

ARE THE CONSTRUCTION GRADUATES ON CIOB ACCREDITED DEGREE COURSES MEETING THE SKILLS REQUIRED BY THE INDUSTRY?

Jason Rawlins and Ramesh Marasini¹

Southampton Solent University, Maritime and Technology Faculty, East Park Terrace, Southampton SO14 0YN, UK.

The CIOB skills in the construction industry (2009) report suggested that 34% of employers felt that new graduate skills sets are not relevant to the industry. This has been supported by the Council for Industry and Higher Education (CIHE) report on Graduate Employability, which highlights that 30% of employers are disappointed with graduate's employability skills. This study explores the perception of employers regarding the skills of graduates from CIOB accredited degrees, mainly on Construction Management programmes and whether there are any skills gaps that are not covered in the CIOB framework. The findings from a survey of construction professionals in the South of the UK is analysed and discussed in this paper. The study highlights that the problem of a skills shortfall is not because of a lack of emphasis, or incorrectly defined, learning outcomes within the CIOB educational framework, more of a deficit of employability competencies such as personal skills, and lack of work experience by Construction Management graduates.

Keywords: CIOB educational framework, employability, graduate skills.

INTRODUCTION

Educational Frameworks mainly 'The Framework for Qualifications of the European Higher Education Area (FQ-EHEA)' and the UK HEI educational framework (FHEQ) set general guidelines and standards in curriculum design and delivery of undergraduate courses by the HEI and establish what is expected of the graduates when they leave the university. The FHEQ (2008) utilises qualification criteria, which are generic statements of the intended outcomes of study, which are defined as learning outcomes (LOs). A LO is the statement of what a learner is expected to know, understand and/or be able to demonstrate after completion of a process of learning (QAA 2008). FHEQ (2008) stipulates that HEI's have the autonomy of interpretation and application of the educational frameworks provided the basic requirements set by the frameworks are satisfied; the curriculum and assessments provide all students with the opportunity to achieve, and to demonstrate achievement of, the intended outcomes. Subject benchmark statements and HEI's degree programme descriptors provide more descriptive statements. The benchmark statements, typical and threshold standards for bachelor degrees with honours (QAA, 2008), contain a descriptive list of subject specific and generic learning outcome requirements in subject knowledge and understanding, subject specific skills, and

¹ Ramesh.Marasini@solent.ac.uk

generic skills. The achievement of the learning outcomes eventually become the attributes of the graduates on the programme studied.

To cater for the industry specific requirements, for the construction industry, specifically, Construction Management (CM) discipline, the Chartered Institute of Building (CIOB) provide an educational framework to accredit the undergraduate courses in construction. The CIOB Educational framework (2010) is based on policy creation from the Construction Industry Council (CIC), National Occupational Standards (NOS), and the Quality Assurance Agency for Higher Education (QAA). The CIC common learning outcomes (CLO) cover the Built Environment Higher Education programmes and are designed to reflect the changing needs of the Construction industry. The CIOB framework has mapped the requirements of the CIC scheme against its Education Framework to establish parity (CIOB 2006).

CIOB (2007) describes the CIOB educational framework as having three levels; level 1 (FHEQ level 4) is the entry level the undergraduate degree programme and covers principles and context. Level 2 (FHEQ level 5) includes analysis and application, whilst level 3 (FHEQ level 5) introduces synthesis and evaluation skills. At each level, the CIOB accredited BSc (Hons) Construction Management degree programme of study includes four components: Construction Technology, The Construction Environment, Specialism, and Skills. Table 1 shows the relationships of FHEQ requirements, CLO's, and Subject Benchmarks and CIOB educational framework requirements.

Table 1: CIOB Educational Framework with FHEQ, CLOs and Benchmarks

FHEQ	CLO's	Benchmarks	CIOB Educational Framework
- Subject knowledge, Analysis	- Personal Skills - Technical Knowledge	- Subject Knowledge	- Construction Technology
- Conceptual understanding, Personal Management, Evaluative approach	- Professional Knowledge - Benchmarks - Subject Knowledge	- Subject Specific Skills - Generic Skills	- Environment and Management, Specialism, Skills
- Communication, Transferable Skills	- Subject Specific Skills - Generic Skills		

In an ideal situation, if HEI deliver programmes as per FHEQ and a Professional organisations educational framework, the graduates should meet the industry requirements. The CIHE report by Archer and Davison (2008) entitled ‘Graduate Employability: What do employers think and want?’ found that 30% of employers are disappointed with graduate’s employability skills. Similarly, 72% of respondent’s in a survey titled ‘Skills in the UK Construction Industry’ suggested that there is a skills shortage within the construction and CM graduates need to be equipped to quicker adapt to the new workplace environment than ever before asserting that there is a need for a comprehensive undergraduate programme (CIOB, 2010). 34% of employers also felt that new graduate skills sets are not relevant to the industry. Davies *et al.* (1999) suggest that graduates from professional courses are often described by employers as lacking in useful immediate fee-earning skills, however, there are few differences between graduates, and employers, assessment of achievement of skills. Massyn *et al.* (2009) state that the Construction Industry is primarily concerned with short term recruitment solutions, whereas academia is principally focused on educating for the long term success of the graduate. This opinion is mirrored by the earlier work of Love *et al.* (2002), who suggests that CM skills are important for immediate employment. They also argue that managers select graduates that show

similar traits, skills, and qualifications as their own. Nielson (1998) found that construction management graduates were often unfairly criticised by their employers as they are new to the workplace and have limited technical and practical ability.

The aim of this research is to evaluate CIOB accredited Bachelor degree CM programmes from the construction industry's perspective and to identify any shortfalls in the skill requirements of graduates entering the construction industry, suggesting any future improvements. The research hypothesis is: "There is a significant skills difference between the industry importance attributed to, and, the performance of Construction Management graduates, in key learning outcomes from the CIOB educational framework."

The following sections review the industry skills requirements, administration and evaluation of a survey questionnaire of Construction employers, and conclusions of the study.

INDUSTRY KEY SKILLS REQUIREMENTS

Lees (2002) argues that employability is more than key skills, and curricula to enhance employability should focus on; knowledge and understanding, developing skills, self-efficacy beliefs, and strategic thinking or reflection. Lees also highlighted that employers rank team working more important than numeracy and literacy. The study by Lees ranks employability factors as "Willingness to learn; Commitment (to organisation); Dependability/reliability and Self-motivation". In another study, Archer and Davidson (2010) rank employability skills as "Communication Skills; Team Working skills; Integrity; Intellectual ability; Confidence." These studies confirm the findings of Nove *et al.* (1997) which highlighted that managers rank practical ability/relevant work experience, and interpersonal skills as the most desirable skills.

Table 2: Key Industry Skills requirements for graduates

Massyn (2009)	Enthusiasm, personal values , commitment to the working environment, ability to work in teams, ability to solve problems , ability to adapt to the environment
Farooqui <i>et al.</i> (2008)	Knowledge of HandS regulations, Interpreting contract documents, Listening ability and attention to detail, Knowledge of building codes and regulations, Time Management, Planning and goal setting, Construction documentation interpretation, Knowledge of construction law and legal environment, Hands-on project experience prior to graduation, Marketing with clients
Baharudin (2006)	Discipline understanding, understanding of construction drawings, communication (oral/written), leadership, good working relations
Egbu (1999)	Leadership, communication (oral/written), motivation of others, health and safety, decision making, forecasting and planning
Sears and Clough (1991)	Practical experience, planning, effective working with others
Young (1989)	Skills and knowledge in organisation, human relations, communication (oral/written), personnel management, operational planning
Fryer (1979)	Managing change, recognising opportunities, handling problems, decision making, social skills

The perception of the industry of the key skills obtained upon completion of CIOB accredited Construction Management degree, is key to the employability of the graduate. The employability competencies at first appear to be very similar to the key skills requirements of the industry, and the CIOB educational framework learning outcomes, but are more individualistic and personal to the construction graduate. In this context, this study evaluates the perception of employers of construction management graduates and analyses whether there is a difference in the skills required

by the industry and skills and performance of CM graduates in the CIOB accredited courses.

The review of literature suggests that huge emphasis is placed on certain skills such as communication and practical skills by the industry. Table 2 summarises various authors' findings on the key employability skills of graduates. The construction industry appear to view undergraduate performance as lacking in key areas. Archer and Davison (2010) emphasise that "there is a need for action by universities, employers, students and government to address both the reality and perception of the skills deficit in our graduates. Massyn *et al.* (2009) reinforce this view, stating "graduates had understanding of key skills required" but employers wanted further depth."

RESEARCH METHODOLOGY

The study was focussed to CM BSc (Hons) degree programmes. A questionnaire survey of local (south) construction industry professionals was carried out using on-line survey, Kwiksurvey © tool. The questionnaire, presented in the Appendix, was divided into nine sections: Number of graduate employment and associated information (Question 1 – 3), entry level employability of CM graduates and progression time to management roles (Questions 4, 5 and 7), Preference of graduates with Construction Management degree experience, and High grades (Question 6), Skill performance of Construction Management graduates and additional skill requirements from the industry (Questions 8, 9, 12 and 13), Graduate performance, and industry importance, of learning Outcomes (Question 10 and 11), Employability of Construction Management graduates (Question 14 and 15), changing skills requirements of the Construction Industry, and changing skills of Construction Management graduates (Questions 16 and 17) and additional improvements to CIOB accredited Construction Management degree programmes (Question 18 and 19 and 20).

The survey was sent to 55 Construction professionals and 44 responses were received. The results were analysed using both quantitative and qualitative analysis. The qualitative analysis included clustering of views of the respondents and quantitative techniques used weighted averages, ranking, gap analysis and hypotheses testing. Some summary responses are presented in the appendix with the questionnaire and detailed evaluation on the performance and importance of learning outcomes are discussed in the following section.

ANALYSIS OF RESULTS

Entry level employability of CM graduates and progression to senior level

Q1 response suggested the 91% of responses came from the employers employing CM graduates. An analysis of responses of question 2 and 3 shows that a higher percentage of CM graduates are recruited in the 0-5 band, but interestingly 39% of respondents recruit more than five non graduates, compared to only 23% of CM graduates. Similarly, the analysis of responses of questions 4 and 5 suggests that CM graduates are more likely to achieve an entry level position of a technical or supervisory level, whereas non-graduates are more likely to achieve an entry level position of non technical. The majority of respondents (58%) believe the time taken for a CM graduate to reach middle management would be 2-5 years, with 28% expressing this could take over 5 years. This indicates that the CM graduates need to acquire additional skills and competencies through work experience.

Preference of graduates and skills

The responses from question 6 suggest that the employers preferred a CM degree with high grades and previous experience with the highest weighted rating, 4.72. The choices with experience scored higher scores (Appendix Q6).

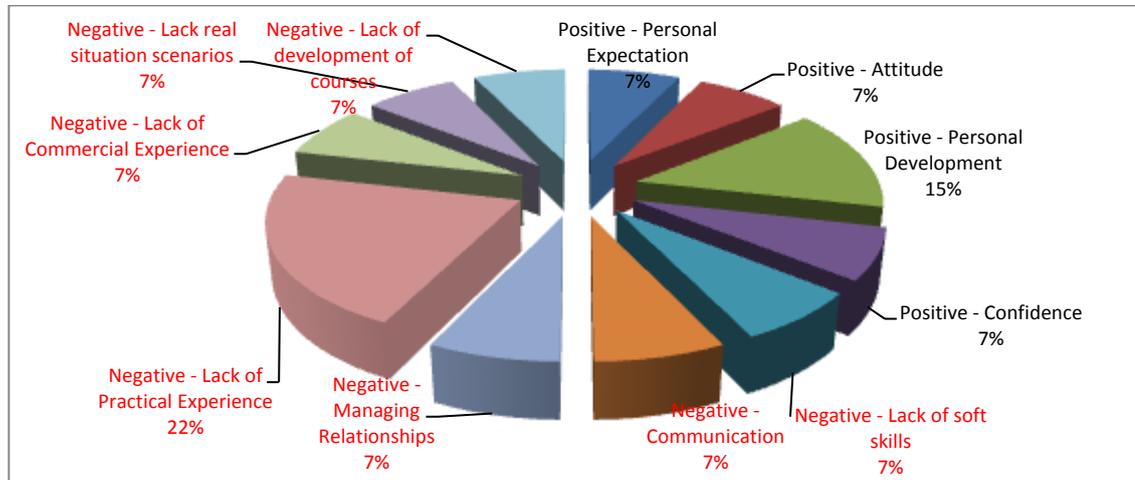


Figure 1: Skills of CM graduates

The majority of respondents (55%) highlighted that CM graduates lack skills required by the industry (Q8 response, Appendix). The summary of responses for the positive (graduates have sufficient skills) and negative (graduates have not got sufficient skills) were summarised in Figure 1.

Table 3: Skills required to fast track progression

Personal Attributes	Personal Skills	Business Skills	Experience
Discipline (2)	People skills (6)	Business processes	Site Experience (4)
Adaptability	Communication (3)	knowledge	Subject knowledge (4)
Common Sense	Presentation	Commercial acumen	General Experience (3)
Passion and Drive	Time management	Planning skills	Management experience
Be articulate	Technical skills		Organisation
Realistic Expectations	IT skills		experience (2)
Confidence	Team working		Legal experience
	Networking ability		
20%	33%	16%	31%

The skills shown in Figure 1 are addressed through CIOB learning outcomes, however, graduates are perceived as lacking certain skills mainly; experience, communication, and commercial operations. Table 3 shows skills required to fast track progression in which experience and personal skills development are seen as important areas that should be given priority, to improve the employability of the graduates.

The analysis of responses presented in the Appendix for questions 13 to 20 highlight similar responses to Table 2 and provides confirmative evidence to the statement that employers perceive CM graduates lacking the skills required to the level expected by the industry.

Comparative Analysis of Performance and Importance of Learning Outcomes

A comparative analysis can be carried out on the results obtained from question 10 and 11. This indicates the difference between the importance, and the performance of, Construction Management graduates, in specific learning outcomes to identify any ‘skills gap’. Table 4 illustrates the gap analysis of, the weighted rating of;

performance ratings against the weighted rating of importance ratings of specific learning outcomes.

Table 4: Gap Analysis between importance (Q11) and performance (Q10) of Learning Outcomes

Learning Outcomes	Variance	Rank
Use of effective communication	-2.03	1
Development and management of relationships and interactions	-1.59	2
Leadership and self development	-1.46	3
Evaluate and make judgement on relevant aspects of management	-1.30	4
Team work	-1.16	5
Demonstrate a critical approach to project and site management	-1.13	6
Investigation of unfamiliar problems and suggest solutions	-1.03	7
Knowledge and skills relating to construction technology	-0.64	8
Knowledge of the importance of key issues in construction	-0.56	9
Knowledge of key concepts and theory	-0.38	10
An evaluative approach to graduate's discipline	-0.27	11
Knowledge acquisition and appropriate research methods	0.11	12
The management and control of a personal learning plan	0.45	13
Other	0.50	14
Selection of appropriate IT applications	0.60	15
To plan, implement and conduct research	0.92	16

The results indicate that the Construction industry do perceive a 'skills gap' in CM graduate performance, and the importance of learning outcomes. Learning outcomes 1 to 11 lag the importance rating and graduates were seen performing better in learning outcomes 12 to 16.

The results show that communication, management of relationships (people skills), leadership, evaluative judgements (problem solving), and team work, are the areas with the biggest gap. This indicates that these are the areas requiring most improvement in the skills of CM graduates.

The hypothesis "There is a significant skills difference between the industry importance attributed to, and, the performance of Construction Management graduates, in key learning outcomes from the CIOB educational framework" was tested using a T-Test. The null hypothesis predicts that there will be no significant difference between the perceived importance of learning outcomes than the performance of CM graduates. This is expressed as:

$$H_1 = I > P \quad \text{Research Hypothesis} \quad H_0 = I = P \quad \text{Null Hypothesis}$$

Criteria $P < 0.5$, Critical Value of T = 2.042

The data was analysed using an excel data analysis function. The critical value of T was obtained from calculation tables. The results are tabulated in Figure 2.

The value of T is greater than the critical value of T, therefore the results are significant. That is, attributed importance of learning outcomes is greater than performance of CM graduates in those learning outcomes. The probability figures also show that these figures are not due to chance ($P < 0.01$).

t-Test: Paired Two Sample for Means		
	Variable 1	Variable 2
Mean	58.00	49.78
Variance	24.71	66.63
Observations	32	32
Pearson Correlation	0.1073	
Hypothesized Mean Difference	1	
df	31	
t Stat	4.49	
P(T<=t) one-tail	0.00005	
t Critical one-tail	1.70	
P(T<=t) two-tail	0.00009	
t Critical two-tail	2.04	

Figure 2: Results from T Test

CONCLUSIONS

The industry opinion is that CM graduates performance is lacking in almost every learning outcome provided in the study (in comparison to the importance). This would suggest that graduate learning is not satisfying the Construction Industry's perception of the key skills requirements, although CIOB educational framework covers the industry requirements through learning outcomes. The problem of a skills shortfall is not because of a lack of emphasis, or incorrectly defined, learning outcomes within the CIOB educational framework, more of a deficit of employability competencies such as personal skills, and lack of work experience by Construction Management graduates.

REFERENCES

- Archer, W. and Davison, J. (2008), *Graduate Employability: What do employers think and want?*, The Council for Industry and Higher Education (CIHE), UK.
- CIOB (2009), *Skills in the construction industry 2009*, Chartered Institute of Building, Ascot, UK.
- CIOB (2010), *Skills in the Construction Industry*, Chartered Institute of Building, Ascot, UK.
- Council for Higher Education (2006), *Degrees of Skill Student Employability Profiles A Guide for Employers*, Linney Direct, Mansfield, UK.
- Davies, H.A., Csete, J. and Poon, J. (1999), "Employers expectation of the performance of Construction Graduates", *International Journal of Engineering*, **15**(3),191-198.
- Farooqui, R. (2008) *Desirable Attributes and Skills for Graduating Construction Management Students*, Florida International University, Florida, USA.
- Lees D. (2002) *Graduate Employability*, LTSN Generic Centre, Exeter, UK.
- Love, P., Haynes, N.S., Sohal, A.S., Chan, A.P.C. and Tam, C.M. (2002), *Key Construction Management Skills for Future Success*, Faculty of Business and Economics, Monash University, Australia.
- Massyn, M., Mosime, L. and Smallwood, J. (2009), "Construction management graduates – do they have the competencies that industry need?", *RICS COBRA Research Conference*, University of Cape Town, 10-11 September 2009, 56-266.
- Nielson, A. (1998), *Research on Employer Satisfaction with graduate skills*, Interim Report, Canberra, Australia.
- Nove, A., Snape, D. and Chetwynd, M. (1997), *Advancing by Degrees*, Department for Education and Employment, London, UK.

- Odusami, K. (2002), "Perceptions of Construction Professionals Concerning Important Skills of Effective Project Leaders", *Journal of Management in Engineering*, ASCE, 62-67.
- Sears, R. and Clough, G. (2000), *Construction Project Management*, 4th Edition, John Wiley and Sons, Chichester, UK.
- The Quality Assurance Agency for Higher Education (QAA) (2008), *The framework for higher education qualifications in England, Wales and Northern Ireland*, August 2008, Linney Direct, Mansfield, UK.
- Young, B. (1989), "Management Skills and Knowledge: A Case Example from the Construction Industry", *Leadership and Organisation Development Journal*, **10**(6), 3-9.