Employers' perception of employability skills among built-environment graduates

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Abstract

Purpose – Universities have become training centres or "academic hubs" where skilled labour for societal and global consumptions are continuously produced. More so, the quality of teaching (pedagogy) provided by universities is essential in enhancing the skills, expertise and competencies of students who are required to meet the needs of the construction industry after graduation. Hence, the purpose of this study is to assess employers' level of satisfaction with the employability skills of built-environment graduates in Nigeria.

Design/methodology/approach – A quantitative approach was adopted for this study with close-ended questionnaires administered to respondents drawn from professionals in the Nigerian construction industry. Out of 150 questionnaires disseminated, 131 were completed and 126 were usable, signifying an 87% response rate. Data from this research were analysed using descriptive and exploratory factor analysis.

Findings – Employers are seemingly satisfied with the sound academic record of built-environment graduates. They also affirmed their contentment with graduates' willingness to learn and the way they achieve tasks with positive results. However, they expressed their dissatisfaction with the graduates' prior work experience, communication skills and technical competencies in handling industry tasks effectively.

Research limitations/implications – Data was collected from construction professions across two cities – Abuja and Lagos. Because of the limited budget allocated for this study, other regions were not considered. Because of time and financial implications, it was extremely impossible to visit all 36 states. It is, therefore, impossible to generalise the results of this research to the larger population. In generalising the results on a larger scale, the study would have to factor in a more diverse sample to ensure it is more representative. A more diverse sample may mitigate any possible bias that may arise from a self-administered questionnaire.

Practical implications – From the survey results obtained from the respondents, it was observed that general knowledge about local and global trends, management skills, teamwork skills, work experience, communication skills, critical thinking skills, numeracy skills and civic responsibility are among the major non-academic skills lacking among built-environment graduates. This places significant pressures on universities in Nigeria to revisit and revamp its curricula in developing these skills among students who require them to thrive in the construction industry.

Originality/value – Although the subject of employability has been adequately discussed across various fields (accountancy, psychology, management, business, marketing, etc.), there exist limited research studies in the built-environment context, a gap, which this study aims to fill. This study also provides several approaches through which employability skills can be developed.

Keywords Construction education, Employability skills, Graduateness, Employability, Pedagogy, Human capital

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1. Introduction

Globally, the quest for improved results in construction activities has resulted in technical complexities, increased project scope and technological ideas, thereby increasing the industry's need for skilled graduates. In addition to being academically sound, the industry constantly seeks graduates who are adequately equipped with the appropriate skills and competencies to fulfil their expectations and address arising issues. Moreover, present-day industry employers seek graduates who can communicate effectively, work efficiently as part of a team, make quality decisions to enhance results, possess good work principles, exhibit confidence, amongst others (Russell *et al.*, 2007; Archer and Davison, 2008; Ariana, 2010; Ahn *et al.*, 2012). Consequently, Cox and King (2006) affirm that the preparation of twenty-first-century graduates for the rigours of the industry, as well as their future success in their professions, should be of paramount significance to present-day universities. This amplifies the call for a more complete approach in educational pedagogy to strike a balance between practicality and theory, as well as aligning universities curricula with the industry requirements to encourage a new paradigm shift in construction education. The information garnered in this study is critical to the successful evaluation and modification of university curricula in aligning its pedagogical content with the increasing industry expectations.

More than ever, nations around the world and even Nigeria constantly seek graduates who are flexible and adaptable to various changing conditions and are generally responsive. Subsequently, several researchers around the globe have conducted studies that reinforce the fact that industry employers prefer to recruit graduates who are not only academically sound but also possess the necessary non-academic skills. In Ghana, Boateng and Ofori-Sarpong (2002) assert that employers prefer graduates who are industry ready (sound academic degree and non-academic skills). This assertion was resonated by Pauw *et al.* (2008), who opines that South African industry employers often recruit graduates who adequately possess workplace readiness and soft skills to excel in the world of work after graduation. The council for industry and higher education in the UK report by Archer and Davison (2008) also suggest that for graduates to excel in the world of work they need to display certain abilities including intellectual ability and values, decision making skills, confidence, amongst others. In certain regions of the USA, Farooqui and Ahmed (2009) maintain that employers seek graduates with numerous skills. In total, 80 skills were acknowledged including technical skills, management skills, problem-solving competencies, leadership skills, amongst others. In Canada, Arain (2010) proposed several desirable skills sought after by industry employers. These skills include leadership competencies, industry knowledge ethical professionalism, communication skills and business intelligence. Similarly, 16 skills were perceived as critical for industry success according to graduates, university educators and employers in Sri Lanka (Wickramasinghe and Perera, 2010). Some of these skills include innovativeness, self-confidence, adaptability, numeracy skills, teamwork skills, amongst others.

From the foregoing discussion, various nations across the globe are not strangers to the employability discussion. More so, the employability concept has also generated discussions across various quarters in Nigeria. It has become a common occurrence for construction industry employers to retrain graduates because they sometimes struggle to live up to expectations (Adebakin *et al.*, 2015). It has been put forward that graduates are sound theoretically and sometimes boast of impressive academic results, but fail to address industry problems due to lack of certain non-academic skills (Pitan and Adedeji, 2012; Akinyemi *et al.*, 2012). This situation has resulted in the belief that academic standards across the nation have struggled considerably in recent times. Hence, there is the popular saying that owning a certificate with a first-class degree is no longer a guarantee of

possessing the necessary skills that the industry requires. With the advent of the fourth industrial revolution, the nation is seeking graduates who are responsive and knowledgeable as the nation's quest for a holistically vibrant economy continues. Against this backdrop, this study seeks to assess employers' level of satisfaction with employability skills of built-environment graduates and recommend possible methods of skills development to foster socio-economic growth.

2. Literature review

2.1 The employability concept

The primary goal of universities, as already discussed, is to improve the quality of graduates for the construction industry and improve their employability in the process. The benefits of graduates attaining this quality can bridge the various industry skill gaps and improve organisational productivity, which helps to further develop the nation's economy. It is now widely known that graduates who are confident, dependable, technically sound and fully equipped with non-technical skills are better prepared for the industry and future success in their careers (Jackson, 2016). The term "employability" is defined as a set of abilities, skills and attributes that make an individual relevant in a specific field, which will be beneficial to him- or herself, the industry and society at large (Moreland, 2006). This definition is similar to that of the Confederation of British Industry (CBI, 2009) that defines employability as a set of industry attributes, skills and prerequisite knowledge that graduates need to possess to be operational in the industry to achieve not only self-satisfaction but also industry satisfaction. These definitions indicate that a graduate is more likely to be employable if he or she possess and exhibit certain skills and abilities. Some of these skills may be natural or unique and some may have to be developed by the higher education institutions (HEIs) to suit the needs of the industry. Rothwell and Arnold (2007) defined employability as the ability to use one's acquired skills to keep a job or to obtain a specific job one desires. Hence, employability refers to skills and knowledge that enable fresh graduates to contribute meaningfully to the growth of an organisation or construction firm. This implies that possessing these skills and attitudes enables graduates to flourish in their endeavours and be valued by industry professionals.

The definition by Harvey (2002) suggests the concept of employability goes beyond just being employed, but rather focuses holistically on the development of the students' ability, which includes skills, to enable them to fit into the industry after graduation. These skills could be transferable skills, which focus on individual attributes, which can be exhibited from one job to another, as well as subject skills, which are more career driven as they are required for one to succeed in one's career (Cox and King, 2006). According to Rae (2007), the employability of graduates is not the successful completion of a certain course or module, but rather the result of an encompassing learning experience, which involves cumulative learning racked up over a period, through activities such as work experience, wider contextual learning and interaction with industry professionals. Simply put, the concept of employability relates to the overall skill set of a graduate. Rothwell *et al.* (2008) view the concept of employability in the context of students possessing a sound academic background, confidence to undertake various tasks in the industry, as well as a knack for learning new ideas and innovations. Students possessing individual values such as honesty, time-management skills, self-confidence, creative thinking and decision making were found to possess employability skills in the studies by Rae (2007). Being adaptable, having an entrepreneurship mindset, exhibiting analytical skills and accepting responsibilities are all key factors in the employability of a graduate, according to Bennett (2012). Another

perspective of employability was further mentioned in a study by O'Leary (2017), which referred to students possessing sound ethical values required for industry success.

2.2 Employability skills

The present-day construction industry is fast becoming global and to be successful in such a competitive sector, the industry has higher expectations of twenty-first-century graduates than ever before. This globalisation has led to the roles of graduates going beyond the orthodox functions of just filling job vacancies to having an insight into many industry front-end services, including new management initiatives and varying contractual delivery schemes. The industry of today now requires graduates with a broader knowledge of various construction elements including its methods, systems, materials, planning, scheduling, amongst others (Tay *et al.*, 2017). According to Arain (2010), the industry of today is in dire need of graduates with a good foundation in construction principles and are able to handle and oversee construction projects with respect to its principles, ethics and operations. This skill provides graduates with an edge, as they are able to fit into the world of work with relative ease (Ayarkwa *et al.*, 2012; Jackson and Chapman, 2012; Arain, 2010). They are further required to have ample industry experience, leadership abilities, as well as the ability to contribute meaningfully to design in improving the built environment (Russell *et al.*, 2007). Graduates who possess leadership traits are able to display confidence, teamwork ability and taking the initiative. They should be able to encourage and motivate team members to focus on achieving goals, take responsibility for actions and participate in and facilitate necessary changes to bring about improvements (Cox *et al.*, 2009; Conrad and Newberry, 2012; Muller and Turner, 2017). It is important for built-environment graduates, irrespective of their job experience or academic achievement to possess personal values. Having these values is essential to enhancing productivity in the industry, as well as building good relationships with other industry professionals. These traits and values include commitment, loyalty, honesty, general attitude, self-esteem, reliability, punctuality, genuineness, integrity and enthusiasm (Rawlins and Marasini, 2011; Lievens and Sackett, 2012; Finch *et al.*, 2013).

More so, present-day graduates today must be effective communicators. They must be able to effectively express their ideas clearly and confidently to others. They must also be good readers, active listeners and quick thinkers, as most of the information needed to carry out their duties will come from verbal interactions or written form (Archer and Davison (2008), Ariana (2010) and Ahn *et al.* (2012)). It is also very important for present-day graduates to display creativity and practicality, as well as logical reasoning in deciphering solutions to arising industry problems. In addition, they are required to generate quality ideas to proffer solutions to industry challenges, as well as use mathematical principles in solving problems (Washer, 2007; Kilgour and Koslow, 2009; Wickramasinghe and Perera, 2010; Reid and Anderson, 2012; Durrani and Tariq, 2012). The ability to work independently and in a team, as well as being aware of one's own role in a team are key skills needed by graduates. These skills are essential in helping them work effectively in industry set-ups and committees to complete tasks timeously (Washer, 2007; Samavedham and Ragupathi, 2012). Present-day graduates are required to be adaptable to varying situations, given the unpredictable nature of the industry. They should be able to adapt to new technologies and innovations, as well as developing a strategic vision (Ahn *et al.*, 2012). It is of paramount importance for built-environment graduates to be able to establish priorities. The ability to strike a balance between several responsibilities and executing tasks successfully through a scale of preference is an industry expectation of graduates. They must also possess the ability to organise themselves to work effectively, to achieve set tasks, be resourceful and

establish achievable goals (Jackson and Chapman, 2012). With technological trends on the rise in the construction industry, employers are seeking graduates who possess the ability to use technology to perform their industry functions effectively. Present-day graduates are further required to have basic computer knowledge, be willing to upgrade technology skills seasonally and be open to learning new and evolving technologies (Christodoulou, 2004; Arain, 2010).

3. Research methodology

The principal aim of this research was to assess employers' perception of employability skills among built-environment graduates using both descriptive analysis and exploratory factor analysis (EFA). Construction professionals in the Nigerian construction industry including architects, builders, engineers and technicians, quantity surveyors, estate (property) surveyors and valuers, land surveyors and urban planners were sampled for this study. Considering the purpose of this study, which was to assess employers' perception of employability skills of built-environment graduates, these construction professionals in Nigeria were most relevant. For this study, a quantitative approach was adopted. Quantitative research, according to Creswell (2013) and Snap (2017), helps quantify and generalise outcomes and often makes use of well-structured close-ended questionnaires rather than open-ended ones. In cases were findings are conclusive and descriptive, quantitative research makes use of statistical analysis (Babbie, 2010). In addition, this research study adopted a convenience sampling approach, also known as non-random sampling method. This method of data collection involves obtaining data from identified respondents who are willing and readily accessible (Research Methodology, 2016). Nonetheless, the conveniently selected professionals fell within the parameters of stakeholders in the Nigerian construction industry. Out of 150 questionnaires disseminated, 131 were completed, signifying an 87 per cent response rate, which according to Moser and Kalton (1971) is convenient for use. A five-point Likert scale was used to rank employers' level of satisfaction with employability skills in the Nigerian construction industry. The adapted scale was as follows:

- Very dissatisfied (VD);
- Dissatisfied (D);
- Neutral (N);
- Satisfied (S); and
- Very satisfied (VS).

To ensure the appropriateness of the chosen data collection instrument, a pilot study was conducted. This was achieved by administering 20 questionnaires to construction industry professionals in Abuja and Lagos in Nigeria. A further 10 was handed over to academic lecturers/educators and curriculum planners in both States to ascertain the quality of questions and variables to be measured. Both sets of respondents were requested to conduct thorough checks and make notes where necessary. Modifications obtained were helpful in ensuring the quality of the questionnaire. Because of the simplicity in data collection and less time consumed, close-ended questions were designed. From the 130 questionnaires returned, 126 were analysed. Before data analysis, Statistical Consultation Service experts (STATKON) of the University of Johannesburg carried out the process of data cleaning and screening to ensure clarity. For data analysis, the statistical package for social sciences (SPSS) computer software was adopted. More so, both descriptive analysis and EFA were conducted. The former was used to assess employers' level of satisfaction with

employability skills in the Nigerian construction industry. In a descending manner, the mean item score (MIS) and standard deviations were tabulated to show the different skills employers were most satisfied with. Through SPSS, EFA was applied to arrange and classify the cluster of variables into a more manageable size. The reason for undertaking factor analysis is to reduce a larger number of variables to manageable sizes, as well as guarantee easy understanding and interpretation of patterns and relationships (Tucker and MacCallum, 1997; Yong and Pearce, 2013).

For the actualisation of factor analysis, three steps need to be taken into cognisance (Pallant, 2010). The first step includes checking the data suitability for factor analysis. In checking data suitability, the various parameters include the verification of sample size for reliable results in cases of much larger samples. The correlation coefficient among items is less reliable in cases of smaller samples. The data suitability step of factor analysis also involves the verification of the strength of the inter-correlations among the variables. The use of factor analysis becomes questionable if no correlation exceeds 0.30 (Tabachnick and Fidell, 2001). More so, if Bartlett's test of sphericity is less than 0.05 and Kaiser–Meyer–Olkin (KMO) has a minimum index of 0.6, then factor analysis is considered appropriate (Kaiser and Rice, 1974; Kaiser, 1970). The second step is the factor extraction that determines the factors to represent the interrelationship among determined items. Several forms of factor extraction include alpha factoring, image factoring, principal components and principal factors (Child, 2006). The final step of factor analysis is factor rotation and interpretation. After determining the factors, interpreting them is the next stage. The SPSS is responsible for the rotation and combination of the items into various groups (oblique [correlated] or orthogonal [uncorrelated]) (Yong and Pearce, 2013). According to Rummel (1970), orthogonal outcomes are easier to interpret. Section 3.2 highlights the factor analysis process in detail.

3.1 Mean item score

MIS indicated the average level of agreement with an item. The Likert scales were transformed into a MIS for each of the research objectives as applicable. The indices were then used to determine the rank of each item. These rankings made it possible to cross compare the relative importance of the items as perceived by the respondents. Following the mathematical computations, the criteria were then ranked in descending order of their relative importance. From the responses observed, there is a high rate of dissatisfaction among the industry employers with the employability skills of graduates, which indicates serious skills mismatch. Table I shows that with a mean score (M) of 3.11 and standard deviation of (SD) = 1.175, "sound/excellent academic record" was ranked 1 as the skill with which the industry professionals are most satisfied. "Willingness to learn" was ranked 2 with (M = 3.05; SD = 1.019); "achieve tasks timeously with positive results" was ranked 3 with (M = 3.04; SD = 1.031); "sense of responsibility to society" was ranked 4 with (M = 3.02; SD = 0.921); "work with little supervision" and "exercise professional judgement always" were both ranked 5 with (M = 2.97; SD = 1.043) and (M = 2.97; SD = 1.239), respectively. Table I further revealed that "conversant with various computer operations" was ranked 6 with (M = 2.96; SD = 1.106). "Adapt to changing work environments" and "show creativity in problem solving" were both ranked 7 with (M = 2.95; SD = 1.050) and (M = 2.95; SD = 1.057); "possess business acumen" was ranked 8 with (M = 2.93; SD = 1.060); "think critically and work effectively" and "sound understanding of numbers and related applications" were both ranked 9 with (M = 2.92; SD = 0.993) and (M = 2.92; SD = 1.001), respectively. "Lead responsibly" was ranked 10 with (M = 2.89; SD = 1.022); "exhibit interpersonal skills such as honesty and self-confidence" and "understand industry

Employability skills	$\bar{x}$	σX	R
Possess a sound/excellent academic record	3.11	1.175	1
Display willingness to learn	3.05	1.019	2
Achieve tasks timeously with positive results	3.04	1.031	3
Civic responsibility	3.02	0.921	4
Work with little supervision	2.97	1.043	5
Exercise professional judgement always	2.97	1.239	5
Be conversant with various computer operations	2.96	1.106	6
Adaptability	2.95	1.050	7
Show creativity in problem-solving	2.95	1.057	7
Possess business acumen	2.93	1.060	8
Think critically and work effectively	2.92	0.993	9
Numeracy skills	2.92	1.001	9
Lead responsibly	2.89	1.022	10
Interpersonal skills	2.88	0.985	11
Understand industry intricacies	2.88	1.107	11
Display coordination in achieving industry tasks	2.87	1.015	12
Keeping abreast with societal trends	2.87	1.051	12
Possess good management skills	2.87	1.233	12
Ability to work in a team	2.86	1.079	13
Work experience	2.75	1.186	14
Communication skills	2.71	1.220	15
Proper understanding of construction documents	2.68	1.218	16
Proper understanding of contract documents	2.56	1.256	17

Notes: $\bar{x}$ = Mean item score; σX = Standard deviation; and R = Rank

Table I. Employer's perception of employability skills

intricacies" were ranked 11 with (M = 2.88; SD = 0.985) and (M = 2.88; SD = 1.107), respectively. "Display coordination in achieving industry tasks", "possess general knowledge about local and global trends" and "possess good management skills" were all ranked 12 with (M = 2.87; SD = 1.015), (M = 2.87; SD = 1.051) and (M = 2.87; SD = 1.233), respectively. Table I additionally revealed that "ability to work in a team" was ranked 13 with (M = 2.86; SD = 1.079); "hands-on project experience prior to graduation (internship)" was ranked 14 with (M = 2.75; SD = 1.186); "communicate effectively in reading, speaking, listening and writing" was ranked 15 with (M = 2.71; SD = 1.220); "interpret construction documents e.g. drawings, schedules and bills" was ranked 16 with (M = 2.68; SD = 1.218); and "interpret contract documents e.g. tenders and building codes" was ranked the least with (M = 2.56; SD = 1.256).

3.2 Factor analysis for level of satisfaction with graduates' skills

Inspection of the correlation matrix revealed the presence of a coefficient of 0.6 and above, which was suitable for factor analysis. Table II and Figure 1 presents the results of the KMO with the data returning value-sampling adequacy of 0.898. Any value above the cut-off point

KMO measure of sampling adequacy		0.898
Bartlett's test of sphericity	Approx. chi-square (χ^2)	2,828.980
	Df	253
	Sig	0.00

Table II. KMO and Bartlett's test for level of satisfaction with graduate skills

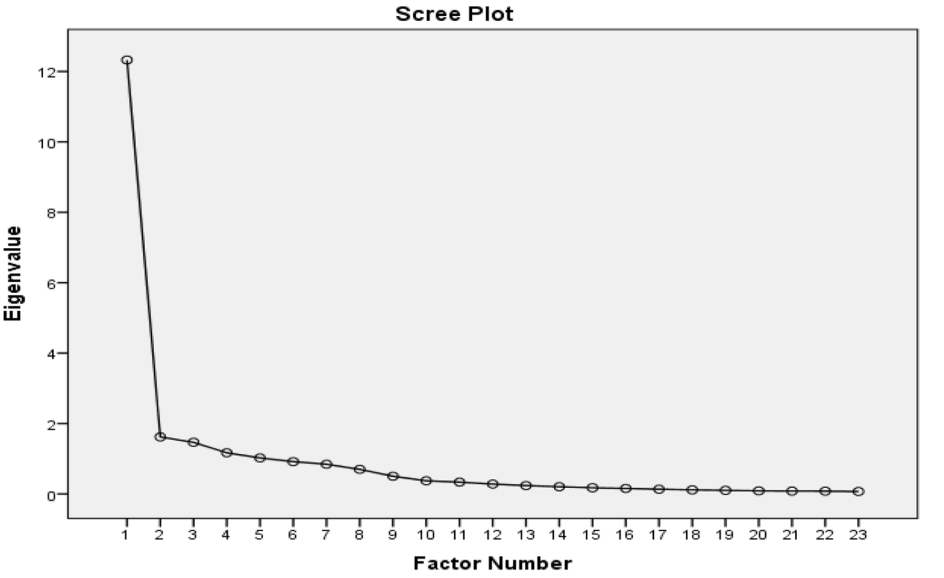

Figure 1.
Scree plot for level of satisfaction with graduate skills

of 0.6 is adequate to conduct factor analysis (Eiselen *et al.*, 2007). The respective Cronbach's alpha coefficient for each of the cluster factors shows that the reliability of the study instrument is good as seen in Table III.

3.2.1 Anti-image correlation. Inspection of the correlation matrix revealed the presence of a coefficient of 0.6 and above, which was suitable for factor analysis.

3.2.2 Communalities table. Table IV shows the various items after extraction and should contain values above 0.3. The values as seen from the table all consist of items greater than 0.3, a parameter, which okays the various factors (items).

3.2.3 Total variance explained. In Table V, the various employability skills and their corresponding eigenvalues are highlighted. Factors with eigenvalues exceeding 1.0 were considered with reference to the Kaiser's criterion of factors retention. Based on this criterion, five employability that satisfied this criterion were retained, which resulted in 12.325, 1.619, 1.467, 1.169 and 1.023. These values represent 52.32, 5.874, 5.109, 3.907 and 3.173 per cent of the variance, respectively. Hence, the Cluster 1 accounts for 52.321 per cent of the variance and that ranks it as the employability skills, which employers of the Nigerian construction industry are most satisfied with. Similarly, Cluster 2 accounts for 5.874 per cent and that ranks it as the second cluster of employability skills, which employers are most satisfied with. Clusters 3, 4 and 5 indicate 5.109, 3.907 and 3.173 per cent that ranked the

Table III.
Reliability of the factors of satisfaction levels with employability skills

Cluster factors	Cronbach's alpha coefficient
Factor 1 – technical and leadership skills	0.885
Factor 2 – management and academic skills	0.905
Factor 3 – work ethics and business skills	0.923
Factor 4 – organisational and ethical skills	0.903
Factor 5 – industry knowledge	0.878

Communalities of skills	Initial	Extraction
C8.1 Communication skills	0.719	0.445
C8.2 Ability to work in a team	0.804	0.708
C8.3 Proper understanding of construction documents	0.855	0.709
C8.4 Proper understanding of contract documents	0.834	0.640
C8.5 Show creativity in problem-solving	0.787	0.658
C8.6 Lead responsibly	0.796	0.594
C8.7 Numeracy skills	0.824	0.742
C8.8 Display coordination in achieving industry tasks	0.829	0.814
C8.9 Think critically and work effectively	0.814	0.766
C8.10 Civic responsibility	0.758	0.637
C8.11 Interpersonal skills	0.805	0.723
C8.12 Adaptability	0.827	0.824
C8.13 ICT skills	0.761	0.662
C8.14 Business knowledge	0.790	0.683
C8.15 Achieve tasks timeously with positive results	0.844	0.764
C8.16 Display willingness to learn	0.823	0.712
C8.17 Work with little supervision	0.840	0.714
C8.18 Understand industry intricacies	0.744	0.704
C8.19 Work experience	0.713	0.741
C8.20 Keeping abreast with societal trends	0.712	0.663
C8.21 Possess a sound/excellent academic record	0.700	0.654
C8.22 Possess good management skills	0.839	0.894
C8.23 Exercise professional judgement always	0.797	0.735

Extraction method: principal axis factoring

Table IV.
Communalities

	Initial eigen values			Extraction sums of squared loadings		
Factor	Total	% of variance	Cumulative (%)	Total	% of variance	Cumulative (%)
1	12.325	53.587	53.587	12.034	52.321	52.321
2	1.619	7.041	60.628	1.351	5.874	58.195
3	1.467	6.377	67.005	1.175	5.109	63.304
4	1.169	5.083	72.088	0.899	3.907	67.211
5	1.023	4.448	76.536	0.730	3.173	70.384
6	0.918	3.989	80.526			
7	0.843	3.665	84.190			
8	0.698	3.036	87.226			
9	0.503	2.185	89.412			
10	0.373	1.620	91.032			
11	0.335	1.459	92.490			
12	0.281	1.221	93.712			
13	0.237	1.031	94.743			
14	0.206	0.894	95.637			
15	0.176	0.764	96.401			
16	0.156	0.679	97.080			
17	0.134	0.582	97.662			
18	0.115	0.502	98.164			
19	0.103	0.448	98.612			
20	0.089	0.386	98.997			
21	0.081	0.353	99.350			
22	0.080	0.348	99.698			
23	0.069	0.302	100.000			

Table V.
Total variance explained

various satisfaction levels of employers. From the 23 factors, these 5 clusters highlight 70.384 per cent of the total importance.

3.2.4 Scree plot. From the scree plot as shown in Figure 1, there is a break after the fifth factor. The steady slope highlights the large factors. On the other hand, the gradual tailing off highlights the smaller factors that possess eigenvalues lower than 1. Hence, the large factors on the steep slope were recorded.

From Table VI, the following cluster factors and their respective factor loadings, eigen, percentage of variance and mean values were deduced and discussed next.

4. Discussion of results

In further understanding employers' perception of employability skills using factor analysis, the following cluster factors were deduced.

4.1 Cluster factor 1 – technical and leadership skills

The six items loaded onto Factor 1 are "ability to work in a team" (67.8 per cent), "interpret contract documents" (58.1 per cent), "interpret construction documents" (57.2 per cent), "show creativity in problem solving" (52.9 per cent), "communication skills" (44.6 per cent) and "lead responsibly" (35.8 per cent). This cluster accounted for 53.21 per cent of the variance. These loaded items all relate to the graduates' possession of technical and

Table VI.
Level of skill satisfaction correlated with selected factors

Cluster factor groupings	Factor loadings	Eigenvalues	% of variance	Mean
Factor 1 – technical and leadership skills		12.325	53.21	2.77
Ability to work in a team	0.678			2.86
Proper understanding of contract documents	0.581			2.56
Proper understanding of construction documents	0.572			2.68
Show creativity in problem-solving	0.529			2.95
Communication skills	0.446			2.71
Lead responsibly	0.358			2.89
Factor 2 – management and academic skills		1.619	5.874	2.98
Possess good management skills	0.880			2.87
Exercise professional judgement always	0.762			2.97
Possess sound/excellent academic record	0.662			3.11
Factor 3 – work ethics and business skills		1.467	5.109	2.97
Adaptability	0.928			2.95
ICT skills	0.775			2.96
Interpersonal skills	0.762			2.88
Business knowledge	0.600			2.93
Achieve tasks timeously with positive results	0.554			3.04
Display willingness to learn	0.426			3.05
Factor 4 – organisational and ethical skills		1.169	3.907	2.93
Display coordination in achieving industry tasks	−0.832			2.87
Think critically and work effectively	−0.741			2.92
Numeracy skills	−0.693			2.92
Civic responsibility	−0.460			3.02
Factor 5 – industry knowledge		1.023	3.173	2.87
Work experience	−0.798			2.75
Understand industry intricacies	−0.709			2.88
Keeping abreast with societal trends	−0.489			2.87
Work with little supervision	−0.471			2.97
Total variance explained			71.273	

leadership abilities that are needed to achieve construction industry success. Possession of teamwork abilities ensures that employees are willing and capable of working with other personalities (employees or supervisors) from different backgrounds and orientations in achieving a common goal. Interpreting contract and construction documents involve understanding the various key documents relating to construction industry functions in a design or supervisory role. The ability to be innovative and creative, as well as thinking-outside-the box in proffering solutions to industry problems, are both elements of problem-solving. The ability to communicate clearly involves fluency in reading, speaking, listening and writing reports. Finally, the ability to lead shows graduates' knowledge of various leadership principles and willingness to show responsibility and accountability when tasked with taking charge of a research team in overseeing job activities (Samavedham and Ragupathi, 2012; Ahn *et al.*, 2012; Finch *et al.*, 2013).

4.2 Cluster factor 2 – management and academic skills

The three items loaded onto Factor 2 are "good management skills" (88 per cent), "professional judgement" (76.2 per cent) and "sound/excellent academic record" (66.2 per cent). This cluster accounted for 5.874 per cent of the variance. These loaded items all relate to the possession of management and academic skills. Possession of management skills (time-management and self-management skills) refers to the ability of built-environment graduates to the capacity of managing one's time, resources and temperament in achieving setout tasks. This set of skills provides graduates with sufficient knowledge about their possible strengths and weaknesses that may abide in their career choices or job descriptions (Ahn *et al.*, 2012; Valentine *et al.*, 2014; Steyn and van Staden, 2018). The possession of academic skills or knowledge refers to the core competencies obtained by virtue of successful completion of an academic discipline. They also include discipline-specific understanding acquired through the completion of academic courses. Academic skills also relate to the capacity of graduates to write and present thoughts academically when needed (Sala and Gobet, 2017). Construction professionals from the Nigerian construction industry also expressed reasonable satisfaction with these six sets of skills and competencies. These findings corroborate the study of Pitan and Adedeji (2012) and Akinyemi *et al.* (2012), who both argue that graduates are sound theoretically and sometimes boast of impressive academic results, but struggle to display relevant non-academic skills in addressing industry problems.

4.3 Cluster factor 3 – work ethics and business skills

The six items loaded onto Factor 3 are "adaptability" (92.8 per cent), "information and technology (ICT) skills" (77.5 per cent), "interpersonal skills" (76.2 per cent), "business knowledge" (60 per cent), "achieve tasks timely with positive results" (55.4 per cent) and "display willingness to learn" (42.6 per cent). This cluster accounted for 5.109 per cent of the variance. These loaded items all relate to work ethics and business skills. The ability to adapt to the ever-changing and dynamic work environment highlights graduates' capacity to seamlessly adjust to the world of work, regardless of its unpredictability. With the advent of the fourth industrial revolution, possessing ICT skills cannot be overemphasised. The possession of interpersonal skills involves the ability to exhibit certain traits regarded as soft skills. They include honesty, self-confidence, professionalism and reliability. Business acumen deals with the ability to exhibit quickness and keenness in deciphering a possible business opportunity. Graduates who possess these skills turn out to be great entrepreneurs who can self-sustain in the absence of societal jobs. The ability to achieve tasks timely with positive results deals with the capacity to possess time-management skills while the

willingness to learn involves the preparedness to accept new ideas in solving problems (Packer and Brainard, 2003; Lievens and Sackett, 2012; O'Leary, 2017). Construction professionals from the Nigerian construction industry were barely satisfied with these six sets of skills and competencies, which highlights the need for universities to intensify efforts in developing students who understand the essence of carrying out their job effectively, as well as understand the intricacies of business execution.

4.4 Cluster factor 4 – organisational and ethical skills

The four items loaded onto Factor 4 are "display coordination in achieving industry tasks" (−83.2 per cent), "think critically and work effectively" (−74.1 per cent), "sound understanding of numbers and related applications" (−69.3 per cent) and "civic responsibility" (−46 per cent). This cluster accounted for 3.907 per cent of the variance. These loaded items all relate to organisational and ethical skills. Organisation and coordinating skills allow graduates to set clear priorities and work accordingly in their quest to solve industry problems. These sets of skills are related to critical thinking as they deal with the capacity to employ smart ways in problem-solving. The ability to engage numbers and its related functions are key components of numeracy skills. Possessing a sense of responsibility to society requires graduates to understand their functions as a citizen and understanding the concept of corporate social responsibility (giving back to the community) (Colby *et al.*, 2003; Samavedham and Ragupathi, 2012; Rawlins and Marasini, 2011; Jackson and Chapman, 2012; Reid and Anderson, 2012). Construction professionals from the Nigerian construction industry were barely satisfied with these four sets of skills and competencies.

4.5 Cluster factor 5 – industry knowledge

The four items loaded onto Factor 5 are "work experience" (−79.8 per cent), "understand industry intricacies" (−70.9 per cent), "keeping abreast with societal trends" (−48.9 per cent) and "work with little supervision" (−47.1 per cent). This cluster accounted for 3.173 per cent of the variance. These loaded items all relate to industry knowledge. Industry employers ultimately seek graduates with adequate work experience. It is a period for students to experience the rigours and activities of the construction industry first-hand. As part of the citizenry in any society, it is necessary for graduates to keep abreast to societal trends so they can be aware of their roles in achieving a knowledge-based society. The ability to work with little supervision is the capacity of graduates to be quick-learners and carry out their duties with some level of confidence (Wickramasinghe and Perera, 2010; Hopkins *et al.*, 2011; Jackson and Chapman, 2012; Pitan, 2015; Rufai and Rashid, 2015).

The various cluster factors discussed resonates with the outcomes achieved by Dabalen *et al.* (2001) and Pitan (2015) that emphasises that employers in the construction industry are satisfied with the educational qualifications of graduates but require that graduates also possess non-academic qualifications and skills. This is evident from the outcomes of the MIS showing respondents satisfaction with graduates' academic record, readiness to learn, abilities in time management and feeling of accountability towards society. These responses echo the findings from factor analysis that showed the employer's satisfaction with graduates' academic records and technical skills. These findings are in agreement with Akinyemi *et al.* (2012). From the results of both the MIS and factor analysis, the construction industry professionals recorded low satisfaction in non-academic skills such as management skills, teamwork skills, work experience, communication skills, critical thinking skills, numeracy skills and civic responsibility. Akinyemi *et al.* (2012), Emeh *et al.* (2012), Pitan and Adedeji (2012), Pitan (2015) and Rufai and Rashid (2015) support these findings. Indeed,

present-day employers require graduates who exhibit these above named non-academic skills.

5. Implication for higher education

From the survey results obtained from the respondents, it was observed that general knowledge about local and global trends, management skills, teamwork skills, work experience, communication skills, critical thinking skills, numeracy skills and civic responsibility are among the major non-academic skills lacking among built-environment graduates. This places significant pressures on universities in Nigeria to revisit and revamp its curricula in developing these skills among students who require them to thrive in the construction industry. Through compulsory final year research projects (researching and presentation), some of these skills are developed including critical thinking, teamwork skills, management skills, self-confidence and even organisational skills (Kinash *et al.*, 2014). In further encouraging teamwork skills among students, the role of extra-curricular activities stands out. Such activities complement traditional lecture room activities and can take place after schooling hours (Parker *et al.*, 2009; Shakir, 2009; Kinash *et al.*, 2014). Nemanick and Clark (2002) opine the inclusions of extracurricular activities on one's curriculum vitae sometimes improve employment chances. Universities could also recommend extracurricular activities for students as such activities promote community connectivity, thereby improving civic responsibility (Shiah *et al.*, 2013; Lau *et al.*, 2014). Through international exchange programmes, employability skills among students are developed. Universities can achieve this by sponsoring students on international trips to other universities globally. These trips improve their overall learning, cultural sensitivity and professional development. By networking with students from other universities, disciplines and faculties, communication skills are honed (Kinash *et al.*, 2014). In cases where universities collaborate with industry, students benefit immensely from industry mentorship. Such programmes improve their industry knowledge, work experience and motivation levels (Smith-Ruig, 2014). Through work experience, students develop critical thinking abilities, communication and teamwork skills (Jackson *et al.*, 2015; Clarke, 2018). To ensure a holistic educational experience for students undergoing work experience programmes, the Nigerian construction industry should ensure quality supervision of students' activities and make adequate arrangements for students to be rotated around various departments as this broadens their learning experience.

Furthermore, universities could encourage students to engage in volunteering activities around their immediate communities. Through volunteering, students accumulate valuable work experience and can boost their civil responsibility (Parker *et al.*, 2009; Moalosi *et al.*, 2012). While on campus, students can be encouraged to engage in the student–government activities. These activities enhance personal growth, leadership skills, continuous learning, community engagement and problem-solving skills. Similarly, through field trips, students can also develop their communication and teamwork skills. During role-play activities, these skills can also be improved where learners are presented the opportunity to depict real-life characters in achieving tasks. Finally, universities can integrate technical competitions into their curricula to improve the overall learning abilities of students. Such competitions improve communication skills, problem-solving skills and innovativeness of students (Ahlgren and Verner, 2013; Fingerut *et al.*, 2013). By integrating sports activities into their curricula, universities improve students' employability. Aside from reducing risky behaviours, sports activities encourage mental alertness, good health and develop non-academic skills like teamwork skills and communication skills (Telford *et al.*, 2012; Bailey *et al.*, 2013).

6. Conclusions and recommendations

With a wide range of factors influencing the Nigerian construction industry, including globalisation, technological innovations and increased project-based works, there is an urgent need for higher education to improve their curricula to adequately prepare built-environment graduates for industry. The construction industry today seeks continuously graduates with considerable knowledge of the ethics, operations and intricacies of the industry, which increases the need for universities to make a conscious effort in their approach to fortify construction education through innovative ways of construction pedagogy. This will ensure that students are not only academically sound but also are equipped with non-academic skills to thrive in the construction industry and other related fields. This can be accomplished through revisiting and revamping the curricula and integrating pedagogical activities that can develop students holistically. The introduction of these activities plays a pivotal role in complementing classroom experience and such activities improve students' creativity, curiosity and innovativeness. Furthermore, these pedagogical activities will not only improve the students academically but also provide them with non-academic skills such as communication skills, organisation skill, leadership skills, personal values, teamwork skills, management skills, critical thinking skills, problem-solving skills and technical skills. The possession of this set of non-academic skills gives graduates an edge as they can fit into the world of work with relative ease.

Overall, the findings of this study reveal that graduates' employability skills are at a reasonably average level. It is a well-known fact that the graduates of today are tasked with the responsibility of developing and sustaining the built environment, hence, the need for universities around the country to make conscious efforts in their approach to improving construction education to produce skilled graduates. The aforementioned pedagogical activities should not be viewed as comprehensive but seen as a basis from which other approaches could result in improving construction education in the country. Because of an increase in the number and complexities of construction activities such as roads, buildings and dams around the country, the benefits of skilled graduates cannot be overstated. Ultimately speaking, graduate success is no longer a function of successfully graduating from universities, but possessing the required skills and knowledge.

7. Limitation of the study

The successful completion of this research study was not without a few limitations. Primarily, data was collected from construction professions across two cities – Abuja and Lagos. Because of the limited budget allocated for this study, construction professionals from other regions were not considered. Because of time and financial implications, it was extremely impossible to visit all 36 states across the nation. It is, therefore, impossible to generalise the results of this research study to the larger population. In generalising the results on a larger scale, the study would have to factor in a more diverse sample to ensure it is more representative. More so, a more diverse sample may mitigate any possible bias that may arise from a self-administered questionnaire.

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Further reading

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