A Review of Construction Industry Expectations of the 21st Century Graduates

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Abstract

Nowadays the construction industry and its employers are gradually coming to terms with the fact that its activities require fully equipped construction graduates furnished with the right skills in order to succeed. However, with the ever-changing needs and challenges of the industry, these skills appear to be in limited supply. The process of identifying the various expectations of the industry for construction graduates is a pivotal step in the development of university curricula which in turn is key to meeting the needs of the profession. This paper studies the construction industry expectations that are crucial for construction graduates' training. Also, the study presents some recommendations for shaping university curricula to align with the professional perspective. A review of relevant literature was conducted from journal and conference articles and from databases, including Taylor and Francis Online, Springer, Emerald, and ASCE, amongst others. This study found that graduates without the required industry skills are not only at a disadvantage to themselves but also to the 21st century construction industry. As such, it is essential for present day students to develop skills and experiences that meet the increasing expectations of the industry. It is recommended that higher education institutions (HEIs) promote industry awareness among students as well as providing an overview of their operations as this is fundamental to improving the construction industry in this 21st century and beyond.

Keywords: Construction education, employability, higher education institutions, construction industry, key skills

1.0 Introduction

The construction industry in the 21st century plays a pivotal role in every economy globally. Its roles in the achievement of socio-economic development goals and provision of local amenities, employment and infrastructural development are encouraged through its numerous activities. These activities which range from the construction of highways, dams, bridges, structures, and canals, amongst others, are strong forces that act as a catalyst for the achievement of infrastructural development in our modern day economy. One

of the characteristics of the construction industry is the mobilization and utilization of both human and material resources in the boosting of economic efficiency in areas such as infrastructural development, job creation and sustainability (Anaman & Osei-Amponsah, 2007). This implies that the industry relies heavily on well-equipped and highly skilled construction professionals for its functions, including infrastructure development, maintenance and all construction-related tasks. In the achievement of these various functions, there exists the growing concern with achieving the utmost satisfaction of clients which involves quality and timely project delivery from which stem various challenges confronting the construction industry in our present day. The construction profession, like other professions, upholds high principles with regard to professional ethics, service and practice (Ahn, Pearce & Kwon, 2012). These rules of ethics therefore increase the need for construction professionals to function effectively according to the standards and expectations of the industry. These needs and expectations therefore lead to the following questions: What are the construction industry's expectations/needs for the graduates of today? What are the prerequisite skills and attitudes that are required to enable graduates have a future in the industry?

The quest for improved results in construction activities has resulted in technical complexities, an increase in project scope and an astronomical increase in technological ideas, thereby increasing the industry's need for skilled graduates. Apart from being academically sound, the industry further requires graduates to be sufficiently furnished with the relevant abilities and competencies to meet its expectations and solve its increasing problems. Moreover, the present day industry employers require graduates who can exhibit confidence in communicative skills such as writing, reading and computing effectively; who have the ability to work effectively in a team when necessary; who can take quality decisions to enhance results; who possess good work principles; who proffer solutions for emerging problems as well as exhibiting confidence in taking responsibility, amongst others (Russell *et al.,* 2007; Archer & Davidson, 2008; Ariana, 2010; Ahn *et al.,* 2012). Consequently, Cox and King (2006) assert that the preparation of 21st century graduates for the rigors of the industry as well as their future success in their professions should be of paramount significance to HEIs. In as much as education is designed to cater for the holistic development of students and provide them with various opportunities to make them job ready, the present day industry seeks skilled graduates to handle its challenging and pressing issues.

Bennett (2002) argues that the industry employers are now seeking to employ construction graduates who are flexible and adaptable to further training in order to be conversant with the ever-changing needs of the industry. This, according to Gill and Lashine (2003), amplifies the call for a more complete approach in educational pedagogy to strike a balance between practicality and theory as well as aligning HEI's curricula with the industry requirements to encourage a new paradigm shift in construction education. Therefore, there is the urgent need for HEIs to promote the activities of the construction industry processes alongside improving its own curricula as well as presentation techniques in order to benefit the students as well as the future of the industry.

In the light of the various challenges impacting the present day construction industry, this paper determines the industry expectations of 21st century graduates. The paper starts out by examining the various roles of HEIs in equipping students for the challenges of the industry. This paper also reviews literature from various sources, including conference papers, journals and government reports, to highlight the concept of employability and it also hints at key skills that graduates of the 21st century need to possess in order to meet the expectations of the industry. The present study was motivated by a desire to examine the current needs of the industry and the need for HEIs not only to develop graduates with the right skills, but also to

provide them with timely updates on happenings in the industry and the latest requirements which the industry expects. The information garnered in this study is critical to the successful evaluation and modification of the HEI curricula in aligning its pedagogical content with the increasing industry expectations.

2.0 Literature Review

2.1 The Roles of HEIs

Generally, the importance of HEIs in enhancing the future industry workforce with the right skill set has earmarked it as a catalyst for economic growth. According to Ayarkwa *et al*., (2012), they are key centres that cater for the development and equipping of present day graduates and therefore their strengthening is key for economic prosperity among countries globally. Their functions in the areas of academic innovation and development further make them a pivotal player in the improvement of construction education. Generally, the primary role of HEIs is to produce graduates who will enter the construction industry with the right skills and mind set to solve industry problems (Mihail, 2006; Russel *et al.,* 2007; Sewell & Pool, 2007; Storen & Aamodt, 2010; Jackson & Chapman, 2012). It is well known that apart from training students, HEIs also serve as platforms for conducting quality and innovative research in various academic fields to increase the body of academic knowledge.

In addition, the HEIs need to sensitize themselves to the needs of the construction industry in order to produce quality graduates (Valo, 2000). This is necessary because in recent times, HEIs have been criticized by the industry employers for not preparing adequately skilled graduates who are capable of addressing the challenges faced by the construction industry as indicated by (Harpe, Radloff & Wyber, 2000). This resonates with the opinion expressed by Tomlinson (2012) who states that HEIs are primarily concerned with the theoretical aspect/pedagogy of construction education and there are not enough activities that encourage training among students. According to Omondi (2008), training is described as the conscious preparation of students by engaging them with relevant construction activities that improve their skills and knowledge that will enable them to thrive in the construction industry. It can also be described as an active pedagogical process that prepares students mentally to perform industry tasks required of them. This infers that training develops the skill set and competencies of students which can positively impact their career paths and choices as well as ensuring their industry readiness.

Furthermore, it is the responsibility of the HEI educators to encourage and motivate students to understand their importance to the future of the industry. This strategy, according to Hunter, Laursen & Seymour (2007) is instrumental in boosting their confidence and self-belief so that they can operate more effectively when called upon to perform industry tasks and solve industry-specific problems. Also, the educators should be at the forefront of integrating experiential learning approaches as this helps students gain insight into various professional ideologies (Cornellissen & Van Wyk, 2007). The involvement of these experiential approaches for students further improves their employability and increases their chances of meeting the expectations of the industry (Reid *et al.,* 2008). It can therefore be seen that the functions of higher institutions transcend the provision of quality education but also should include the provision of the right environment for students to garner/develop the right skills to meet the expectations of the construction industry (Jackson, 2016). This was reflected in a study by Ayarkwa *et al.,* (2012) which concludes that increasing numbers of graduates are currently unemployable as a result of inadequate skills to fit into the industry. This skills shortage has increased the pressure on HEIs which further necessitates that this study expounds further on understanding the concept of employability among graduates.

2.2 The concept of graduate employability

From an examination of the above literatures, the main aim of HEIs is to improve the quality of graduates for the construction industry and, in the process, enhance their employability. The benefits of graduates' attaining this quality can bridge the various industry skill gaps and improve organizational productivity which helps to further develop today'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). Increasing the employability of present-day graduates is increasingly significant as a result of the growing needs for a skilled workforce to meet the expectations of the construction industry. In HEIs today, the issue of graduate employability has gained much significance globally because of its importance to economic growth. It has become a driver for the sustainability of the construction industry which triggers the interest of various stakeholders such as the students, professional bodies, sponsors and higher institutions (O'Leary, 2016).

The term 'employability' is defined as a set of abilities, skills and attributes that makes 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 in order to be fully 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 possessing and exhibiting certain skills and abilities. Some of these skills may be natural or unique and some have to be developed by the HEIs to suit the needs of the industry. Rothwell and Arnold (2007) defined employability as the ability of one to utilize one's acquired skills to keep a job or to obtain a specific job one desires. These are the needed skills and knowledge that enable fresh graduates to contribute meaningfully to the growth of an organization or construction firm (Mason, Williams & Cranmer, 2009). This implies that possessing these skills and attitudes enables graduates to flourish in their endeavors and be valued by the industry professionals. The definition by Harvey (2001) states 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 in to 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 & 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 of time, through activities such as work experience, wider contextual learning and interaction with industry professionals.

The concept of employability relates to the overall skill set of a graduate. Rothwell, Herbert and Rothwell (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 Billet (2011) and Bennett (2012). Another perspective of employability was further mentioned in a study by O'Leary (2016), which made reference to students possessing sound ethical values required for industry success.

3.0 Research Methodology

The research was conducted by means of a distillation of extant literature published in conference papers, journals articles and government reports in reviewing the industry needs and expectations of present day graduates. In order to achieve this, extensive literature searches were carried out over several weeks in July and August 2016, covering the major academic databases including Emerald, Science Direct, ISI Web of Knowledge, Academic Search Complete, EBSCO, and GoogleScholar. Articles spanning a ten-year period from 2006 to 2016 were included based on their relation to the subject. Keywords and phrases including 'construction education', 'employability', 'higher education institutions', 'construction industry' and 'key skills' were used in the search. Common themes which emerged from thematic analysis were identified and are presented as follows. The paper also looks at the possession of key employability skills required by 21st century graduates ahead of working in the industry as well as literature on improving construction education for the future.

4.0 General Employability Skills for 21st Century Graduates

The construction industry is fast becoming global and to be successful in such a competitive sector, the industry has higher expectations of 21st century graduates than ever before. This globalization 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, and scheduling, amongst others (Russel *et al*., 2007). According to Arain (2013), the industry of today is in dire need of construction graduates with a good foundation in construction principles who are able to handle and oversee construction projects. 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 (Russel *et al*., 2007; Arain, 2013). What follows are a number of employability skills which the present day industry expects graduates to possess in order to function effectively while meeting with its needs.

Personal values/skills

It is important that all construction graduates, irrespective of their job experience or academic achievement, have these traits and 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, cleanliness and enthusiasm (Rawlins & Marasini, 2011; Finch *et al.*, 2013; Lievens & Sackett, 2012).

Communication skills

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 in written form (Archer & Davidson, 2008; Samavedham & Ragupathi, 2008; Ariana, 2010; Ahn *et al.*, 2012).

Problem solving skills

It is 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, it is the generation of quality ideas to proffer solutions to industry challenges as well as utilizing mathematical principles in solving problems (Washer 2007; Kilgour & Koslow 2009; Wickramasinghe & Perera, 2010; Finch *et al.*, 2013;

Reid & Anderson, 2012; Durrani & Tariq, 2012).

Teamwork skills

The ability to work independently and in a team as well, as awareness of one's own role in a team are key skills required of present-day graduates. These skills are essential in helping them work effectively in industry set-ups and committees in order to complete tasks timeously (Washer, 2007; Samavedham & Ragupathi, 2008).

Initiative, enterprise and adaptability skills

The 21st century 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 (Samavedham & Ragupathi, 2008; Rawlins & Marasini, 2011; Ahn *et al*., 2012).

Planning and organising skills

It is of paramount importance for construction 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 graduates. They must also possess the ability to organise themselves to work effectively to achieve set tasks, be resourceful and establish achievable goals (Rawlins & Marasini, 2011; Jackson & Chapman, 2012).

Technical skills

The construction industry today requires graduates with a considerable knowledge of the various construction principles, ethics and operations. This skill gives graduates an edge as they are able to fit into the world of work with relative ease (Ayarkwa *et al.,* 2012; Jackson & Chapman, 2012, Arain, 2013).

Leadership skills

Present day industry demand graduates who can exhibit key leadership traits such as 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; Muller & Turner, 2010; Conrad & Newberry, 2012).

Technology skills

With technological trends on the rise in the construction industry, 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; Russell *et al*., 2007; Arain 2010; Archer & Davidson, 2008; Ahn *et al.,* 2012).

5.0 Improving construction education for the future

With the global population continually on the rise, the importance of factors such as energy use, sustainable practices and infrastructural development, amongst others, has also increased significantly in recent times (Russel *et al.,* 2007). In dealing with these population pressures, the role of construction graduates in the conceptualizing, designing, building and operating of systems to meet with these societal needs has become vital. This has increased the need for improved construction education as graduates must be adequately skilled to develop the built environment and meet the needs of the industry (Russel *et al.,* 2007). It is

therefore role of the HEIs to provide holistic construction education that fuses theoretical knowledge and practicality to ensure graduates' effectiveness in the industry today and beyond (Hamdan *et al.,* 2011). This action by HEIs will help graduates to employ analytical and problem-solving skills in meeting industry needs which will not be dealt with by merely providing lecture-note solutions to industry problems. In this regard, it is a paramount task for HEIs to re-visit the content and concepts of the teaching curriculum to enhance learning for students.

There is also the need for more management-based courses in HEI curricula to further prepare graduates for on-site leadership roles in the industry and its various operations. These courses should be aimed at training construction graduates to become future project managers who will be responsible for effectively utilizing resources to achieve timeous results while adhering to project specifications (Arain, 2013). Apart from these courses, there is the need for HEIs to constantly provide industry overviews to bolster construction education for students as well as providing case studies as an integral part of teaching experience. Through these industry overviews provided, 21st century construction graduates will understand the functions and responsibilities of contractors, sub-contractors, clients, designers, draftsmen and other construction professionals. These measures are necessary because after graduation, construction graduates are saddled with the responsibility of practising their profession as well as striving to improve the industry productivity and competitiveness.

In further improving construction education to meet the industry needs, there is the need for HEIs to tap into the wealth of knowledge from the industry professionals by improving their collaboration with the industry (Turhan & Akman 2013). Through this collaboration, students could benefit from industry activities through industrial attachment which increases the career success of construction graduates. These opportunities further provide the graduates with prior industry knowledge as the shock of transition from the lecture room to the world of work is reduced. Another benefit of collaboration is that students could benefit from industry/HEIs mentorship forums which would enrich both students and the industry as well. In summary, graduates are to be fully equipped with the right skills, ideas and innovative concepts to meet industry needs as they are the future of the construction industry.

6.0 Conclusions and lessons learnt

This paper studied the various challenges and factors that make the present day construction industry dynamic and complex. In addition, it examined its current expectations of 21st century graduates. In light of these factors impacting the industry, there is the increasing need for the next crop of construction graduates to be adequately trained and skilled to be able to meet these demands. A review of extant literature was undertaken and the roles of HEIs in enhancing the future industry workforce with the right skills were examined, followed by a review of the various definitions and perspectives on the concept of employability.

Findings from the literature revealed that 21st century graduates need to have various employability skills in order to succeed in the construction industry. The various skills identified were personal skills and values which include communication skills, team skills, leadership skills and organisational skills, amongst others. Technical and analytical skills were also found to be key employability skills that present-day graduates need to have. Furthermore, the ability of graduates to be able to function in a team and be adaptable to various industry situations were also essential skills which the industry expects from 21st century graduates. Given the various challenges and forces which the industry faces today, it is necessary for HEIs to revisit their existing undergraduate curricula and make reforms where necessary in order to produce top quality graduates who will better meet the expectations of today's industry.

From literature on the role of the HEIs in enhancing the employability of graduates, it can be seen that the

construction industry has very high expectations of 21st century graduates. This implies that graduating without the prerequisite skills necessary to thrive in the industry not only disadvantages the graduates but also thwarts the expectations of the industry. It is therefore recommended that HEIs curricula sufficiently strike a balance between theoretical knowledge and practicality to provide a holistic approach in the upscaling of construction education.

The findings from this study are beneficial to present-day industry professionals, education researchers as well as HEI educators actively involved in the scope of construction education and pioneering the quest to meet the industry expectations. With the high expectations of the industry, future studies could be conducted to determine the various roles construction site experiences play and to identify educational activities which improve construction education in the present day.

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