

# **Influence of Experiential Learning on Education of Construction Students in South Africa**

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## **Abstract**

South Africa's education sector comprises various individuals, all with different backgrounds, and this sometimes creates challenges when it comes to the teaching and learning processes, especially in construction education. This research assessed the impact of experiential training on construction education in South Africa. The study used a survey research design. Data were collected by the use of a structured questionnaire aimed at 130 respondents purposively selected among the students who were registered for Construction Management (CM), Quantity Surveying (QS), Civil Engineering and Building Science at a South African higher education institution. Out of the 130 copies of the questionnaire, only 101 were usable and therefore analysed for the study using descriptive statistics. The findings from the survey indicate that most of the respondents were of the view that collaborative learning is effective. Also, the findings of the study suggest that majority of the students are aware that they are working with people from different cultural backgrounds with experiential training running between a period of six months and 12 months. Regarding the influence of experiential training on education of students of construction programmes, the finding shows that experiential training has an influence "in encouraging students to find greater meaning in their studies"; "in providing students with exposure to the real world of work"; "encourages students to develop a greater sense of responsibility"; "encourages students to place more reliance on their judgement"; "in creating students who are readily employable"; and "gives students access to possible funding sources in that order. The study concludes that experiential training influences education of construction students in South Africa.

## **Keywords**

Construction students; education; experiential training, South Africa.

## **1. Introduction**

Education is a method in which training, teaching and learning take place, mostly at a school or university to improve knowledge and to develop skills (Oxford Advanced Learners' Dictionary, 2015). Education in construction is one of the contributing variables to the construction industry since it involves the process of teaching, training and learning about construction, infrastructure, structures and roads, amongst others. The construction industry is one of the biggest industries in the world and contributes greatly to the economy of any country. It is responsible for all the construction and conservation of infrastructure and structures (Owolabi & Olatunji, 2014). Furthermore, it is an industry that plays a substantial part in a country's economy, irrespective of the country's level of development; it also plays a significant role in the transformation of the physical terrain of any nation in its march toward greater civilization and economic independence (Owolabi & Olatunji, 2014). The importance of the industry is not only due to the fact that it is responsible for the infrastructure and buildings from which nearly every other sector depends on but also to the fact that it is a large sector in its own right (OECD, 2008). It is necessary to emphasize that construction education is done through various learning institutions which include colleges, universities and universities of technology. Like-wise, the learning institutions are the key centres for developing and fostering the necessary manpower needed to run the construction industry (Ayarkwa et al., 2011).

It is worthy of note that graduates of university construction programmes have been in high demand by contractors in all types of construction, including commercial, residential, highway and heavy construction (Ahn et al., 2012). Traditionally, construction education has been implemented in a way that there is a clear demarcation between the industry and the education sector where discipline-based education and basic skills have been provided to students by universities while their training to become professionals is done by the industry (Park et al., 2003; Gann, 2000). According to Hynds and Smith (2001), universities collaborate with companies for the opportunity to provide students with exposure to the real world of work and this is done through research and student and/or faculty internships for students to have access to possible funding sources, to work on tangible industry-related research, and to have industry practitioners provide input on academic curricula. Also, companies collaborate with universities to gain access to programme graduates, to obtain a window on science and technology, and to gain access to university facilities (Hynds & Smith, 2001).

To succeed in today's complex, dynamic, interconnected, and global world, construction professionals and graduates require competencies such as a firm technical foundation of construction skills, an awareness of ethical issues, good problem-solving skills, leadership abilities, an understanding of safety issues, and collaborative skills: these are considered to be some of the key competencies of construction graduates (Ahn et al., 2012). Importantly, these skills cannot be only obtained in the classroom, but through industry placement of students, which then made experiential training a key form of training for students of construction programmes as reinforced by the study of Hardie and Love (2012). However, it is unclear whether or not collaborative learning is effective for students of construction programmes in South Africa. Are these students working together with people from different backgrounds? For how long are the students exposed to experiential training? How has experiential training influenced their education? These questions are yet to be answered in any scientific work of carefully designed inquiry. It is on this basis that the study is poised to examine the influence of experiential training on education of students of construction programmes with evidence from a South African higher education.

## **2. Review of Related Literature**

### **2.1 An Overview of Construction Education**

Education is defined as the process of teaching or learning in an environment such as a school or college, or the knowledge that you get from this (Cambridge Advanced Learners' Dictionary, 2005). It is also referred to as the process where teaching, training and learning takes place in order to expand knowledge and develop skills. Several elements such as the attitudes of various people, peer behavior, money, and cultural expectations, among others, are covered under education as it does not only cover what we generally think of as we progress through school and college (Kainuwa & Yusuf, 2013). Education introduces people to new ideas and new things in a way that can be beneficial to them.

Similarly, construction education involves the process of teaching, training and learning about construction, infrastructure, structures and roads and this is done through various learning institutions which include colleges, universities and universities of technology. Likewise, the learning institutions are the key centres for developing and fostering the necessary manpower needed to run the industry (Ayarkwa et al., 2011). Haupt (2003) also adds that while higher education institutions maintain their commitment to high academic standards, they also need to be committed to responding to the needs of industry, both in course content and research. One of the ways to obtain a career in the built environment is working through measures such as apprenticeships and training (Grytnes et al. 2017). To produce 'preferred' graduates, tertiary education institutions need to obtain feedback from professional bodies and other industry stake-holders on course curricula in order to ensure that their graduates will meet the changing needs of the industry (Wong et. al., 2007). Better coordination between the training institutions and industry would enable institutions to plan curricula which would meet the needs and expectations of employers more broadly, facilitate access to work experience for students, assist lecturers to upgrade their practical knowledge, and provide students with realistic expectations about their chosen field and the working environment (Haupt, 2003). Therefore, it is crucial for construction education programmes to develop and strengthen these competencies, including both pure construction skills such as estimating, scheduling, project management, cost management, and construction materials and equipment utilization, as well as more general skills such as leadership, cultural dynamics, communication skills, team skills, ethics, critical thinking, and problem solving (Ahn et al., 2012).

According to Avis et al. (2002), upon graduating in the construction sector, graduates have to be equipped with essential attributes such as practical experience for them to be thoroughly familiar with the workings and complexities of the industry. Again, they have to be familiar with the tools and techniques for planning, scheduling and controlling construction operations, and be able to work in teams (Ayarkwa et al., 2011). Construction is a complex and fragmented sector which covers varied activities which comprise designing and planning, construction, civil engineering, maintenance and refurbishments (Grytnes et al., 2017).

One of the concerns that employers and workers in this industry have is the inability of the industry to attract workers and also having no way of investing in training them. This results in serious effects on the productivity as well as the quality of construction products and also on the ability of contractors to satisfy the needs of their clients (International Labor Organization [ILO], 2001). Wolf (2017) outlines that the right group of young people has to be targeted in order to take up field positions, especially in cases where they have just come out of high school. Moreover, Grytnes et al. (2017) is of the view that the construction industry has demonstrated itself as a world leader with plenty to offer young people with diverse talents and interests; however, one of its biggest tasks is enthusing school-children about working in construction. Unfortunately, the majority of people have the perception that the construction industry is vocational or trade-based and has a set of ethical guidelines that are ineffective and is of-ten an irritation and inconvenience to their lives (Mulligan & Knutson, 1999).

The International Labor Organization (ILO) (2001) holds that the issue of the work in the construction industry having such a poor image is generally a result of the type of work done in the industry which is often la-belled as dirty, difficult and dangerous. Many learners do not regard construction and engineering professions as first career choices and this is be-cause of the industry's image and the lack of the attractiveness of the industry in recent years. The Construction Industry Development Board (CIDB) (2007) specifies that some of the stressing elements in the contracting sector are the physical demands, the long working hours, the remote sites and the nomadic lifestyle within the industry and these result in only a few young people regarding it as a career choice (CIDB, 2007). In order to target the right group of youngsters for construction work, candidates should be identified early in high school early: these should be people who have a presence at community colleges, who have a sincere interest in construction due to the fact that they have held more than a few jobs in the sector and youngsters who have a work ethic that has been strongly established.

## **2.2. Experiential Learning for Construction Students**

Experiential learning is defined as a period whereby instruction and relevant practical experience that relates specifically to the selected programme of study are integrated. It occurs when a personally responsible participant cognitively, affectively, and behaviorally processes knowledge, skills, and/or attitudes in a learning situation characterized by a high level of ac-tive involvement (Genty, 1990; Hoover & Whitehead, 1975). According to the Nelson Mandela Metropolitan University (NMMU) Prospectus (2015), the professionals of any discipline require work experience that is appropriate prior to effectively practicing their chosen career. The experience illustrates that the incorporation of theory and in-service/experiential learning creates diplomats who are more mature and readily employable. Similarly, this work experience encourages students to develop a greater sense of responsibility, place more reliance on their judgement, and find greater meaning in their studies (NMMU Prospectus, 2015). However, Haupt (2003) states that the separation between practical and academic work creates a division in the mind of students rather than relating the theory to the application that reinforces the basic concepts taught in the classroom.

According to Henry (1989), experiential learning methods include, in no particular order of relevance, independent learning, problem solving, project work, personal development, prior learning, work, social change, com-munity placement and is non-traditional and is based on activities. Moreover, during the experiential learning period, the student is expected to secure employment/ placement in an approved company. However, universities in some countries assist students to obtain appropriate experiential learning placements at approved companies but the responsibility rests on the student to secure such placement (The University of Johannesburg Faculty of Engineering and Built Environment Rules and Regulations, 2015). After completing each level of the experiential learning, the students need to ensure that they hand in all the documented evidence of their having finished their experiential learning, this should be done ac-cording to the submission dates stipulated by the faculty (The University of Johannesburg Faculty of Engineering and Built Environment Rules and Regulations, 2015).

Obtaining companies to work for in order to complete experiential learning is somewhat of a concern for most engineering and built environment students who do not receive financial aid from bursaries since those who study through bursaries might not face the same challenge since the companies providing funding offer training as well. The mediums through which construction education students can find companies, organizations or places where they can go for their experiential training include learning opportunities that are work integrated, bursaries, internships, presentations by companies, career fairs and through graduate placements (NMMU Prospectus, 2015). Experiential learning encourages and promotes the students' interaction with professionals in their chosen career and is also good for the development of team spirit. Moreover, the NMMU Prospectus (2015) further adds that during the time when students are undergoing their experiential learning, they become exposed to people from diverse spheres of life and therefore develop a greater confidence when working as part of a team.

### **3. Methodology**

In this study, a survey research design was used. Respondents for the study were students who registered for Construction related programmes like Construction Management (CM), Quantity Surveying (QS), Civil Engineering and Building Science at a South African higher education institution. Data were collected by the use of a structured questionnaire aimed at 130 respondents purposively selected among the students who were registered for Construction related programmes as mentioned above. Out of 130 copies of questionnaire administered, 102 were returned, but one of them was discarded due to incomplete information. Therefore, only 101 were usable, representing a response rate of 78 per cent that was deemed viable for statistical analysis for this study. Data were analysed using the mean item score (MIS) to derive straight-forward totals and rank the variables. MIS was computed using the following formula:

$$\text{MIS} = \frac{1n_1 + 2n_2 + 3n_3 + 4n_4 + 5n_5}{\Sigma N}$$

where;

- n1 = the number of respondents for 'not at all influential';
- n2 = the number of respondents for 'slightly influential';
- n3 = the number of respondents for 'somewhat influential';
- n4 = the number of respondents for 'very influential';
- n5 = the number of respondents for 'extremely influential';
- N = the total number of respondents

## **4. Results and Discussion of Findings**

### **4.1. Background Information of the Respondents**

In order to provide insights into the results of this study, respondents background information are first analyzed. The results from the 101 questionnaires that are usable revealed that the majority of the respondents were male with a percentage of 62 per cent while only 38 per cent were female. Also, when asked about their age, 56 per cent of the respondents indicated that they are between the ages of 21 and 25 years of age, 31 per cent of the respondents are within the 26-30 age group, 11 per cent of the respondents are between the ages of 31-35, 1 per cent of the respondents are between the ages of 36-40, followed by 1 per cent who are 41 years and older and none of the respondents were younger than 21 years. Results relating to the ethnicity of the respondents indicates that majority of the respondents were African with a percentage of 90 per cent, followed by whites at 6 per cent, Indian or Asian at 3 per cent and 1 per cent were colored. Further results revealed that 84 per cent of the respondents are single and this was the highest in this category, 12 per cent are married, 4 per cent are co-habiting and none of the respondents were divorced or widowed. Additionally, the findings showed that 90 per cent of the respondents were South African and the remaining 10 per cent non-South African.

Of the overall respondents, 82 per cent are currently registered for a B. Tech. degree while 18 per cent of them are registered for third year in Building science. The respondents currently registered for the B.Tech. degree are

registered for various courses: 46 per cent of them are registered for Quantity Surveying, 28 per cent for Construction Management and 10 per cent for Civil Engineering and the 17 per cent represents those registered for third-year Building Science. Furthermore, when asked who is funding their university fees, the result revealed that 34 per cent of the respondents said that they are responsible for their own fees, 30 per cent of the respondents are studying through a bursary, 23 per cent of the respondents' fees are paid by their parents, 5 per cent of the respondents are studying through NSFAS, another 5 per cent are studying through scholarships and 3 per cent are making use of study loans.

#### **4.2. Experiential Learning and Construction Education of Students**

As part of experiential learning of students, they must be able to work in groups. As such, when the respondents were asked about the regularity of taking part in group work, the findings revealed that 27 per cent of the respondents work in groups two to three times a week, 18 per cent of the respondents do so twice a week, 28 per cent do so once a week, 6 per cent do so once a month, 15 per cent do so once in two months, 2 per cent do so once in three months and the remaining 5 per cent of the respondents never do group work. Again, when the respondents were asked about the effectiveness of collaborative learning, the finding suggests that 81 per cent of the respondents said that collaborative learning is effective while 10 per cent said that collaborative learning is not effective and the remaining 9 per cent were not sure. When the respondents were asked about their knowledge of working with people from different cultural backgrounds, the finding revealed that 90 per cent work with people who are from a different cultural background from theirs; 5 per cent had no knowledge of working with people from a different cultural background from them and the remaining 5 per cent said they were not sure. Additionally, when the respondents were asked how long their experiential training took, the result indicates that 51 per cent did their experiential training over a period of six (6) months; 38 per cent said their experiential training lasted for a period of 12 months and 11 per cent said theirs lasted less than six (6) months.

Regarding the influence of experiential learning on education of students of construction programmes, the respondents were asked about the influence that experiential training has. The findings, as shown in Table 1, suggest that the respondents ranked the fact that experiential training has an influence "in encouraging students to find greater meaning in their studies" first and this had an MIS of 3.97; ranked second was that experiential learning has an influence "in providing students with exposure to the real world of work" and this variable had an MIS score of 3.96; ranked third was that it "encourages students to develop a greater sense of responsibility" and this had an MIS score of 3.78; and ranked fourth was that it "encourages students to place more reliance on their judgement" and this had an MIS ranking of 3.55. Ranked fifth was that experiential training has an influence "in creating students who are readily employable" and this factor had an MIS score of 3.47 and they ranked the fact that it "gives students access to possible funding sources" last in sixth place with an MIS score of 3.27.

Table 1. Influence of experiential learning on construction education of students

	<b>MIS</b>	<b>RANK</b>
In encouraging students to find greater meaning in their studies	3.97	1
In providing student exposure to the real world of work	3.96	2
In encouraging students to develop a greater sense of responsibility	3.78	3
In encouraging students to place more reliance on their judgement	3.55	4
In creating students who are readily employable	3.47	5
In giving students access to possible funding sources	3.27	6

### **4.3. Discussion of Findings**

In some cultures, group dynamics are developed in a more systematic and sustained manner, with greater value placed on interdependence and collaboration than on individual performance (ECTE, 2005). The study findings revealed that 81 per cent of the respondents say collaborative learning is effective while 10 per cent of the respondents said collaborative learning is not effective and the remaining 9 per cent were not sure. The study findings further revealed that experiential training plays a role in encouraging students to find greater meaning in their studies, in providing students with exposure to the real world of work, in encouraging students to develop a greater sense of responsibility, in encouraging students to place more reliance on their judgement, in creating students who are readily employable and in giving students access to possible funding sources. The findings were similar to what the Nelson Mandela Metropolitan University (NMMU) (2015) Prospectus outlined, namely that the experiential learning experience illustrates that the incorporation of theory and in-service/experiential learning creates diplomats who are more mature and readily employable.

Similarly, this work experience encourages students to develop a greater sense of responsibility, place more reliance on their judgement, and find greater meaning in their studies. However, the findings were not in agreement with the study conducted by Haupt (2003) which revealed that the separation between practical and academic work creates a division in the mind of students rather than relating the theory to the application that reinforces the basic concepts taught in the classroom. However, Hynds and Smith (2001) also state that the relationships with the industry are essential to programmes of post-secondary education in construction. Moreover, the NMMU Prospectus (2015) further adds that during the time when students are undergoing their experiential learning, they become exposed to people from diverse spheres of life and therefore develop greater confidence when working as part of a team.

## **5. Conclusion**

This study sought to find the impact of experiential learning on construction education in South Africa. From the findings relating to the demo-graphic aspect of the study, it can be concluded that construction education is studied by people of various cultural groups: Africans, whites, Indians or Asians and coloreds, which indicates that all the ethnic groups were represented in the study. Also, the findings indicate that construction students are registered for courses in Quantity Surveying, Construction Management, Civil Engineering and Building Science. It can also be concluded that the majority of the respondents were young people who are from different cultural backgrounds. The findings also revealed that majority of the respondents take part in collaborative learning once a week or two to three times a week or more. Additionally, most of the respondents were of the view that collaborative learning is effective. Furthermore, majority of the students are aware that they are working with people from different cultural backgrounds. It can also be concluded that for construction related programmes, students did their experiential learning between a period of six months and 12 months. It is also evident from the study that experiential training has an influence in encouraging students to find greater meaning in their studies and in providing students with exposure to the real world of work. Further, it encourages students to develop a greater sense of responsibility and to place more reliance on their own judgement. Above all, experiential learning has an influence in creating students who are readily employable and it gives them access to possible funding sources.

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