

# Introduction of Construction Experience to the Classroom: What Approaches Should Be Adopted

**Aliu John**

Department of Construction Management and Quantity Surveying  
University of Johannesburg, South Africa  
[Ajseries77@gmail.com](mailto:Ajseries77@gmail.com)

**Aigbavboa Clinton**

Department of Construction Management and Quantity Surveying  
University of Johannesburg, South Africa  
[caigbavboa@uj.ac.za](mailto:caigbavboa@uj.ac.za)

## Abstract

The present day construction industry is characterized by a wide range of factors influencing it. Factors such as globalization, technological innovations, client base and expectations, increased project based work, amongst others have led to the increased need for higher education to improve their curriculum to adequately prepare graduates to meet the needs of the 21<sup>st</sup> century construction industry. Construction experiences are known to expose students to various convolutions of construction regarding its challenges, dynamics and limitations. This paper identifies the various approaches of introducing construction experiences into the lecture room in a bid to improve the level of construction pedagogy delivered to future construction professionals. An extant review of literatures was conducted from databases such as Taylor and Francis online, Springer, Emerald, Scopus, ASC conference proceedings amongst others. One of the primary finding stemming from the study revealed that construction site visits/field trips, hosting of guest speakers from the construction industry to deliver lectures and role-playing teaching are some of the key approaches by which HEI's curricula could be improved with construction experiences. Hence, the findings of this paper provides a basis for integrating more construction experiences into HEI curricula to better equip the future employees of the construction industry.

**Keywords:** Construction education, construction industry, higher education institutions, employability skills, construction experience

## 1.0 INTRODUCTION

Transitioning from academia to industry life is never an easy ride; it is like moving from a zone of comfort to a zone of work. Graduates of today step in to their professional stride with high hopes of getting huge motivational rewards based on their academic qualifications and knowledge. It is a well-known fact that construction professionals of today are saddled with the responsibility of developing the built environment which improves the quality of life for any society. Their responsibilities which involves the creation and sustainability of infrastructures through industrial activities has seen their functions in economic development become a vital one. Factors such as the environmental problems, climate changes, technological innovations and depletion of natural resources have seen the present day society plagued with various forms of challenges. In solving these problems, there is a growing demand for skilled graduates to provide solutions which intensifies the need for Higher Education Institutions (HEIs) to make conscious efforts in their approach to fortify construction education.

Generally, it is the aim of HEIs through its curricula to improve students understanding of the fundamentals of construction and professional practice through innovative ways of construction pedagogy (Wiesel, 2006). Several

educators and researchers argue that an early step to prepare the future construction professionals for the industry is to ensure a flexible education that improves the overall quality of the undergraduate programs (Christodoulou, 2004; Arcila, 2006). Arcila (2006) opines that HEIs are also tasked with ensuring that education delivered to students at the early stage equips them for challenges not just in construction but in other fields. This can be achieved through defining and re-shaping the curriculum of construction education, reviewing the course work and introducing activities that can develop students holistically (Carrato & Haryott, 2003). Overtime, the HEIs have been crucial in developing the next generation of construction professionals for societal and economic growth. It has witnessed a paradigm shift which has seen its function as an education provider transcend into a human capital provider as its activities are key in providing competent workforce for the construction industry. This role in enhancing future construction professionals makes it a 'development hub' (Hansen & Lehmann, 2006), which further increases the need to examine vital approaches in achieving its functions. Sewell and Pool (2010) suggested that a major aim of HEIs is to ensure that construction pedagogy is delivered in a way that the gap between industry expectations and the actual abilities of students should be minimal. The introduction of construction activities which heightens classroom experience through student-oriented and project-based learning are key in improving the creativity, innovativeness and curiosity of the students (Lucko, 2006).

According to Toor and Ofori (2008), one of the ways in enhancing learning experiences in the classroom is through the effective use of information and communication technology (ICT). An example of this is CIVCAL, a multimedia pedagogical package which is used in Hong Kong to support undergraduate learning in construction education. This online portal enables students to embark on a virtual construction site visit through videographic and photographic application to learn more about ongoing and completed projects. Apart from these innovative functions of ICT, classroom teaching could be complemented by construction site visits, group projects, involvement in research activities and programs, participation in academic symposiums and conferences, introduction of construction courses and international exchanges among HEIs. These pedagogical approaches in improving the learning outcomes of students develops their problem solving skills, communication skills, creativity, decision making skills, leadership and team building skills (Biggs & Tang, 2011). Bhattacharjee and Ghosh (2013) further highlights some strategic pedagogical approaches HEIs can employ in facilitating the desired learning outcomes among construction students. They include collaborative teaching, problem-based teaching, peer-tutoring, case study-based teaching, simulation based teaching and involving students in project presentations (Bhattacharjee & Ghosh, 2013). Most of these learning approaches improves the students holistically as they actively participate in these activities unlike when compared to conventional teaching approaches (Mayer & Chandler, 2001).

From the various aims of the HEIs above in preparing students for the world of work, the need to complement classroom lectures with construction experiences plays a crucial role in upscaling construction education. Kuennen and Pocock (2004) states that construction practices equips the students with a broader understanding of theoretical lectures delivered by construction educators. The benefits of skilled construction graduates cannot be quantified as these key approaches by HEIs provides students with an up-to-date information of the construction industry (Batra, 2010). According to Kuennen and Pocock (2004), some of these practical activities includes construction site/field visits, the use of footages and photographs for illustration, practical experiences in lecture rooms, inviting guest speakers from the construction industry amongst others. Other practical activities are team-based projects and class room presentations (Gunhan, 2014). These practical activities improves the employability of students for the industry by developing skills such as communication, team work, problem solving, analytical, organizational, leadership, self-confidence amongst others.

In reference to the various approaches in introducing construction experiences to the classroom, this paper argues the importance of revisiting the curricula of HEIs to further improve the holistic education of students. Considering the fact that the future construction graduates are to be engaged in various capacities in design and supervisory roles, this study is germane in helping them succeed in the future of the construction industry. This paper reviews literature from various sources including conference papers, journals and government reports to highlight the importance of such practical activities. With the aid of search engines such as Google scholar, as well as databases including Taylor and Francis online, Springer, Emerald, Scopus and ASCE, related literatures were key in this review. Therefore, the aim of this paper is to examine the benefits of practical activities that improves the classroom experience for construction students ahead of fitting into the construction industry. This study will lay emphasis on the benefits of construction-site visits, inviting guest speakers from the construction industry into class rooms and role-playing teaching as successful approaches in introducing construction experiences into the classroom.

## **2.0 LITERATURE REVIEW**

### **2.1 CONSTRUCTION SITE VISITS**

In enhancing the development of the future construction industry professionals, the inclusion of construction site visits in HEI curricula is key in improving learning experience and developing various skills in students which the industry require (Gunhan, 2014). These visits encourages individuals to work in teams which creates a perfect environment to collaborate and learn from each other thereby improving interpersonal and leadership skills. This type of learning acquired through site visits is called 'collaborative learning'. According to Koehn (2001), 'collaborative learning' occurs when individuals act cooperatively with others to become knowledgeable in some specific subject matter. The skills developed during construction site visits are necessary because the present day construction industry thrives on professionals with team building and leadership skills. The importance of these skills were amplified in a study by Ahn *et al.* (2012) which found out that 'affective competency skills' which comprises collaborative, leadership and interpersonal skills are the most desired by construction industry employers. In today's construction industry, there is an increased importance attached to collaborative skills because projects are becoming highly demanding from a professional point of view. This requires various professionals to work in a team to meet up high expectations of clients or employers. For example, the concept of 'sustainability' which is a major concept requires the collaboration of various experts throughout the life cycle of construction projects. This further requires the close collaboration of key industry players such as the contractors, clients, designers amongst others (Korkmaz, 2012).

In broadening the overall pedagogical experience of students, the infusion of construction site visits must be encouraged. Stepping out of the classrooms to construction sites increase students observation, memorizing abilities and real-life experiences as they are exposed to the tangible aspects of construction education. Robertson (2003) pointed out that in achieving the utmost benefits of construction site visits, it is necessary to integrate it into the HEIs curricula and not be an isolated activity. This infers that construction site visits improves construction education as it is vital in providing a real preview into what the industry entails and helps to ease transition from classroom to industry after graduation. These benefits therefore helps students to be proactive as they know what to expect right after graduation. This attribute is critical in construction education, because one of the characteristics of possessing leadership skills is possessing a proactive personality. Findings from various studies including Mason (1980); Gunhan (2015) shows that these visits increases the learning scope of students and are more effective than conventional lectures. The studies also indicates that field visits are good supplementary pedagogical methods which can be used in tandem with other methods to improve learning experiences among students. By providing an opportunity for social interaction, construction site visits facilitates 'learner-centered pedagogy' as highlighted by (Rebar, 2009). This aligns with the observation of Martin (2004) that learning during construction site visits develops the student's identity and improves social skills.

From the above benefits of construction site visits, it can be deduced that it is an approach which is instrumental in engaging students with practical issues pertaining to construction. This means that it is crucial for HEIs to introduce it into their curricula to complement course content. According to Arain (2010), a construction program curricula should be designed in such a way to promote activities that could provide project-based learning, active learning and student interaction which points to the need for construction site visits to be instilled. This approach further provides a fascinating, unforgettable and stimulating experience not obtainable during conventional lectures. In improving construction education, Tatum (2010) outlined three different approaches to bolster HEI curricula. They include: traditional/conventional, cooperative/active and integrated learning approaches. Construction site visits are part of the cooperative/active methods which amplifies the need for its inclusion into the curricula of HEIs (Tatum, 2010). By providing students the opportunities to observe various construction processes, construction site visits provide an insight into their professions (Sanromán *et al.* 2010). This implies that students are further provided with a deeper understanding of the theoretical aspects of construction education when they are exposed to real life industry situation. It is also reinforces concepts learnt during lectures and further stimulates students interest (Forest & Rayne, 2009).

### **2.2 GUEST SPEAKERS FROM CONSTRUCTION INDUSTRY IN CLASS ROOMS**

In further enhancing the lessons taught in classrooms, hosting guest speakers with an ample wealth of experience from the construction industry to share ideas with students plays a key role in improving construction education. They can

form a valuable real-world adjunct to lecture room pedagogy in construction which can enhance the overall learning curve of students. Various researchers have stated the benefits of this medium as they can help induce construction interest in students. Miller *et al.* (2009) states that it provides the students with an up-to-date information of the industry which stimulates them rather than scare them. Payne *et al.* (2003) also states that guest speakers have the tendency to open the minds of students to various viewpoints around a specific matter which affects the student's perceptions and attitudes in positive ways. During these lectures, talks and occasional visits, guest speakers convey their experiences in a way that would inspire students in readiness for the industry challenges (Schmidt *et al.* 2008). Through this inspiring talks, guest speakers can act as mentors and provide industry knowledge which generally improves the mind-set and employability of students (Phillips & Phillips, 2002; Hogan, 2009).

Apart from making construction related topics come alive, guest speakers from the construction industry are a potential source for enlightening students and helping them realize the essence of their field of study. This was asserted by Robinson and Kaleka (2006) who states that the use of guest speakers from the construction industry is key in fostering an active learning scenario. This approach is seen by various researchers as an 'active learning' alternative using interactive methods of explaining to students the intricacies of their academic disciplines. It is further seen as an instrument in 'spicing' up the lecture room, supplementing other teaching tools such as lectures by educators and providing 'creativity in education' (Robinson & Kaleka, 2006; Zdravkovic, 2010). Furthermore, the use of guest speakers from the construction industry can lead to networking opportunities for students, as well as provide industry with an avenue to scout for employable students who might meet their expectations.

### **2.3 THE CONCEPT OF ROLE-PLAYING TEACHING**

This approach provides students the opportunity to take up different roles of construction project stakeholders in solving real life problems that have been replicated in the classrooms. Bhattacharjee and Ghosh (2013) describes the concept of role-playing teaching as a holistic pedagogical approach that instills the process of critical thinking, prompts emotions and moral values, and informs the students about the world of work. Driscoll and Driscoll (2005) opines that this teaching approach is derived from the idea that knowledge is constructed in individuals by attempting to understand their experiences. This shows that the efficacy of learning experience is ensured through this teaching approach. Learning has been described as a process by which knowledge is obtained through acquired information that can be processed and utilized when necessary. Effective learning transcends conventional read and memorizing activities as it requires a deeper insight of situations and occurrences (Bhattacharjee & Ghosh, 2013). In achieving this, the use of drama is vital as the educators not only conveys the subject idea but can also portray a more vivid image of reality to buttress classroom lectures. Cherif *et al.* (1998) divided role-playing teaching into four stages: preparation and clarification of the activity by the educator; preparation of the activity by the students; role-playing actions to further understand the situation and discussing the entire process. Poorman (2002) posited that these experiential learning activities improves students' understanding of the course contents as their interests are stimulated in the subject matter. This reiterates the assertion made by Fogg (2001) who stresses that students' involvement in role-playing increases their enthusiasm for learning. This can be attributed to the fact that role-playing ensures that students are actively involved in the process of information exchange.

Furthermore, as multiple stakeholders are actively involved in a typical construction project, it is the responsibility of the construction manager to solve arising critical problems that is encountered during supervision. This highlights the importance of role-playing teaching in class rooms as it replicates the real life industry setting as students assume various roles which offers a valuable realistic experience. Therefore, role-playing teaching stimulates an exciting learning experience for students and develop key skills like communication and problem solving. Bhattacharjee and Ghosh (2013) adds that it also trains students to understand real life industry professionals and their roles by placing them in similar roles.

### **3.0 RESEARCH METHODOLOGY**

This research study was conducted with reference to extant literatures published in government reports, conference papers and journals articles in order to review the various approaches in introducing construction experiences to classrooms to enhance the quality of future construction professionals. It is noteworthy that various graduate and undergraduate programs instill different knowledge, expertise and skills through the introduction of several activities. Students are trained and engaged with various tasks which are based on their specific career fields. In order to

understand the vital approaches, extensive literature searches were carried out over several weeks in June and July 2016, covering the major academic databases including Emerald, Science Direct, ISI Web of Knowledge, ASC, EBSCO, and GoogleScholar. A number of construction education databases distilled includes the Association of Researchers in Construction Management, Associated Schools of Construction conference proceedings (ASC), the European Conference on Education Conference Proceedings, the American Society for Engineering Education (ASEE), Springer, Taylor and Francis Online, Emerald and ICE Virtual Library. In order to develop an initial shortlist of key pedagogical approaches, a preliminary survey of five sources was done- ASC, ASEE, Taylor and Francis Online, ScienceDirect and Emerald which identified a number of key pedagogy approaches from 63 articles/book sections which was relevant to this study. An inclusion/exclusion criteria was then adopted in the preliminary survey which targeted specific approaches that benefits construction students the most. In the second stage of the study, based on a robust literature review and preliminary survey results, a comprehensive skill table was developed to determine which approaches directly stimulates the following skills/attributes construction industry require from graduates. These key areas included: 1) technical skills; 2) communication skills; 3) interpersonal skills; 4) managerial and leadership skills; 5) teamwork skills; 6) critical thinking skills; and 7) problem solving skills. At this stage, it was also decided that only those approaches which stimulates at least 90 percent of the listed skills directly will be included in the review. From the 63 shortlisted articles, the works of Cherif *et al.* (1998), Poorman (2002), Payne *et al.* (2003), Robertson (2003), Martin (2004), Miller *et al.* (2009), Hogan, (2009), Bhattacharjee and Ghosh (2013) and Gunhan, (2015) were drawn upon in the study of identifying key approaches in introducing construction experiences into the classroom. From the review of the literatures in this study, HEIs are required to be proactive in their pedagogy approach to improve the quality of the future construction professionals.

#### **4.0 BENEFITS OF INTRODUCING CONSTRUCTION EXPERIENCE TO CLASSROOM**

From the various literatures reviewed, the following benefits can be deduced:

- The activities encourages students to utilize higher order thinking skills.
- They help students to apply what they have learned in other subject areas.
- The activities encourages brain-storming, creativity, problem solving and innovation among students.
- They help to facilitate cooperative learning and teamwork among students .
- The activities are engaging, stimulating and motivating.
- Helps students to understand better what is difficult in textbooks .

#### **5.0 LESSONS LEARNT**

From the reviewed literature, the scope of the construction industry have increased and have become multi-disciplinary in nature with the effect of inventions and innovations making it dynamic. This implies that construction professionals have to be more aware of the environmental and social impacts of technology, and be prepared to work in complex teams to solve arising industry challenges. One of the pedagogical approaches identified was the introduction of site visits into the HEI curricula. From a broad viewpoint, it has been identified as a major collaborative learning experience for students. The experience garnered from this visits exposes the students to the requirements and rigors of the construction industry. For example, by embarking on a to a visit to mechanical factory, construction students are provided with a hands-on-equipment experience which reinforces the theoretical aspect of the lectures acquired in the classroom which improves their learning process. Similarly, by visiting an on-going construction site, students are provided the opportunity to interact with various construction professionals and seek clarifications where necessary. Students can also be furnished with a proper understanding of site drawings, project documents, schedules, bills amongst others which can broaden their holistic understanding of the construction industry and its activities. In summary, construction site visit is an integral part of construction education as it helps bridge the gap between the lecture room and the construction industry. Several literatures Robertson (2003); Kuennen and Pocock (2004); Rebar (2009) and Gunhan (2015) all gave various benefits of construction site/field visits and they are summarized below:

- Helps students to learn new concepts in thinking
- Improves articulation and communication skills among students
- Improves cooperation and interaction among students thereby boosting teaming skills
- Broadens the mindset of students
- Improves their problem solving skill as they are faced with real-life situations and tasks

- Encourages creativity and inventiveness among students
- Helps to discover students personality as they are exposed
- Helps students to easily focus and memorize factual information
- Provides a break from the usual lecture room setting
- Exposure to a variety of other related construction professions
- Helps students to appreciate the importance and relevance of the lecture room
- Helps improve critical thinking skills and tolerance among students

Literature also examined the benefits of HEIs inviting guest speakers to lecture room as another key approach in introducing construction experience into their curricula. The benefits of guest speakers from industry also enhances student learning as well as improved collaborations between the HEIs/industry and industry/community. Various literatures highlights that the invitation of guest speakers to classrooms provides the opportunity for students to ask real-time industry questions. Guest speakers from industry also give a different perspective of issues which provides students with a variety of possible ideas. Finally, through discussions, guest speakers can inspire students which is key in building their self-confidence ahead of working in the construction industry.

Finally, due to the construction industry complexities and involvement of multiple stakeholders in the successful completion of construction projects, role-playing can be an effective pedagogical approach. By playing the roles of different industry stakeholders, students are actively engaged which improves their skills and creates a wonderful pedagogical experience.

## 6.0 CONCLUSIONS

The construction industry is continually evolving as a result of new trends, technologies and improved delivery methods which increases the need for adequately prepared construction graduates. Despite the importance of technical skills and acumen, industry employers today are seeking graduates with good communication, leadership, interpersonal and collaborative skills. These skills cannot be fully acquired from conventional lectures but from key teaching approaches which necessitates the reason for this study. This paper contributed to the body of knowledge by examining various pedagogical approaches in introducing construction experience into the classroom in a quest to develop better graduates for the construction industry. A review of extant literature was undertaken to explore these approaches. The studies revealed that an integral part of construction pedagogy is the introduction of construction site visits in HEI curricula. These visits helps to improve their communicative, technical, leadership, team building and critical thinking skills. In developing a clear link between classroom and the industry, the students are enhanced as they value the thrill of reality. The study also revealed that hosting of guest speakers from the industry plays a key role in construction pedagogy. This approach has the tendency to broaden the industry horizon of students, enhance their learning curve and provide a source of inspiration and mentorship for them. Students are also provided with the latest industry information through this teaching approach. Further findings revealed that role-playing teaching provides a great opportunity for students to be actively involved as they assume roles of various industry project stakeholders in a replicated classroom setting. This approach improves their creativity, problem solving, communication, decision making skills and critical thinking skills. It is therefore recommended that HEIs ensure that the future construction professionals are engaged in the role-playing teaching approach since the theoretical knowledge taught will be transferred to the practical field someday. These approaches discussed in this study are extremely beneficial to construction students, but their implementation is completely dependent on the HEIs and its educators.

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## Biography



**Aliu John** is currently a Masters Student and tutor at the University of Johannesburg, South Africa. Mr. John holds a Bachelor of Engineering Degree in Civil Engineering from Nnamdi Azikiwe University, Awka, Nigeria. His research interests include construction safety, constructability, sustainability, construction materials, construction site operations, temporary structures, construction management and construction education. His current research field includes construction education and Higher Education Curriculum Development. His passion for the field has resulted in the publishing of journals and several conference papers.



**Prof. Aigbavboa Clinton, PhD**, is an Associate Professor at the University of Johannesburg, South Africa. His research interests are situated in the fields of sustainable human development, with the focus on: sustainable housing regeneration (urban renewal and informal housing), Life Cycle Assessment in the Construction Industry, remanufacturing, leadership in low-income housing, Biomimicry, post occupancy evaluation and green job creation.