

# **Equipping graduates for the future: The need for higher institutions to collaborate**

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## **Abstract**

Despite the increasingly high number of higher education institutions (HEIs) in Nigeria, there have been serious concerns regarding the ability of graduates to effectively handle construction industry problems. Various researchers have found out that these concerns arises as a result of minimal collaborations between the HEIs and the industry sector. Through the help of a well-structured questionnaire survey, this research identified the various reasons why HEIs need to collaborate with the construction industry, as well as the benefits of doing so. The sample for this study consisted of one hundred and twenty-six (126) respondents drawn from professionals in the Nigerian construction industry. Factor analysis reveals four clusters, in the order of importance as enabling students to participate in industry activities, improving skills and competency among students, improving the overall university curricula and improving job and academic opportunities for students as these clusters signify the benefits of collaborations. The study revealed that the Nigerian government can foster collaboration through the provision of specific support services to HEIs by conducting outreach activities to increase awareness on the need for collaborating. It is therefore recommended that HEIs establish cordial relationships with the construction industry as students are kept abreast of the latest trends in the job market as well as industrial needs. This is necessary because as future custodians of the industry, present day students need to be imparted with the requisite skills and knowledge which adequate collaborations can result to.

**Keywords:** Higher education institutions, Higher education, skills, Construction industry, Collaborations

## **1. Introduction**

The roles of HEIs in equipping the future generation of industry professionals has seen its role become more crucial for societal and economic development. Its function in providing competent and adequately skilled workforce for the construction industry has seen its functions become increasingly dynamic. According to Wiezell (2006), present day HEIs are tasked with the responsibility of providing students with the requisite understanding of the rudiments and principles of the construction industry through innovative ways of construction pedagogy. In achieving this, HEIs must ensure a flexible and holistic educational set-up that generally improves the level of undergraduate programs (Ssebuwufu et al. 2012). Esham (2008) argues that defining, re-shaping and reviewing the curricula of HEIs as well as engaging in other traditional pedagogy approaches are simply not enough. Hence, one of the many ways through which HEIs can improve the quality of construction education today is through collaborations with the construction industry (Hagan, 2004).

According to Hagan (2004), collaborations create an avenue for students to garner work experience which increases their knowledge and awareness of the construction industry just before graduation. Haupt (2012) opines that collaboration between HEIs and the industry can result in planning and improving of existing HEI curricula to meet

the needs of the construction industry; making more cases for work experience among students (experiential learning); improving the practical knowledge of HEI educators and improving the learning curve of students with respect to their chosen field of study (Haupt, 2012). This implies that there is an increased need for collaboration between the industrial sector and the educational sector to improve graduates' skills and scientific innovations leading to sustained economic progress. Considering these benefits, collaboration between both cannot be ignored as it is fundamental in achieving economic satisfaction through industrial expansion and growth, leading to the generation of employment.

Based on several researches, there is a growing perception that the skills and knowledge acquired by students from HEIs around Africa do not meet the requirements of the construction industry and the wider economy (Pauw *et al.*, 2008; Pitan & Adedeji, 2012). It is expected that the findings of this study will increase the need for HEIs to forge strategic partnerships with the construction industry to address socio-economic problems and promote innovation for economic growth. In the context of the need for HEIs to demonstrate greater accountability to society and respond to national development imperatives, the need for collaboration has become more significant in addressing the shortcomings of higher education in Nigeria and Africa.

According to Bramwell and Wolfe (2005), HEIs are pivotal players in a knowledge-based society since they are continuously viewed as pioneers of innovations and agents of economic growth. This role can be further enhanced through effective collaborations with the construction industry. It is worth noting that collaborations have increased in recent times as HEIs continually strive to break the barriers that exists between them and the emerging community. It has significantly become one of the most critical agendas of higher education (H.E) policy making as well as in the economic environment of both the national and institutional levels. Schartinger *et al.*, (2002) states that HEIs have three major roles to play in the establishment of collaborations with HEIs, namely: undertaking scientific research which influences the technological frontiers of the construction industry over the long run; knowledge design and generation which results in new processes and innovative concepts; and provision of capable and adequately skilled graduates who can significantly handle and take on the needs of the construction industry.

For HEIs, there are various reasons which necessitates the need for collaboration. Some of these includes: improvement of teaching, access to funding, enhancement of reputation, improved knowledge about practical problems useful for effective teaching and access to empirical data from industry. For the industry, some reasons for collaborating with HEIs may include the following: gaining access to complementary technological knowledge (including patents), exploring the possibilities of scouting skilled workers, developing new products and processes, provision of training to existing or future employees, gaining access to the HEIs facilities and equipment, gaining access to public funding and incentives and influencing the overall teaching and research agenda of HEIs.

## **2. Methodology**

This study adopted a quantitative methodology because the aim of this study is to identify the benefits of collaborations between HEIs and the construction industry. A questionnaire survey method was used to collect the data. The five point Likert scale was used to measure the responses of the respondents. Respondents were requested to indicate the degree of importance of each of the roles of collaboration between the HEIs and the construction industry in upscaling construction education based on a five point Likert scale (strongly disagree = 1, disagree = 2, neutral, = 3, agree = 4, strongly agree = 5). One hundred and twenty-six complete questionnaires were received signifying an 84% response rate. For this study, the target population was construction professionals in the Nigerian construction industry, namely architects, builders, engineers, quantity surveyors, estate surveyors and valuers, land surveyors, and town planners. This selection was made because these set of professionals are likely to have a considerable amount of knowledge in contributing to the objectives of this study. This study was carried out in two major areas in Nigeria, namely; the Federal Capital Territory, Abuja and Lagos State. Both cities were selected because of the high level of developmental projects which ensures regular construction activities in both areas. This study adopted the random sampling technique because it gave all the participants an equal chance to be selected for the study with the same criteria.

### **2.1 Data analysis**

Two statistical analysis were carried out namely descriptive statistics in the mould of (mean item score) and exploratory factor analysis. The mean item score (MIS) was used to find the importance of the variables. Whilst factor

analysis was used in establishing which of the variables could be measuring the same underlying effect. The procedure, findings and relevant discussion follows.

## 2.2 Factor Analysis

Factor analysis was employed to establish which of the variables could be measuring aspects of the same underlying dimensions. Factor analysis is useful for identifying clusters of related variables and thus ideal for reducing many variables into a more easily understood framework. Tables 1-5 and Fig.1 present the result. Average communality of the variables after extraction is as shown in Table 3; Table 4 presents the results of the Kaizer-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity which were carried out. In this study, the KMO value of 0.840 was recorded. This is considered sufficient to conduct a factor analysis as any value above 0.6 (the cut-off point) is considered acceptable (Eiselen et al. 2007). The Bartlett test of sphericity was also significant suggests that the population matrix was not an identity matrix (Table 4). Thus, the necessary tests in respect to adequacy of the sample size were favorable for the factor analysis to proceed. Cronbach's alpha of 0.881 suggested the reliability of the study instrument used was good.

### 2.2.1 Scree plot

An inspection of the scree plot on Figure 1 reveals a break after the fourth factor. The steep slope shows the large factors while the gradual trailing off shows the rest of the factors that have an eigen value lower than 1. Four clusters of factors are positioned on the steep slope and they were retained.

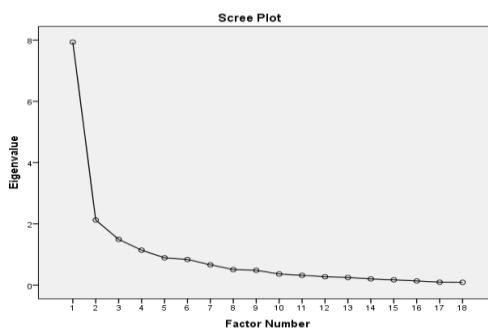


Figure 1. Scree plot for roles of collaboration between HEIs and the construction industry

### 2.2.2 Total variance explained

Table 1 shows the roles collaboration between HEIs and the Nigerian construction industry and their respective eigen values. The data was subjected to principal component analysis (with oblimin rotation). The eigenvalue and factor loading were set at conventional high values of 1.0. The latent root or Kaiser's criterion of retaining factors with eigen values greater than 1.0 was employed. Hence, four clusters of factors with eigen values exceeding 1 were retained, resulting in 7.934, 2.127, 1.494 and 1.142 selected which explains 42.101 percent, 10.145 percent, 6.473 percent, and 4.505 percent of the variance respectively. The first cluster of factors accounted for 42.101 percent of the total variance which makes it the most important benefit of HEI-industry collaboration. In the same vein, the second cluster of factors accounted for 10.145 percent, the third cluster of factors accounts for 6.473 percent and the fourth cluster of factors accounted for 4.505 percent. These four clusters of factors together have a total cumulative percentage of 63.223 percent of the total importance which highlights their significance from the eighteen components.

**Table 1. Total Variance Explained**

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %

1	<b>7.934</b>	44.079	44.079	7.578	<b>42.101</b>	42.101
2	<b>2.127</b>	11.815	55.894	1.826	<b>10.145</b>	52.246
3	<b>1.494</b>	8.298	64.192	1,165	<b>6.473</b>	58.718
4	<b>1.142</b>	6.346	<b>70.538</b>	.811	<b>4.505</b>	<b>63.223</b>
5	.893	4.960	75.498			
6	.839	4,660	80.158			
7	.664	3.688	83.845			
8	.508	2.823	86.668			
9	.485	2.696	89.365			
10	.363	2.019	91.383			
11	.321	1.781	93.164			
12	.275	1.528	94.692			
13	.251	1.392	96.085			
14	.204	1.131	97.216			
15	.173	.961	98.176			
16	.138	.764	98.940			
17	.098	.543	99.484			
18	.093	.516	100.000			

Table 2: Pattern matrix

	Factor			
	1	2	3	4
E13.10 Setting up of schemes to enable students to attend industry events	<b>.892</b>	-.082	-.013	-.090
E13.8 Incorporating industry/academic mentoring plan for students	<b>.721</b>	.076	.100	.054
E13.9 Encouraging construction site visits and field trips for students	<b>.708</b>	-.144	.051	-.163
E13.11 Incorporating open-days in universities to further sensitize future graduates	<b>.669</b>	-.029	-.035	.191
E13.12 Publicizing university activities relevant to industry	<b>.513</b>	.043	.014	.450
E13.1 Exposing construction students to the world of work	<b>.448</b>	.020	.214	.048
E13.7 Establishing student chapters of professional institutions	<b>.387</b>	.078	.294	.237
E13.17 Creating and training students with the key skills industry require	-.049	<b>-.940</b>	.123	.036
E13.18 Providing equipment and services to facilitate learning for students	.000	<b>-.784</b>	.122	.041
E13.16 Providing students access to updated technical information	.212	<b>-.730</b>	-.148	.208
E13.3 Involving industry in university curricula design, planning and evaluation	-.072	-.139	<b>.787</b>	-.087
E13.4 Introducing construction project exercises to classrooms	.023	-.003	<b>.769</b>	-.072
E13.5 Improving the overall university curriculum	.090	-.010	<b>.712</b>	.103
E13.2 Integrating some industry-specific courses into the university curriculum	.146	-.055	<b>.579</b>	-.011
E13.6 Visiting universities to organize workshop on products by industry players	.043	.085	<b>.536</b>	.241
E13.14 Enhancing job opportunities for graduates	-.094	-.143	.051	<b>.849</b>
E13.13 Strengthening universities in conducting quality and relevant research	.054	-.126	.042	<b>.724</b>
E13.15 Creating an entrepreneurship culture among graduates	.174	-.292	.019	<b>.538</b>

Extraction Method: Principal Axis Factoring.

Rotation Method: Oblimin with Kaiser Normalization.

a. Rotation converged in 9 iterations.

Table 3: Communalities

	Initial	Extraction
E13.1 Exposing construction students to the world of work	.447	.374

E13.2 Integrating some industry-specific courses into the university curriculum	.534	.475
E13.3 Involving industry in university curricula design, planning and evaluation	.601	.602
E13.4 Introducing construction project exercises to classrooms	.626	.583
E13.5 Improving the overall university curriculum	.712	.657
E13.6 Visiting universities to organize workshop on products by industry players	.556	.423
E13.7 Establishing student chapters of professional institutions	.658	.504
E13.8 Incorporating industry/academic mentoring plan for students	.666	.614
E13.9 Encouraging construction site visits and field trips for students	.622	.537
E13.10 Setting up of schemes to enable students to attend industry events	.746	.769
E13.11 Incorporating open-days in universities to further sensitize future graduates	.702	.588
E13.12 Publicizing university activities relevant to industry	.773	.659
E13.13 Strengthening universities in conducting quality and relevant research	.754	.679
E13.14 Enhancing job opportunities for graduates	.753	.791
E13.15 Creating an entrepreneurship culture among graduates	.738	.659
E13.16 Providing students access to updated technical information	.790	.785
E13.17 Creating and training students with the key skills industry require	.847	.963
E13.18 Providing equipment and services to facilitate learning for students	.756	.718

Extraction Method: Principal Axis Factoring.

Table 4: KMO and Bartlett's test for roles of collaboration between HEIs and the construction industry

Kaiser-Meyer-Olkin measure of sampling adequacy.	0.840
Bartlett's test of sphericity	1592,859
Approx. chi-square	
Df	153
Sig.	,000

Table 5: Reliability of the factors of the role of HEI-industry collaboration

Cluster factors	Cronbach's alpha coefficient
Factor 1 – Enabling students to participate in industry activities	0.883
Factor 2 – Improving skills and competency among students	0.917
Factor 3 – Improving the overall university curricula	0.838
Factor 4 – Improving job and academic opportunities for students	0.866

### 3. Discussion of Results

From the factor analysis, four factors emerged and they are discussed as follows:

#### **Cluster factor 1 - Enabling students to participate in industry activities**

The seven extracted components loaded onto cluster factor 1 were ‘setting up of schemes to enable students to attend industry events’ (89.2%), ‘incorporating industry/academic mentoring plan for students’ (72.1%), ‘encouraging

construction site visits and field trips for students' (70.8%), 'incorporating open-days in universities to further sensitize future graduates' (66.9%), 'publicizing university activities relevant to industry' (51.3%), 'exposing construction students to the world of work' (44.8%) and 'establishing student chapters of professional institutions' (38.7%). This cluster accounted for 42.101 percent of the variance. These loaded items all relate to enabling students to participate in construction industry activities, as reported by (Esham 2008). In enabling students to participate in various industry activities, collaborations are essential in developing the Nigerian economy. This is because in an era which is influenced by factors such as evolving technology, it is imperative for HEIs to establish a cordial relationship with the industry in a bid to exchange ideas as well as creating developmental strategies. This collaboration provides opportunities for students to attend construction industry events and engage in construction site visits and activities which expose them to the world of work (Hagan, 2004; Ishengoma & Vaaland, 2016). These findings are also highlighted in the work by Ramakrishnan and Yasin (2011), which state that through collaborations, an industry/academic mentoring plan for students can be realized which provides career planning tips to students which is essential in defining their careers in the construction industry. Esham (2008) also notes that the construction industry looks forward to flourishing collaborations with HEIs during open-days, seminars, workshops and training to look out for skills-equipped students to meet their future needs.

### **Cluster factor 2 - Improving skills and competency among students**

The three extracted items loaded onto cluster factor 1 were 'creating and training students with the key skills industry require' (94.0%), 'providing equipment and services to facilitate learning for students' (78.4%) and 'providing students access to updated technical information' (73.0%). This cluster accounted for 10.145 percent of the variance. These loaded items all relate to improving skills and competency among students as studied by (Ramakrishnan & Yasin, 2011). These findings are reflected in the work by Haupt (2012) who established that collaborations help provide work experience among students (experiential learning) which improves their non-academic skills. Ramakrishnan and Yasin (2011) also state that collaborations provide equipment and services to facilitate learning for students which helps improve their learning curve with respect to their chosen field of study. Furthermore, the exposure of students to these equipment and technologies from the construction industry helps provides students with updated technical information required to achieve industry success (Ramakrishnan & Yasin, 2011).

### **Cluster factor 3 - Improving the overall HEI curricula**

The five extracted items loaded onto cluster factor 1 were 'involving industry in university curricula design, planning and evaluation' (78.7%), 'introducing construction project exercises to classrooms' (76.9%), 'improving the overall university curriculum' (71.2%), 'integrating some industry-specific courses into the university curriculum' (57.9%) and 'visiting universities to organize workshop on products by industry players' (53.6%). This cluster accounted for 6.473 percent of the variance. These loaded items all relate to the overall development of the HEI curricula. 'Involving industry in university curricula design, planning and evaluation' emerged the highest factor in this cluster and conforms to the work by (Haupt, 2012). The findings are also reflected in the work of Cox and King (2006) who state that collaborations between HEIs and the construction industry lead to the integrating of some industry-specific courses into the university curriculum which are aimed at preparing students. Similarly, Raybould and Sheedy (2005) opined that introducing workshop style courses would further expose the construction students to the reality of the construction industry which leads to the overall improvement of the HEI curricula (Feng *et al.* 2011). Furthermore, the ever-growing demand for graduates to be equipped with more than just an academic degree makes collaboration between HEI and the Nigerian construction industry essential. Marotta *et al.* (2007) state that collaborations between both can lead to the generation of new knowledge where industry professionals share their innovations and experiences by conducting lectures and seminars at HEIs. These lectures and seminars help stimulate certain skills among students, such as soft skills which include communication skills, leadership skills, teamwork, interpersonal skills and problem-solving skills.

### **Cluster factor 4 - Improving job and academic opportunities for students**

The three extracted items loaded onto cluster factor 4 were 'enhancing job opportunities for graduates' (84.9%), 'strengthening universities in conducting quality and relevant research' (72.4%) and 'creating an entrepreneurship culture among graduates' (53.8%). This cluster accounted for 4.505 percent of the variance. These loaded items all relate to improving job and academic opportunities for students. 'Enhancing job opportunities for graduates' emerged

the highest factor in this cluster and conforms to the work by (Marotta *et al.* 2007). In this digital era where HEIs are faced with the challenges of the rising cost of education, collaborations provide an opportunity to invite funding from the construction industry through research grants and scholarships. Findings further agree with the study of Ramakrishnan and Yasin (2011), who posit that collaborations provide opportunities for students to get hands-on and practical construction experience required for industry success. Marotta *et al.* (2007) also state that collaborations provide opportunities for students to be equipped with technical skills which are not obtainable during conventional lectures. This set of skills enhances the job opportunities for graduates.

#### **4. Lessons Learnt and Conclusion**

From the empirical study, it was revealed that collaborations between the HEIs and the construction industry provides opportunities for students to participate in industry activities, improve skills and competency among students, improve the overall HEI curricula and improve job and academic opportunities for students after graduation. In ensuring adequate collaborations, it is imperative the HEIs embark on the following: encourage and create avenues for greater involvement of faculty with the construction industry; encourage and create avenues for staff exchange between the industry and institutions; encourage and create avenues for greater involvement of staff in research and development (R & D) activities and consultancy; arrangement of workshops, seminars and training programs for industries to adopt modern technology in industry; develop specialized continuing education programs for updating skills and knowledge; keep the industry informed about new discoveries and innovative scientific work being undertaken; and provide consultancy services, of a viable nature, like the development of programs or softwares as well as conducting surveys. Likewise, the construction industry can do the following: make funds available to HEIs for research and development (R & D) activities and consultancy; participate, in HEIs initiatives in undertaking research related to technology transfer in collaboration with R & D units in industry; provide financial assistance for the development of the HEIs; assist in the development of HEIs curricula and syllabi; participate in teaching programs organized by HEIs; participate in the workshops and training programs organized by HEIs; participate in the training programs for technicians, scientists and engineers organized by the HEIs and provide facilities and a conducive environment for hands-on training to students. It is therefore recommended that HEIs establish cordial relationships with the construction industry as this is one of the many ways through construction education can be improved.

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