

Measuring and Enhancing the Emotional Intelligence of Construction Management Students: An Empirical Investigation

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Abstract

Social and personal competencies, such as self-awareness, optimism, and empathy, have been shown to enhance both satisfaction and productivity at work. Collectively, these competencies have been termed 'Emotional Intelligence' (EI) and have been shown to differentiate leading managers from less able performers. There have, however, been relatively few empirical studies on EI conducted within the construction sector context and so little is known of how emotionally intelligent those choosing construction careers have the propensity to be, or how their EI can be enhanced. This paper reports on the findings of research which explored construction management MSc students' EI and the effect of their programme's content on their EI development. A standard EI measurement tool (SEI) was used to assess EI levels before and after specific modules. Follow-up interviews with students established how EI-enhancing interventions could be better integrated into the curriculum. The results revealed that the current content of modules studied did little to enhance EI levels amongst the cohort. They also suggested that there may be differences in EI development on the basis of both gender and age, although the sample size was too small to draw firm conclusions in this regard. On the basis of the findings, tentative suggestions are provided for enhancing the future EI content of postgraduate courses in the built environment. These include adding additional modules that cover work psychology, simulating the working environment through role-play and explicitly introducing the concept of EI into the construction curriculum.

Keywords: Emotional Intelligence, Curriculum Development, Modular Content

Introduction

Over the last decade, the assessment of Emotional Intelligence (EI) has become a topical issue within the management literature (Cooper and Sawaf, 1996; Goleman, 1998a; Weisinger, 1998; Jordan *et al.*, 2002; Fredrickson, 2003; Sy *et al.*, 2005; Jordan and Ashkanasy, 2006). The impetus of much of this interest was stimulated by Goleman's (1995) best-selling book entitled *Emotional Intelligence*, in which he suggests that EI explains a higher proportion of variance in individual performance and effectiveness than intellectual intelligence. A number of researchers have since developed the concept such as Mayer and Salovey (1997), Bar-On (1997) and Goleman himself (Goleman, 1998b). More recently there has also been some work which has suggested that the ability of individuals to succeed in construction may also be dependent upon EI traits such as creativity, emotional awareness and other aspects of tacit knowledge (Chinowsky and Brown, 2004). This has suggested that the traditional criteria used to assess a person's abilities, such as higher academic grades and Intelligence Quotient (IQ), are inadequate.

Despite the emphasis on EI in the recent literature, there have been relatively few empirical studies on EI conducted within a construction sector context and so little is known of how emotionally intelligent those choosing construction careers have the propensity to be. Accordingly, this study aimed to begin to redress this knowledge gap by exploring construction students' EI on demographic factors, such as their gender, age and work experience and to determine the effect of construction modules on EI development. Moreover, it examined the effect that built environment modules have on developing the EI of students on our courses. The results establish an initial understanding of the emotional intelligence levels of construction students, provide a more informed understanding of the impact of the curriculum on students' EI development, and point towards areas where improvements could be made to enhance the EI of built environment students in the future.

Background to the EI Construct

EI as a term has been present in the literature for a relatively long time (Leuner, 1966; Greenspan, 1989). As early as 1920, Thorndike proposed a model of intelligence which included not only the traditional intellectual factors, but also what he termed 'social intelligence', defined as "...the ability to understand and manage men and women, boys and girls — to act wisely in human relations" (Thorndike 1920, p.228). Since then, research interest in social intelligence has fluctuated and has been characterised by diverse approaches. Numerous studies have been conducted to attempt to separate academic from social intelligence, but with only moderate success (Thorndike and Stein, 1937; Leeper, 1948; Tenopyr, 1967; Hoepfner and O'Sullivan, 1968; Walker and Foley, 1973). In the 1980s, Gardner (1983) developed his 'Multiple Intelligence Theory' which combines cognitive and emotional aspects of intelligence. According to Gardner part of this is 'social intelligence' which comprises a person's interpersonal and intrapersonal intelligences; intrapersonal intelligence relates to one's intelligence in dealing with oneself, while interpersonal

intelligence relates to one's intelligence in dealing with others. This provided the basis for the development of the EI construct.

In 1990, the term of emotional intelligence was first defined by Salovey and Mayer (1990), who defined it as “the subset of social intelligence that involves the ability to monitor one's own and others' feelings and emotions, to discriminate among them and to use this information to guide one's thinking and actions” (p.189). After that, subsequent writers such as Bar-On (1997), Goleman (1998a), Cooper and Sawaf (1996), and Weisinger (1998) have espoused their own notions of emotional intelligence and have developed models of its dimensions and manifestations. All, however, share a common reference to EI as the ability to accurately perceive, evaluate, regulate and express one's own emotions (Songer and Walker, 2004).

In his best-selling book on the construct, Goleman (1995) made strong claims about the contribution of EI to individual success, and specifically to individual success in the workplace. In effect, he questioned the primacy of intellectual intelligence (IQ) as the key determinant of performance. Indeed, he identified intellectual intelligence as contributing only 20% towards life success and suggested that the remaining 80% of life success may be attributable to emotional aspects of intelligence.

There is a growing body of evidence which supports the contention that EI is crucial to the performance and success of individuals and hence, organisations (Bachman *et al.*, 2000; Fox and Spector, 2000; Jordan *et al.*, 2002; Wong and Law, 2002; Lopes *et al.*, 2003; Lopes *et al.*, 2006). Much of this research has focused on how it relates to workplace success and performance. There have been recent studies which have shown the positive impact of emotional intelligence on individuals' leadership ability (Scheusner, 2002; Boyatzis, 1999; Cherniss, 2001; Caruso *et al.*, 2002; George, 2000; Zhou and George, 2003; Cote *et al.*, 2004; Butler and Chinowsky, 2006), work performance (Bachman *et al.*, 2000; Fox and Spector, 2000; Jordan *et al.*, 2002; Wong and Law, 2002), management ability (Slaski and Cartwright, 2002; Carmeli, 2003; Zhou and George, 2003), academic performance (Schutte, 1998; Petrides *et al.*, 2004; Parker *et al.*, 2004, 2005), and in their ability to perform cognitive tasks (Schutte *et al.*, 2001). Goleman (1998a) also claimed that, because EI affects almost every aspect of work life, employees who are high in EI tend to be ‘star performers.’ There is also some evidence that it is important in determining group performance. For example, Jordan *et al.* (2002) suggested that high levels of emotional intelligence make teams perform better in all aspects of management and Elfenbein (2006) demonstrated that a high average level of individual EI of team members predicts stronger team performance. Hence, given the strong relationship between EI and performance, EI tests have been advocated for personnel selection and development (Multi-Health Systems, 2001).

Emotional Intelligence & Construction Education: The need for further research

Construction is a project-based industry that involves bringing together different combinations of clients, designers, contractors and suppliers for relatively short periods of time (Dainty *et al.*, 2003). The inherent multidisciplinary of construction activity, and the temporary

involvement climate within which work takes place, renders it one of the most challenging environments in which to manage people effectively to ensure project and organisational success. The effective management of people demands effective communication skills, group interaction management and leadership abilities (Melvin, 1979; Goleman, 1998a; Dainty *et al.*, 2003; Songer and Walker, 2004). These factors all demand high levels of EI in addition to the more traditional (and arguably more tangible) management abilities which leading practitioners possess. Indeed, evidence exists of a positive relationship between high levels of EI and transformational leadership behaviours in construction executives (Butler and Chinowsky, 2006).

Given the espoused importance of EI, it is unsurprising that higher education institutions have attempted to build EI-related components into their courses. Skills in communication and self-management regularly complement the technical subject content (NCIHE, 1997). In addition, significant reports have commented on the fact that students continue to graduate with strong technical skills, but lack critical leadership and management skills (NSF, 1995 cited in Chinowsky and Brown, 2004). In a survey of employers' views about newly qualified engineers in the construction sector, employers stressed the importance of emotional skill in combination with technical competence (Jagger and Conner, 1998). This response points to an acute need to establish the extent to which construction education supports EI development. Although Chinowsky and Brown (2004) examined this in relation to civil engineering graduates in the United States, no such study has examined this within the context of the UK. Furthermore, it remains unclear as to whether programmes aimed specifically at developing managers in the construction industry develop these competencies more effectively. It could be hypothesised that, given the strong managerial content of such programmes, students will develop higher levels of EI in comparison to traditional civil engineering programmes. Furthermore, given the important role of EI in individual and organisational success discussed above, it could also be hypothesised that appropriate learning interventions could enhance students' EI in a way which benefits organisational performance (Goleman, 1998a).

A range of other factors are known to affect EI in addition to pedagogic variables. For example, gender represents a widely analysed demographic variable (Bar-On, 1997; Deitz-Uhler and Murrell, 1998; Goleman, 1995; Mayer *et al.*, 1999; Hyde and Plant, 1995; Van Rooy and Viswesvaran, 2004; Day and Carroll, 2004; David *et al.*, 2004). This research has shown that women out-perform men in EI tests, a phenomenon which is often attributed to them having better emotional and interpersonal skills (Petrides and Furnham, 2000; Petrides and Furnham, 2003; Van der Zee *et al.*, 2002; Van der Zee and Wabeke, 2004). The validity of this assertion within a construction context remains unexplored. Similarly, previous research has suggested that older workers have higher levels of EI relative to their younger colleagues (Bar-On, 1997; Mayer *et al.*, 1999; Bar-On, 2002; Sala, 2002). Given this previous research, it is reasonable to hypothesise that emotional intelligence will increase relative to age and work experience.

Given this background, this research set out to examine the impact of the construction management curriculum on the EI development of university students. In addition, it also aimed to explore whether construction students' EI is determined by social and demographic factors, such as their gender, age and previous work experience.

Methodology

In order to examine the EI of construction management students and the impact of their programmes on their EI development, a methodology was required which measured their EI before and after the learning interventions provided by the modules on which they studied. An examination of the content of both undergraduate and postgraduate courses at Loughborough University revealed that there was a cluster of modules within the postgraduate programmes which appeared to be closely aligned with development of emotional skills. These included modules on teamwork and leadership, strategic management and human resource management. All of these modules set out to develop a series of 'social skills', a key dimension of emotional intelligence (Goleman, 1998a), such as leadership, communication, effective interaction and project management skills. Accordingly, an instrument was developed to ascertain EI levels before and after the completion of a series of modules.

In order to measure EI effectively, it is necessary to choose a simple, practical, and psychometrically sound measure which is appropriate for the subjects under investigation. There are a number of instruments that can be used for EI measurement, and these vary widely both in terms of their content and methods of assessment. A literature review revealed four frequently used tools for measuring EI which could be applied to this study, namely: The Bar-On Emotional Quotient Inventory (EQ-I) (Bar-On, 1997), The Mayer, Salovey, Caruso Emotional Intelligence Test (MSCEIT) (Mayer *et al.*, 2002), The Emotional Competence Inventory (ECI) (Goleman, 1998a) and The Schutte Self-Report Emotional Intelligence (SEI) (Schutte *et al.*, 1998). The Schutte Self-Report Emotional Intelligence was chosen from a number of different mixed model, self-report scales for several reasons. Firstly, the elements have a theoretical foundation and were based on an earlier version of an EI model by Salovey and Mayer (1990). Secondly, SEI has been found to consistently measure aspects of personality relevant to emotional intelligence (Schutte *et al.*, 1998; Brackett and Mayer, 2003; Saklofske *et al.*, 2003). In addition, it also has good internal reliability ($\alpha = .78$) and high consistency ($\alpha = .90$) in comparison to the other tools. A recent investigation revealed that the SEI was used in the majority of research studies exploring EI (Van Rooy and Viswesvaran, 2004).

The self-report questionnaire developed by Schutte *et al.*, (1998) uses the three-component model of EI (appraisal/expression of emotions, regulation of emotions and utilisation of emotions) originally proposed by Salovey and Mayer (1990). The test comprises 33 self-referencing statements, 3 of which are reverse-scored. It requires subjects to rate the extent to which they agree or disagree with a set of statements measured on a 5-point Likert scale (1=strongly disagree; 2=somewhat disagree; 3=neither agree nor disagree; 4=somewhat

agree; 5=strongly agree), which takes approximately 10 minutes to complete. There is some debate within the EI literature as to whether SEI is better assessed as a uni-dimensional (single factor) or multi-dimensional (four-factor) measurement. Given the inconsistent subscale reliabilities reported in the literature (Ciarrochi *et al.*, 2001; Schutte *et al.*, 1998), and the satisfactory full score reliability reported for adolescents ($\alpha = .78$), it was decided to use total scale scores only in the current investigation.

The SEI test was administered to 30 students studying on the MSc in Construction Management programme at the Department of Civil and Building Engineering, Loughborough University. This programme is one of the most established postgraduate construction management programmes in the world, having been operated by the Department for several decades. The sample, comprising 22 male and 8 female students, was assessed at the beginning of the second semester, with a second EI test being conducted at the end of the semester after completion of their taught modules. The modules were deliberately categorised as technical and/or science modules, managerial modules or law-related modules, in order to establish the types of curriculum content which affects EI (in either a positive or negative sense). All of the questionnaire data was analysed using SPSS version 12.0. Following the EI retest and subsequent data analysis, a series of semi-structured interviews were carried out with 10 of the respondents (4 female and 6 male) to establish how the content of the programme and individual modules could be developed in such a way as to enhance their EI over the programme. These interviews provided suggestions as to how the issues raised by the questionnaire could be addressed through curriculum development in the future.

Results

The results of the SEI survey are presented below. Where appropriate, responses are delineated in relation to the demographic characteristics of the sample group and the modules on which they studied. It should be noted that the small sample size precludes the establishment of statistically significant correlations and as such, these results should be viewed as exploratory in nature. Nonetheless, they do enable some tentative suggestions to be made in terms of how students' EI develops in relation to both educational interventions and in relation to the demographic profile of the students.

El and Construction Curriculum

Table 1 provides the Means, Standard Deviations and EI changes in relation to different construction modules studied over the test – retest period. This analysis reveals several interesting findings. Firstly, students who chose the technical and science courses did not experience EI growth. Some even appeared to experience a reduction in EI. This is evidenced by the modules 'Construction Innovation and Site Strategy', and 'Off-highway Plant' both scoring an average of 122 with a standard deviation of 9, representing no EI growth, whilst modules 'Construction Technology' and 'Sustainability and the Built Environment', both displayed a significant EI reduction of 6 and 5 respectively. The largest EI reduction occurred in the module 'Construction Procurement: Law and Practice'. The data

showed a significant decrease from the first sample (which scored an average of 125 (S.D.=11)) and the second sample (which reduced to 114.6 (S.D.=11)). Similarly, another law module (Law for Construction Project Managers) also reported score reduction from 126 (S.D.=10) to 123 (S.D.=10). Only students who chose management-oriented modules exhibited EI enhancement. For example, the modules 'Teamwork and Leadership' and 'Management of Design Process' both showed a slight EI increase from an average score of 127 (S.D.=9) to 129 (S.D.=9) and from an average score of 128 (S.D.=8) to 130 (S.D.=8) respectively.

Table 1 Mean, Standard Deviation for Construction Modules

Module Category	Variable	First EI Test		Second EI Test		EI Change $M_{\text{second}} - M_{\text{first}}$
		Mean	S.D.	Mean	S.D.	
Law-Connected Modules	Law for Construction Project Managers	126	10	123	10	-3
	Construction Procurement: Law and Practice	125	11	115	11	-10
	Construction Innovation and Site Strategy	122	11	122	9	0
Technical & Science Modules	Off-Highway Plant	122	11	122	9	0
	Construction Technology	128	11	122	9	-6
	Sustainability and the Built Environment	127	9	122	9	-5
	E-Construction	121	10	121	12	0
Managerial Modules	Human Resource Management in Construction Projects	122	11	123	9	1
	Management of Design Process	128	8	130	8	2
	Teamwork and Leadership	127	9	129	9	2
	Strategic Management in Construction	122	10	123	11	1

Although these results suggest a relationship between EI and some of the modules studied, in order to further confirm whether these relationships were statistically correlated with emotional intelligence a series of Pearson correlation coefficients were calculated with each of the modules as the dependent variable (see Table 2). Caution must be taken given the small sample size, but these results suggest that the correlations between students' emotional intelligence and construction curricula were either low or non-significant. Thus,

there is no clear evidence that construction modules had stimulated the changes in EI observed. This warrants further investigation in a future study.

Table 2 Interactions, Means and Standard Deviations for 11 different modules with Total Emotional Intelligence (N = 30)

Variable	CVP004	CVP005	CVP006	CVP007	CVP010	CVP013	CVP031	CVP032	CVP044	CVP048	CVP054	Total Emotional Intelligence	Mean	Standard Deviation
CVP004	--	.126	.155	.155	.088	.000	.088	.149	-.598(**)	-.217	.520(**)	.108	123.4	10.19
CVP005	--	--	.929(**)	.929(**)	-.555(**)	.866(**)	-.555(**)	-.471(**)	-.189	.636(**)	-.253	.191	122.25	8.98
CVP006	--	--	--	.910(**)	-.515(**)	.932(**)	-.515(**)	-.438(*)	-.203	.713(**)	-.217	.173	122.21	9.22
CVP007	--	--	--	--	-.515(**)	.932(**)	-.515(**)	-.438(*)	-.203	.713(**)	-.217	.173	123.21	9.22
CVP010	--	--	--	--	--	-.480(**)	.712(**)	.850(**)	.105	-.312	.088	.413(*)	129.50	8.19
CVP013	--	--	--	--	--	--	-.480(**)	-.408(*)	.055	.649(**)	-.365(*)	.150	122.11	9.48
CVP031	--	--	--	--	--	--	--	.850(**)	.105	-.515(**)	.351	.044	122.00	9.48
CVP032	--	--	--	--	--	--	--	--	.089	-.438(*)	.149	.213	128.67	8.96
CVP044	--	--	--	--	--	--	--	--	--	.074	-.598(**)	-.055	122.64	11.30
CVP048	--	--	--	--	--	--	--	--	--	--	-.402(*)	.050	121.21	11.53
CVP054	--	--	--	--	--	--	--	--	--	--	--	-.258	114.60	11.22
Total Emotional Intelligence Score	--	--	--	--	--	--	--	--	--	--	--	--	--	--

- Key:
- CVP004 - Law for construction project managers
 - CVP005 - Construction innovation and site strategy
 - CVP006 - Off-highway plant
 - CVP007 - Human resource management in construction projects
 - CVP010 - Management of the design process
 - CVP013 - Construction technology
 - CVP031 - Sustainability and the built environment
 - CVP032 - Teamwork and leadership
 - CVP044 - Strategic management in construction
 - CVP048 - E-construction
 - CVP054 - Construction procumbent: law and practice

EI and Gender

Table 3 shows the students' emotional intelligence in relation to their gender, age and work experience. This reveals that there was no significant change in EI between the initial test and retest ($M_{\text{tests}}=120$, $S.D._{\text{test}}=10$; $M_{\text{retests}}=121$, $S.D._{\text{retests}}=11$), which suggests that overall the current curriculum does not enhance students' EI development. Interestingly, men scored higher than women in the first EI assessment ($M_{\text{males}}=123$, $S.D._{\text{males}}=8$; $M_{\text{females}}=117$, $S.D._{\text{females}}=14$). This finding differs from previous research conducted outside of the construction domain which has suggested that females are more emotionally competent than males (Wertlieb *et al.*, 1987; Wierzbicki, 1989; Ciarrochi *et al.*, 2000; Schutte *et al.*, 1998; Mayer *et al.*, 1999; Day and Carroll, 2004; David *et al.*, 2004). However, it is interesting to note that the retest scores show that females' EI rose moderately from 117 to 123 with a standard deviation of 14 and 10 respectively, while males did not experience any change. Although this change is relatively modest, this does suggest that women may be more likely to experience EI growth than men during the construction learning process. Reasons for this are speculative given the limited sample size, but it could be related to the propensity for women to exhibit better emotional skills in response to external stimulus as was alluded to above. This also warrants further investigation.

EI and Age

Exploring the changes in EI in relation to age and work experience shows some interesting potential relationships. In the first EI test, age appears to have a positive relationship with the overall EI score with the older students having a higher EI score than younger respondents. This result is consistent with previous research which has shown that emotional intelligence increases with age (Bar-On, 1997; Mayer *et al.* 1999). However, the EI score of the older age group was found to decrease after the second EI test, reducing to an average score of 119 for the 30 to 35 year old group, whilst the EI for the younger age group rose slightly over the same test period. Although this change is relatively modest, this may infer that younger participants experienced greater EI growth through their study than their older counterparts, although why this should be the case is unclear.

Table 3 Means, Standard Deviation for EI Test and Retest (n=30)

Variable	N ₁	First EI Test		N ₂	Second EI Test		EI Change% M _{second} -M _{first}
		Mean	S.D.		Mean	S.D.	
Total EI Score	30	120	10	30	121	11	1%
Gender							
Female	8	117	14	7	122	10	5%
Male	22	123	8	23	121	12	-2%
Age							
20-24	11	120	12	10	122	10	2%
25-30	12	121	9	12	120	11	-1%
31-35	7	122	11	8	119	15	-3%
Work Experience							
<=1 year	13	119	11	11	122	11	3%
2-5 years	11	122	10	12	121	10	-2%
>=5 years	6	124	10	7	119	14	-5%

EI and Work Experience

EI was also found to be higher in those students with greater job experience. The data shows an average overall EI score of 119 for people possessing less work experience (<= 1 year), as compared to 124 for people who have greater work experience (>=5 years), with a standard deviation of 11 and 10 respectively. This finding is consistent with previous work which has shown that 'emotional maturity' comes with age and experience (Bar-On, 1997). Surprisingly, however, in the second EI test the results show a contrary trend; participants with greater work experience (>= 5 years) scored lowest among all work experience groups (M=119, S.D.=14), while people who have less job experience displayed the highest EI score. Again, reasons for this finding remain speculative, but it suggests that those with greater experience may be less responsive to EI development on construction courses.

In order to confirm that the observed changes were statistically significant, the one-way ANOVA test was applied to analyse if a high confidence level could be obtained in these factors. The results are shown in Table 4, which indicate that there were no significant

differences in relation to EI score and gender ($F = 0.194$, $p = 0.824$), age ($F = 0.205$, $p = 0.816$) and work experience ($F = 0.353$, $p = 0.705$). Notwithstanding the limitations imposed by the small sample, this suggests that gender, age and work experience were not determining factors for EI in the construction students sampled.

Table 4 One-Way Analysis of Variance Summary Table Comparing Total EI on Age, Gender and Work Experience

	Sum of Squares	Df	Mean Square	F	Sig.
Age					
Between Groups	.219	2	.110	.205	.816
Within Groups	14.448	27	.535		
Total	14.667	29			
Gender					
Between Groups	.076	2	.038	.194	.824
Within Groups	5.290	27	.196		
Total	5.367	29			
Work Experience					
Between Groups	.476	2	.238	.353	.705
Within Groups	18.190	27	.674		
Total	18.667	29			

Discussion and Recommendations for Curriculum Development

The relationship between EI and construction curriculum shows that the existing modular structure of the MSc Construction Management programme does not necessarily support students' EI development. This supports the findings of Chinowsky and Brown (2004) who researched the impact of the engineering curriculum on civil engineering students and suggested that the civil engineering curriculum, being based on a foundation of maths and science, is taught through factual theorems and utilises an approach focusing on applied problem solving that precludes independent thought. This is certainly true of some of the more technical components of the Construction Management MSc programme at Loughborough. However, this research has also suggested that a positive relationship exists between EI and some aspects of the construction management curriculum, particularly in relation to the 'softer' management subjects. Given that managerial courses involve more 'human' factors such as communication skills, human resource management, team working and leadership, this would infer that such modules provide beneficial outcomes in terms of EI development.

Although the results reflect those of other studies within the extant EI literature, there were some notable anomalies which present the possibility of a unique context for the development of EI amongst built environment students. Again, it is important to stress that caution must be taken given that the small sample precludes the establishment of statistically significant correlations and, as such, these results should be viewed as exploratory in nature. However, contrary to many significant EI studies (see for example Wertlieb *et al.*, 1987; Wierzbicki, 1989, Ciarrochi *et al.*, 2000), women did not score significantly higher for EI than their males counterparts. Reasons for this are speculative, but given that the participants were recruited from civil and building engineering backgrounds, the women's attitudes may have been affected by the previous environments in which they studied (cited in Powell *et al.*, 2005a; 2005b). Although such an assertion cannot be supported without more data on the students' backgrounds and experiences, the finding suggests a need for future research to investigate gender differences in EI construction. Future research should also consider the impact of gender on the rate of emotional intelligence development amongst such student cohorts. This study has revealed that female EI grew significantly within two months, whilst males did not show any significant development. This is an important finding with many possible implications. For example, if females are more likely to experience emotional intelligence growth through the construction learning process, then this could influence construction companies' recruitment strategies given that EI accounts for 80% of individual success (Goleman, 1995).

With respect to age and work experience, the results partially confirmed the findings of previous studies. EI was found to be higher in relation to age, which is consistent with several recent empirical studies (Bar-On, 1997 and Mayer *et al.*, 1999). However, it was also significant that EI tends to decrease for older students through the learning process. Although the reason for this contrary trend is unclear, one possible explanation may be that the content of the programme adversely affects those with greater work and life experience, either by reconfirming negative issues related to the industry, or perhaps by raising their awareness of them. Why this should not affect younger and less experienced students is more difficult to speculate. Wechsler (1958) suggested that cognitive intelligence increases up until late adolescence, before beginning to decline in the second and third decades of life. If this phenomenon is being reflected here in relation to EI, then this has significant implications for lifelong learning and for ensuring a continuing EI growth for older learners. It suggests that the curriculum may have to be specifically redesigned to encourage EI development for this group.

As was discussed above, this research has suggested that the existing construction management curriculum does not support students' emotional intelligence development. Given that emotional intelligence is a high predictor of individuals' success and performance (Goleman, 1998a), there is a need to establish how to integrate EI development in the future. Much previous research on linking the concept of emotional intelligence into an educational context is based on the opinion of educators, professionals, consultants, and psychologists. However, little research has been conducted which has taken into account the views of students. Accordingly, in this study 10 participants were randomly chosen for interview after

the second EI test, during which they were asked to state how EI could be embedded into their modular programme. The responses are briefly explained below:

(i) Adding additional modules covering work psychology - several students suggested that the introduction of optional modules, which specially focused on the problems that they would face during future work in construction, should be provided. These would encompass aspects of basic work psychology which could better prepare them for the interactions which will eventually define their professional performance.

(ii) Simulating the working environment through role-play - a second suggestion was to use role-play to simulate 'real-world' scenarios. It was suggested that this would be very useful for helping students handle different unexpected problems, as well as providing opportunities for putting theoretical knowledge into practice.

(iii) Explicitly introducing EI into curriculum - most of the students interviewed suggested that a module that addressed the emotional and social abilities of managers, emphasising aspects such as communication skills, team working, effective interaction and leadership, should be integrated into construction management courses. Whilst these aspects are implicitly covered within the existing curriculum, their explicit incorporation would raise the profile of such skills as a component of the competencies of a construction manager.

(iv) Module delivery improvements - several students suggested that the way in which modules were delivered is key to the effect that they have on EI development. They believed that effective teaching could foster a positive learning atmosphere, which in turn would facilitate EI absorption during the learning process. This opinion is supported by Goleman *et al.* (2001) who suggest that the relationship between the trainer and learner is critically important in social and emotional learning situations. This is particularly the case for law-related modules that have reported a tendency to reduce students' EI amongst construction educators.

Clearly, these suggestions only offer a limited range of ideas for imparting EI as an integral aspect of the curriculum and are without empirical foundation in terms of their affect on students' EI learning abilities. Nevertheless, they may offer a starting point for developing existing modules without the need to overhaul the technical content of existing programmes.

Conclusions

Emotional intelligence is increasingly being acknowledged as important in defining managerial competence, particularly in industries and sectors which rely upon human interaction for performance, including construction. This study has explored construction students' EI in terms of the effect of particular learning modules/course on EI development as well as their gender, age and work experience. It has revealed that, overall the curriculum of a leading construction management MSc programme does little to support students' emotional intelligence development, although certain management subject modules have a limited positive impact with EI improvement. Some aspects of the research findings seem to contradict those of general EI research. For example, the finding that women are more likely

to experience EI growth could have significant implications for company recruitment. Another finding is that opportunities to enhance EI through learning interventions may decline in older and more experienced students. The reasons underlying this phenomenon are unclear and would require further exploration in a more extensive study. Future research should also identify the impact of personal factors such as individual interests and attitudes on EI development.

In terms of improving students' EI in the future, this research has suggested that simple enhancements to the construction management curriculum could assist their development in this regard. The tentative suggestions provided within this paper include developments in module delivery, the addition of simulation and explicit acknowledgement of work psychology and emotional intelligence within the construction curriculum. Considering the range of apparent variables which seem to impact on EI development, however, it seems likely that such changes may be best designed around the needs of the individual learner, rather than applied generically across construction programmes. However, given the limitations of the sample size, this assertion would need to be supported by further research to examine the impact of curriculum content on EI development.

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