - *Architectural education; Architectural practice; Competencies; Construction Industry; Curriculum; Twenty-first century challenges.*

Introduction

Architecture is an age-long, prestigious profession that gives practical expression to the needs, expectations and improvement of quality of life of individuals, social groups, communities and human settlements through the creation of forms and city structures that are not only functionally efficient but also structurally sound and aesthetically pleasing. For ages, the profession relied on apprenticeship system to perpetuate itself (Sutton, 1999; Nikolaev, 2010; Encyclopedia Britanica, 2016; Tzonis; 2014; Abdulkarim, 2005; Salama, 1995; Chakraborty, 2014; Maina, 2015). In modern times, it reproduces itself through an institutionalised education system that is based in universities and polytechnics. The training programme generally encompasses knowledge in all vast areas of human endeavour ranging from psychology, economics, management, politics, and philosophy to physical sciences. The students are also equipped with a set of specific skills that facilitate the application of knowledge to be able to perform the above role effectively. The relevance of all these competencies is well documented in the literature (Abdulkarim, 2005).

The contents of these architectural curricula are, however, under heavy criticisms in recent times. For instance, the architectural education in most countries, especially developing countries, has been faulted with inability to adequately prepare the graduates to meet the challenges of the changing world. As observed by several scholars, the education does not respond to environmental crisis plaguing the world (Amos-Abanyie et al, 2014; Dare-Abel et al, 2015); emerging volatile global

economy; advancement in information and communication technology (Oladele, 2008; Ogunrayewa et al, 2012; Dare-Abel et al, 2015; Salleh et al, 2013) and the changing urban patterns and envelope (Baba, 2014; Elendu & Abdulkarim, 2009; Onyegiri et al, 2014).

In another perspective, critics argue that the existing curriculum is too loaded and time consuming (Tzonis, 2014; Till, 2003). In their opinion, accommodating the new competencies brought about by the changing forces could make the curriculum more tedious and fragmented (Tzonis, 2014; Till, 2003). They, therefore, call for restructuring of the education to focus on teaching of fundamentals of the core of architectural knowledge only. Given these conflicting and shifting demands, which are based on heuristic research and personal judgement, there is need to re-examine the current education programme by categorising and prioritising education competencies to circumvent the impasse.

This task, according to Oluigbo (2005) goes beyond the architectural educators and university communities alone. The input of other stakeholders especially the practitioners and the contractors is equally important to avoid biased perception. The purpose of this study is to examine the views of these stakeholders on the competencies expected of architects in the twenty-first century. The results of the study would guide the policymakers in the development of architectural curriculum that is responsive to the needs and sociocultural realities of both the immediate and global society.

Conceptual Issues And Review Of Related Literature

Competency is a concept used to label particular abilities that an individual needs to perform work roles or occupational functions effectively. It is generally defined as the capability to apply or use a set of related knowledge, skills and attributes to successfully perform critical work functions or tasks in a defined work setting. This definition provides a useful guide to the different units of competencies that are necessary to be able to assess the competence of a worker in a given assignment. Competency can therefore be conceptualised as having three components: knowledge, skills and attributes.

The first of these, *knowledge*, relates to facts, information, description, insights, meanings, opinions or attitudes which is acquired through experience or education by perceiving, discovering or learning. It can be referred to as the theoretical or practical understanding of a subject or situation acquired through education. University of Nebraska-Lincoln (2017) defines it as 'the cognizance of facts, truths and principles gained from formal training and/or experience'. It facilitates the acquisition of new skills (National Directorate of Employment, 1989). Its application and sharing is, therefore, considered to be critical to individual and organisation's success (National Directorate of Employment, 1989; Amos-Abanyie, et al, 2014).

Skill (or technical skill), on the other hand, refers to an ability and capacity acquired through deliberate, systematic and sustained effort to smoothly and adaptively carry out complex activities or job functions involving ideas, things and/or people. It is a developed proficiency or dexterity in a specific kind of activity, particularly one involving methods, processes, procedures or techniques such as draughting and photography (Osemeke, 2012). It involves specialised knowledge and technical ability within that specialty, and facility in the use of tools and techniques of specific disciplines. The skill is developed through training, practice and experience.

The third component, *attribute*, encompasses those soft skills, personal or interpersonal, that are genetically developed or acquired from one's accumulated life experiences which have effect on the performance of a worker. University of Nebraska-Lincoln (2017) describes it as an ingrained, problem solving behaviour used appropriately and responsibly in the management of personal affairs. They are essentially used to handle problems and questions commonly encountered in daily human life.

It is worth noting here that the kind of competencies required of each member or worker in any organisation is triggered by the culture and values of the organisation. As such, each organisation or institution carefully selects a unique set of competencies that support and facilitate these values and goal. For the architecture profession, the ultimate goal is to give practical expression to the needs, expectations and improvement to the quality of life of individuals, social groups, communities and human settlements (UNESCO/UIA, 2011). This demands that architects are equipped with the necessary knowledge and skills to meet these expectations. The UNESCO/UIA Charter on Architectural Education generally classifies them into three, covering design capabilities, knowledge and skills. According to the Charter, sound knowledge of design theories, design methods and procedures as well as design precedents and architectural criticism are crucial to architectural professional competence.

Contributing along this line, Rapoport (1979), while explaining the importance of history to architectural education explained that a full understanding of the historical styles can help an architect to establish constancy and change in design pattern, which, in turn, provides a basis for prediction of future changes.

The Charter further recognises the need for graduate architects to be well versed in cultural and artistic studies, social studies, environmental studies and technological studies. These are broken down into context, technology, regulation, professionalism, procurement, management and communication. Such knowledge would enable students to cope with the dynamics of the changing world technology, material innovation, management techniques, knowledge profusion and complex client requirements and prepare them for the commercial world of architecture (Usama, 2014; Oladele, 2008; Ogunrayewa et al, 2012; Dare-Abel et al, 2015; Salleh et al, 2013; Baba, 2014; Onyegiri et al, 2014). Jules (1979) added that knowledge of visual-ordering techniques used in visual arts is needed to mould the architectural composition so that it communicates the appropriate messages to the users and the admirers of building.

In recent times, there were advocacies for the introduction of entrepreneurship education in the schools of architecture. It was argued that the teaching philosophy of architectural schools should provide the students with support and guidance in expanding their expertise by combining design with entrepreneurship. This, in the long run, would enable them compete in a rapidly changing economy (Dare-Abel, et al, 2015; Usama, 2014; Salleh et al, 2013). There have been also calls for the teaching of sustainable design skills (Amos-Abanyie et al, 2014; Dare-Abel et al, 2015). According to these scholars, students are expected to be introduced to environmental ethics and equipped with skills and knowledge in those designs that combat and mitigate the consequences of environmental degradation. In a related development, scholars have pointed out that a large number of architectural schools in Nigeria and other developing countries are failing to connect architecture with complex urban patterns and envelope and the advancement in information and communication technology (Oladele, 2008; Ogunrayewa et al, 2012; Dare-Abel et al, 2015; Salleh et al, 2013; Baba, 2014; Onyegiri et al, 2014; Elendu & Abdulkarim, 2009). They argue that the teaching of computer-aided design skills would enhance the job readiness of the students in the global market, as virtually all aspects of architectural services have gone digital.

A number of soft skills have also been considered by several authors as the innate marks of architects. Salleh et al (2013), for example, posit that graduate architects are expected to demonstrate ability to work under pressure both independently and as a team member. They add that flexibility is an important attribute an architect must possess to be able to play his managerial roles in environmental design, planning and management. As the architectural services and clients' demands become complex, architects need to be able to adapt to changes while keeping focus on goals and apply knowledge to prevailing circumstances. This, according to them, would keep him fit in the changing world of architecture. Okpoechi (2005) also notes that a good working relationship between all participants of the project team needs to be sustained throughout the duration of a project for the successful execution of the work. She observes that the sustenance of this relationship becomes more difficult as building process becomes more complex and more adversarial. As such, architect needs to be a good team player to be able to navigate the complexities.

Kwofie et al (2016) and Onyegiri et al (2014) argue that complexity of modern construction infrastructure; modern practices in design and construction have necessitated a paradigm shift in the construction industry's clients' demands and needs. This complexity puts demands on architects of the leading edge of practice that are increasingly beyond the capacity of any individual. In this regard, the success of any building project depends on the effective communication among the project participants (Polatoglu & Vural, 2012; Okpoechi, 2005). Both communication (oral and written) and leadership skills of architects are therefore central to the project's coordination and success. Salleh *et al* (2013) add that presentation skills are very essential in the teaching of architecture as graduate architects are expected to give presentation to their clients on a regular basis. They also need graphical communication skills such as drawing, model making, printing, photography and graphic art to effectively communicate with their clients and other members of the construction team.

The importance of research in architectural practice and education has equally been stressed by several authors. Whitman (2017) pointed out that the increasing profile of architects' works in terms of new building types, new building systems and products, new procurement methods, new urban problems, new global environmental issues which are beyond the conventional wisdom calls for the development of new knowledge through research if the profession is to maintain its expertise and relevance now and in future. This view is shared by some scholars who link success in modern design to ability to source for highly technical information. The ability to gather information and apply analysis and critical judgement is therefore crucial to the performance of an architect in this complex

and dynamic world of architecture (Kwofie et al, 2016; Architects Accreditation Council of Architects, 2015; UIA, 2014).

While all these scholars are advocating for the introduction of these competencies in the school curriculum, another school of thought argue that the existing curriculum is too loaded and time consuming (Tzonis, 2014). In their opinion, accommodating the new competencies could make the curriculum more tedious and fragmented (Tzonis, 2014; Till, 2003). They, therefore, call for restructuring of the education to focus on teaching of fundamentals of the core of architectural knowledge only. Till (2005) even consider this attempt as irrelevant. He argues that societal and spatial constructs are rapidly emerging and thus what is considered to be new today may be obsolete and irrelevant before the students graduate from school. To him, the radical contingency of architectural practice demands new forms of education rather than new forms of knowledge. The question that readily comes to mind is: How will the architects be educated? What constitutes this new form of education? What are the fundamentals of the core of architectural knowledge? These are questions still begging for answer.

Methodology

The target population for the study consists of three groups who are major players in the education and practice of architecture: the architects, allied professionals (civil engineer, quantity surveyors, electrical engineers, town planners) and the contractor who are all working in Lagos. The sampling frames for the practising architects and allied professionals were drawn from the membership directory compiled by their respective professional bodies. Two hundred (200) architects were randomly selected using a table of random number. One hundred and sixty-seven eventually participated. Similar technique was used in selecting 250 allied professionals from the directory of their respective professional bodies, out of which 211 responded to the questionnaires. The sampling frame for the contractors could not be determined because such information could not be obtained. Hence, the study used a quasi-snowball technique to obtain the list of contractors. Each practising architect selected was asked to give the names and addresses of at least one contractor he/she has worked with, resulting in 98 contractors participating in the study.

All the three categories of respondents were asked to rate the importance of competencies required of architects on a five-point scale (from 0 to 4), using ‘0’ for not important, ‘1’ for slightly important, ‘2’ for important, ‘3’ for very important and ‘4’ for extremely important. These were assessed for their relative importance index using the mean item score computed as follows:

$$\text{Relative Importance Index (RII)} = \frac{4n_4 + 3n_3 + 2n_2 + 1n_1 + 0n_0}{4N} \qquad (0 \leq \text{RII} \leq 1)$$

Where: n_0 = number of respondents for not important
n_1 = number of respondents for slightly important
n_2 = number of respondents for important
n_3 = number of respondents for very important
n_4 = number of respondents for extremely important
N = total number of respondents

The relative importance indices were then ranked from the highest to the lowest in order to determine the importance of each of the elements of competencies. To determine whether the ratings of the respondents depend on the category of respondents or not, the result was further subjected to Kruskal-Wallis test using SPSS software package (version 25.0).

The respondents were further asked to classify each competency into core, basic or optional. (The basic competency was defined in the questionnaire as that competency that is common to all professionals in the building industry; while core competency was defined as the one that is uniquely required of architect. Optional competency was referred to as the one that reflects area of specialisation or future career diversification). This was intended to categorise and prioritise the competencies so that attention and resources that are commensurate with the importance of each competency can be given to it in the architectural curriculum. The number of respondents for each of the three options for a particular competency was expressed as a percentage of the total number of respondents. The preferred classification for a particular competency was then conceded to an option with highest percentage.

Data Presentation And Analysis

The study sought to find out the competencies that are considered crucial to the training of architects in Nigeria. The results are presented in four sections: sample characteristics, ranking of the professional competencies, statistical testing of differences in rating of competencies and classification of competencies into basic, core and optional courses.

1. Sample characteristics

Table 1 indicates the background information on the respondents. Among the respondents, 35% were Architects, 19% were Quantity Surveyors, 4% were Builders, 16% were Engineers, and 6% were Town Planners while the remaining 21% were Contractors. Majority of the professionals were full or corporate members of their professional bodies (54%). Thirty-nine and 7 per cent of them belonged to associate and fellow categories respectively. The average years of working experience is put at 13 and most of them had bachelor and master's degree as the highest qualification. A great number of them (76%) were male, while 24% were female. With this diversity in academic and professional background, the respondents could be said to represent various interests in the construction sector which gives credibility to the data collected.

Table 1: Sample Characteristics

Variables	Category	Frequency	Percentage
Sex	Male	363	76
	Female	113	24
Age	18 – 35	205	43
	36 – 55	233	49
	56 & above	38	8
Profession	Architects	167	35
	Builders	19	4
	Engineers	76	16
	Quantity Surveyors	90	19
	Town Planners	26	6
	Contractors	98	21
Years of working Experience	1 – 5	119	25
	6 – 10	124	26
	11 – 15	124	26
	15 & above	109	23
Professional Membership Categories	Associate	186	39
	Full/Corporate	257	54
	Fellow	33	7
Highest Educational Qualification	HND/B.Sc	252	53
	Masters	200	42
	Ph.D	24	5

2. Level of Importance of the Professional Competencies Expected of an Architect

The level of importance of the professional competencies expected of an architect is determined and presented in Table 2. According to the result, all the competencies stated are very important and relevant to the study of architecture. The Computer Aided Draughting skill (RII= 0.85, R=4th) was however rated the highest among the new skills being advocated for inclusion in the curriculum while Entrepreneurship Education was considered the least (RII=0.71, R=17th). Architectural Design knowledge maintains its lead. It was ranked first by all the three categories of stakeholders.

Table 2: Relative Importance Indices and Ranking of the Professional Competencies

Competencies	Architects (N= 167)		Allied Building Professionals (N= 211)		Contractors (N= 98)		Overall Average (N=476)		
	RII	R	RII	R	RII	R	RII	R	Kruscal-Wallis *p*-value
Architectural Design	0.97	1st	0.96	1st	0.93	1st	0.93	1st	.060
Construction Technology	0.88	4th	0.87	2nd	0.83	2nd	0.86	2nd	.065
Professionalism	0.89	3rd	0.85	4th	0.81	5th	0.86	2nd	.150
Computer Draughting	0.87	5th	0.86	3rd	0.80	6th	0.85	4th	.251
Environmental Sciences	0.84	8th	0.81	6th	0.79	7th	0.81	5th	.451
Contract Administration	0.78	15th	0.82	5th	3.30	2nd	0.80	6th	.369
Sustainable Design	0.84	8th	0.76	11th	0.83	2nd	0.80	6th	.155
Research Skills	0.79	13th	0.81	6th	0.78	9th	0.79	8th	.720
Graphic Skills	0.85	7th	0.80	9th	0.73	13th	0.79	8th	.002*
Material Science	0.95	2nd	0.62	18th	0.78	8th	0.78	10th	.445
Regulation	0.84	8th	0.75	12th	0.75	12th	0.78	10th	.334
Model Making	0.87	5th	0.67	17th	0.76	10th	0.77	12th	.001*
Architectural History & Theories	0.80	11th	0.79	10th	0.68	17th	0.76	13th	.067
Management Principles	0.79	14th	0.71	13th	0.76	10th	0.75	14th	.106
Behavioural Studies	0.80	11th	0.71	13th	0.70	16th	0.74	15th	.070
Theory of Structures	0.77	18th	0.70	16th	0.71	15th	0.73	16th	.134
Entrepreneurship Education	0.62	21st	0.80	8th	0.72	14th	0.71	17th	.164
Landscape Design	0.77	16th	0.71	13th	0.56	21st	0.68	18th	.000*
Urban Planning & Design	0.77	16th	0.56	20th	0.66	18th	0.66	19th	.139
Fine Arts	0.68	19th	0.56	20th	0.63	19th	0.62	20th	.238
Interior Design	0.68	19th	0.61	19th	0.58	20th	0.62	20th	.133

Note: RII = Relative Importance Index; R = Ranking; * = Significant at 0.05
Source: Authors' Analysis (2019)

3. Differences in Rating of Competencies

The relative importance indices for all the competencies as ranked by the three categories of respondents are shown in Table 2. The Independent-Samples Kruskal-Wallis Test, at 95% confidence level, indicates insignificant difference in the rating of the majority of the competencies among the three categories of the respondents. The architects, the allied professionals and the contractors are unanimous in the rating of these competencies, including all the new skills advocated for inclusion in the curriculum by most scholars. They, however, differed in the rating of Graphic Skills, Model Making and Landscape Design.

4. Classification of Knowledge and Skills

According to Table 3, eight of the competencies were categorised as basic. These include: Material Science; Theory of Structures; Fine Arts; Urban Planning and Design; Management Principles; Regulation; Behavioural Studies; and Entrepreneurship Education. Ten competencies were considered uniquely required of architect. They include: Architectural Design; Construction Technology; Environmental Sciences; Architectural History & Theories; Professionalism; Contract administration; Sustainable Design; Computer-Aided Draughting; Research Skill; Graphic Skills and Model Making. Two competencies (Interior Design and Landscape Design) were seen as skills that one can specialise in in future.

Table 3: Classification of Knowledge and Skills

Competencies	Core		Basic		Optional		Preferred Classification
	Freq	%	Freq.	%	Freq.	%	
Architectural Design	390	82	81	17	5	1	Core
Material Science	186	39	271	57	19	4	Basic
Construction Technology	276	58	186	39	14	3	Core
Theory of Structures	143	30	276	58	57	12	Basic
Environmental Sciences	228	48	224	47	24	5	Core
Architectural History & Theories	243	51	162	34	71	15	Core
Fine Arts	90	19	248	52	138	29	Basic
Urban Planning & Design	171	36	219	46	86	18	Basic
Management Principles	186	39	219	46	71	15	Basic
Professionalism	333	70	114	24	29	6	Core
Contract Administration	228	48	219	46	29	6	Core
Regulation	186	39	228	48	62	13	Basic
Behavioural Studies	186	39	228	48	62	13	Basic
Sustainable Design	267	56	167	35	42	9	Core
Entrepreneurship Education	171	36	267	56	38	8	Basic
Graphic Skills	290	61	153	32	33	7	Core
Model making	267	56	147	31	62	13	Core
Computer Draughting	290	61	153	32	29	6	Core
Research Skills	233	49	176	37	67	14	Core
Landscape Design	109	23	171	36	195	41	Optional
Interior Design	129	27	171	36	176	37	Optional

Source: Authors' Analysis (2019)

Discussion

From the results, there seems to be a consensus that all the new skills are considered by all the stakeholders in the building construction industry as important to the training of architects. This is consistent with the opinion of several scholars who see the acquisition of these skills by the budding architects as very essential for them to survive in the changing world of construction industry. It therefore follows from these findings that architectural education needs to be revised and renewed for it to be able to deal with the new problems and challenges.

To address the boredom or tedium the incorporation of the new skills into the curriculum may suggest, skills that are classified optional could be made free electives. These could form areas of specialisation within the field in future. This is very important considering the findings of Nicol and Pilling (2000), which revealed that not all architectural graduates go into the mainstream when they leave school. A large number of them embark on careers that only have marginal connection with the construction industry. All this is pointing to the need for standard-bearers of architectural education to redesign the curriculum in such a way that students could diversify after their studies by making them to have at least basic knowledge in elective courses that are culturally relevant. This will make them to be more versatile and lay intellectual foundation for life long training of architects needed to keep them abreast with and to properly respond to the dynamic changes in construction and development activities.

A set of ten skills were also considered to be central to the core of architectural profession. The acquisition of these skills and knowledge is believed to provide proficient level of ability or knowledge to render basic architectural services to the client. While these are accorded priority in the curriculum, as said earlier, opportunities should also be given to students to devote their attention to the courses that personally excite them.

Conclusion

The paper has examined the stakeholders' perspectives on knowledge, skills and attributes expected of architects in Nigeria. It established that the majority of the stakeholders considered the new skills crucial to the training of architects. The profession, therefore, needs to restructure itself and re-engineer its services to be able to cope with the changing world. This implies that architectural knowledge need not only be deep but must also be broad to enable the graduates diversify after leaving school. This should, however, not make learning too cumbersome for the students by overloading the curriculum. A rigorous and cohesive curriculum where certain competencies considered to be optional are assigned elective status is desirable. Such curriculum will help the students in acquiring knowledge and right attitudes that will enable them face the seemingly ferocious globalised job market.

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