Measuring and enhancing the emotional intelligence of built environment students

This item was submitted to Loughborough University's Institutional Repository by the/an author.

Additional Information:

- A Doctoral Thesis. Submitted in partial fulfillment of the requirements for the award of Doctor of Philosophy of Loughborough University. If you are the author of this thesis and would like to make it openly available in the Institutional Repository please contact: repository@lboro.ac.uk

Metadata Record: https://dspace.lboro.ac.uk/2134/5868

Publisher: © Yi Yi Mo

Please cite the published version.
This item was submitted to Loughborough’s Institutional Repository (https://dspace.lboro.ac.uk/) by the author and is made available under the following Creative Commons Licence conditions.

For the full text of this licence, please go to:
http://creativecommons.org/licenses/by-nc-nd/2.5/
MEASURING AND ENHANCING THE EMOTIONAL INTELLIGENCE OF BUILT ENVIRONMENT STUDENTS

By

YI YI MO

A Doctoral Thesis submitted in partial fulfilment of the requirements for the award of Doctor of Philosophy of Loughborough University

October, 2009
ABSTRACT

Emotional Intelligence (EI) has been viewed as a critical factor influencing students’ academic achievement, ability to work, and potential to succeed. Previous research has shown that students with high EI perform better academically than those with low EI, as well as being better equipped for their professional careers. However, despite the acknowledged importance of EI, little work has explored the construct within the context of built environment education and relatively little is known about how built environment curricula should be designed to enhance EI. This research explores the EI levels of built environment undergraduates and its relationship to their specific programmes, and investigates the types of pedagogic interventions which appear to influence EI in a positive way.

This research adopts a multimethodological research design and a mixed methods approach, involving a combination of both quantitative and qualitative datasets to explore students’ experiences and learning enhancements. These include a questionnaire survey of 420 respondents, a secondary examination of built environment programmes, interviews with construction professionals and 45 in-depth interviews with placement students and other undergraduates. The results reveal that the existing built environment education inhibits students’ EI development, but that EI is shown to increase during industrial placements. The results also reveal that EI development differs by the types of programme taken, with students studying on Civil Engineering and Architectural Engineering & Design Management programmes showing a propensity for higher EI scores in comparison with those studying on a Commercial Management & Quantity Surveying programme.

An analysis of the modular content of programmes, together with the mode of teaching, learning and assessment used, reveals the types of pedagogic intervention which can enhance EI development. Group work and student-centred learning in particular were found to have a positive effect on EI development. These findings form the basis of recommendations for how current built environment education can be enhanced in a way to develop students’ EI. It is suggested that a better understanding of students’ EI levels and the ability of such programmes to influence students’ EI may help to produce graduates better able to meet the future requirements of the construction industry.

Key words: built environment education, construction professionals, emotional intelligence, industrial placement, pedagogic interventions
ACKNOWLEDGEMENTS

It could never have been possible to complete this thesis without the help of so many people. First and foremost, my sincere thanks go to my academic supervisors, Prof. Andrew Dainty and Prof. Andrew Price for their knowledge, guidance, constructive criticism and support over the past years. It is really a pleasure to work with them. Special thanks to Prof. Andrew Dainty who has always given me timely feedback and is ever so willing to help me. But above all, it is his true understanding of an international student, which I would consider makes him the best supervisor I have met so far.

My heartfelt gratitude goes to all informants who have participated in this study, but for the confidentiality, I will not mention their names here. However, my appreciation goes to those who gave their valuable time in completing the questionnaire and in allowing me to interview them. Special thanks to Dr. Nicola Schutte, the developer of SSRI questionnaire, for allowing me to use the instrument in the research and her kind suggestions and guidance during this study.

In addition, my appreciation goes to my colleague Ms Sarah Bamforth for co-ordinating questionnaire distribution, Ivy Soon for helping me proofread and all my friends for their direct and indirect help and assistance during the research. Special thanks to my friends from Loughborough Chinese Christian Fellowship, for their spiritual support through persistent prayers when I was in times of stress.

My final acknowledgements go to my beloved family for their encouragement, love and unstinting support throughout my PhD study.
TABLE OF CONTENTS

ABSTRACT ........................................................................................................... I

ACKNOWLEDGEMENTS .................................................................................. II

TABLE OF CONTENTS..................................................................................... III

LIST OF FIGURES ...............................................................................................IV

LIST OF TABLES ................................................................................................. V

CHAPTER ONE: INTRODUCTION ................................................................. 1

1.1 INTRODUCTION .......................................................................................... 1

1.2 RESEARCH CONTEXT ................................................................................. 1

  1.2.1 A new concept to assess an individual’s potential to succeed ............. 1
  1.2.2 The nature of construction industry requires emotionally intelligent
      construction professionals ........................................................................ 2
  1.2.3 The need to enhance students’ emotional intelligence in the built
      environment education .............................................................................. 4

1.3 THE PURPOSE OF THE RESEARCH ....................................................... 5

  1.3.1 Research question ............................................................................... 5
  1.3.2 Aim and objectives ............................................................................. 6
  1.3.3 Propositions ......................................................................................... 8
  1.3.4 Research scope .................................................................................... 8

1.4 JUSTIFICATION OF THE RESEARCH .................................................... 9

  1.4.1 Educational standpoint ....................................................................... 9
  1.4.2 Methodological standpoint .................................................................. 10

1.5 RESEARCH METHODOLOGY ............................................................... 10

1.6 CONTRIBUTIONS TO KNOWLEDGE ...................................................... 12

1.7 OVERVIEW OF THE CHAPTERS ........................................................... 13

CHAPTER TWO: REVIEW OF EMOTIONAL INTELLIGENCE ............ 17

2.1 INTRODUCTION ......................................................................................... 17

2.2 THE HISTORICAL BACKGROUND OF EMOTIONAL INTELLIGENCE ........ 17

2.3 WHAT IS EMOTIONAL INTELLIGENCE? ............................................... 18

  2.3.1 EI and IQ ............................................................................................ 18
  2.3.2 The definition of EI ............................................................................ 20
  2.3.3 Two EI models (the Ability Vs Mixed Model) .................................... 21
  2.3.4 A comparison of different EI models .................................................. 23
CHAPTER THREE: EMOTIONAL INTELLIGENCE AND EDUCATION

3.1 INTRODUCTION ............................................................................................................. 58
3.2 EMOTIONAL INTELLIGENCE AND ITS ROLE IN EDUCATION ................................. 58
    3.2.1 EI and academic achievement ............................................................................. 59
3.3 CAN EMOTIONAL INTELLIGENCE BE TAUGHT/ENHANCED? ................................. 61
3.4 WHAT PEDAGOGIC INTERVENTIONS ARE SHOWN TO IMPROVE EI? ....................... 62
    3.4.1 School-based EI intervention programmes ......................................................... 63
    3.4.2 Previous EI interventions being used in university .............................................. 64
    3.4.3 EI Curriculum design ......................................................................................... 66
3.5 TEACHING AND LEARNING ....................................................................................... 67
CHAPTER FOUR: RESEARCH DESIGN AND METHODOLOGY........ 79

4.1 INTRODUCTION ................................................................. 79

4.2 THE JUSTIFICATION FOR CURRENT STUDY ............................... 79

4.3 RESEARCH AIMS AND OBJECTIVES ....................................... 81

4.3.1 Aim of the research ..................................................... 81

4.3.2 Research Objectives and Propositions ................................ 82

4.3.3 Objective 1 ................................................................. 82

4.3.4 Objective 2 ................................................................. 83

4.3.5 Objective 3 ................................................................. 84

4.3.6 Objective 4 ................................................................. 85

4.3.7 Objective 5 ................................................................. 86

4.3.8 Objective 6 ................................................................. 86

4.4 RESEARCH FRAMEWORK .................................................... 87

4.4.1 Ontological considerations ............................................ 87

4.4.2 Epistemological positions ............................................. 88

4.4.3 Multimethodology ....................................................... 89

4.4.4 Mixed-methods research and paradigm ............................ 90

4.4.5 Research design ......................................................... 91

4.5 RESEARCH ETHICAL CONSIDERATIONS ................................. 95

4.5.1 Informed consent ......................................................... 95

4.5.2 Confidentiality ......................................................... 95

4.6 QUESTIONNAIRE DESIGN, CONTENT AND CHOSEN ............... 95

4.6.1 Interview: design and content ....................................... 96

4.6.2 Two EI models (Ability Vs Mixed Models) ......................... 97

4.6.3 Rationale for EI instrument chosen ................................ 98

4.6.4 Schutte self-report inventory (SSRI) ................................ 101

4.7 METHODS OF DATA COLLECTION .................................... 101

4.7.1 Sample selection ....................................................... 102
CHAPTER FIVE: RESULTS AND FINDINGS

5.1 INTRODUCTION ........................................................................................................ 112
5.2 FINDINGS FROM QUESTIONNAIRE SURVEY .................................................. 112
  5.2.1 Questionnaire survey sample ............................................................................ 112
  5.2.2 EI changes ........................................................................................................ 114
  5.2.3 EI and programmes ........................................................................................ 116
  5.2.4 EI and gender ................................................................................................... 119
  5.2.5 EI and work experience .................................................................................. 120
  5.2.6 EI and age ........................................................................................................ 122
  5.2.7 Inferential statistics analysis ............................................................................ 123
  5.2.8 Summary .......................................................................................................... 123
5.3 FINDINGS FROM INTERVIEW SAMPLE ............................................................ 124
  5.3.1 Interview sample .............................................................................................. 124
  5.3.2 Descriptive statistics for interview sample .................................................... 126
  5.3.3 Inferential statistics for interview sample ...................................................... 127
  5.3.4 EI changes over placement ............................................................................. 129
  5.3.5 Students’ perspectives of Built Environment Education on their EI development ................................................................. 132
  5.3.6 Work characteristics and skills ...................................................................... 137
  5.3.7 The role of EI in construction industry ............................................................ 141
5.4 HOW EI AFFECTS STUDENTS’ PERFORMANCE ................................................ 143
  5.4.1 Emotions influence behaviours ...................................................................... 144
  5.4.2 Emotional regulation brings success ............................................................... 147
  5.4.3 Effective communication and empathy resolve conflicts .............................. 149
5.5 HOW STUDENTS’ EI IS SHAPED BY WORKING IN THE INDUSTRY .............. 151
  5.5.1 A good mentor ................................................................................................. 151
  5.5.2 Support in the workplace ............................................................................... 155
  5.5.3 Industry experience ......................................................................................... 156
5.6 EI COMPETENCIES BEING DEVELOPED THROUGH PLACEMENT ........... 160
  5.6.1 EI competencies .............................................................................................. 160
  5.6.2 Summary .......................................................................................................... 164
5.7 CHAPTER SUMMARY ........................................................................................... 165
CHAPTER SIX: DISCUSSION ................................................................. 167

6.1 INTRODUCTION ........................................................................... 167
6.2 DISCUSSION OF RESULTS AND FINDINGS ......................... 167
  6.2.1 EI and construction professionals ........................................... 167
  6.2.2 EI and built environment education ...................................... 169
  6.2.3 EI and programmes ................................................................. 170
  6.2.4 EI and gender ......................................................................... 171
  6.2.5 EI and work experience and age ............................................ 172
  6.2.6 How students’ EI is enhanced in industry ............................... 173
  6.2.7 Students’ perspectives of Built environment education on their EI development ............................................................. 175
  6.2.8 Work characteristics and skills ............................................... 176
  6.2.9 The role of EI ....................................................................... 178
  6.2.10 Summary ............................................................................. 179
6.3. RECOMMENDATIONS FOR ENHANCING STUDENTS’ EMOTIONAL INTELLIGENCE .......... 180
  6.3.1 Introducing the concept of EI into modular content ............... 180
  6.3.2 Creating opportunities for group work ................................. 181
  6.3.3 Supporting self-directed learning ........................................... 183
  6.3.4 Input from lecturers to build up a close relationship with students ...... 184
  6.3.5 Simulating the real world through role-play ............................ 185
  6.3.6 Personal charisma improvement ............................................ 186
6.4 CHAPTER SUMMARY ................................................................. 187

CHAPTER SEVEN: CONCLUSIONS, RECOMMENDATIONS AND FUTURE RESEARCH ..................................................... 189

7.1 INTRODUCTION ........................................................................... 189
7.2 ACHIEVEMENT OF THE RESEARCH OBJECTIVES AND PROPOSITIONS ......................... 189
  7.2.1 Objective one and proposition one ......................................... 190
  7.2.2 Objective two and proposition two ...................................... 191
  7.2.3 Objective three and proposition three ................................... 191
  7.2.4 Objective four and proposition four ...................................... 192
  7.2.5 Objective five ................................................................. 193
  7.2.6 Objective six ..................................................................... 194
7.3 SOME PRACTICAL RECOMMENDATIONS FOR ENHANCING EI IN BUILT ENVIRONMENT EDUCATION ................................................................. 195
7.4 CONTRIBUTIONS OF THE RESEARCH ..................................... 197
7.5 LIMITATIONS OF THE STUDY ................................................. 199
  7.5.1 Informant bias and interview techniques ................................ 199
  7.5.2 Limitation in sample size ..................................................... 199
7.6 RECOMMENDATIONS ............................................................... 200
## Table of Contents

7.7 **Further Research** ................................................................................................................. 202
7.8 **Publications** ......................................................................................................................... 203

**References** ................................................................................................................................. 204

**Appendices** ............................................................................................................................... 224

- **Appendix A** Research Questions ............................................................................................... 224
- **Appendix B** ECI Measurement ................................................................................................... 225
- **Appendix C** Bar-On EQ-I Measurement ...................................................................................... 226
- **Appendix D** SSRI Questionnaire ............................................................................................... 227
- **Appendix E** Interview Schedule for Construction Professionals ............................................. 230
- **Appendix F** Interview Schedule for Placement Students ......................................................... 231
- **Appendix G** NVivo Index System Node Description ................................................................. 232
- **Appendix H** Placement Interviewed Students’ Demography ..................................................... 234
- **Appendix I** CE and CMQS Module Assessment ........................................................................ 235
- **Appendix J** AEDM and CMQS Module Assessment ................................................................. 237
- **Appendix K** Curriculum Maps ................................................................................................... 238
LIST OF FIGURES

Figure 1.1: Research design 11
Figure 1.2: Structure of the thesis 16
Figure 4.1: Overview of research design 92
Figure 5.1: EI score for females and males over the test and re-test period 118
Figure 5.2 EI score of students studying on CE, CEM, AEDM and CMQS programme 120
Figure 5.3: EI score of different age groups 121
Figure 5.4: Positions of interviewed students 124
Figure 5.5: Work experience of informants 125
LIST OF TABLES

Table 1.1: Research aims, objectives and related research propositions 7

Table 2.1: A comparison of the two theories of emotional intelligence 23

Table 2.2: Emotional Intelligence and personality pests, using ability, self-report, and informant approaches to measurement 26

Table 2.3: Emotional intelligence/competencies instruments and their use 34

Table 2.4: Demographic information on participants 48

Table 4.1: Summary of research objectives and related methods of data collection/analysis and expected outcomes. 93

Table 4.2: Summary of Emotional Intelligence/Competencies Instruments and their use 99

Table 4.3: Total number of participants in this study 102

Table 5.1: Numbers of participating students by programmes 111

Table 5.2: Average EI score of students from CE, CEM, AEDM and CMQS programmes and the EI changes over the test-retest period. 112

Table 5.3: One-way analysis of variance summary table comparing different programmes taken by students. 114

Table 5.4: Test of Homogeneity of Variances 115

Table 5.5: One-way analysis of variance comparing different built environment programmes taken by students on their EI test 115

Table 5.6: Tukey HSD Post Hoc test 116

Table 5.7: One-way analysis of variance summary table comparing different programmes taken by students on their EI test. 117

Table 5.8: EI score and EI differences for males and females over the test and re-test period 119

Table 5.9: The Means, Standard Deviation and EI changes of students studying on different programmes 120

Table 5.10: The Means, Standard Deviation and EI changes of different student age groups 121
Table 5.11: ANOVA summary table comparing total EI on gender, age and work experience

Table 5.12: Numbers of interviewed students by programme

Table 5.13: Summary of means and standard deviation of EI score in relation to programmes, gender, age and work experience.

Table 5.14: One-way analysis of variance summary table comparing total EI on programmes, gender, age and work experience

Table 5.15: Responses of interviewed students to Questions 1

Table 5.16: Responses of interviewed students to Questions 2

Table 7.1: Research objectives and propositions
CHAPTER ONE: INTRODUCTION

1.1 Introduction

This thesis details research undertaken to measure and enhance the emotional intelligence of built environment students. Chapter One presents the context of current research and then leads to an exploration of the purpose of the research by identifying the research problem, research aim, objectives and propositions. This is followed by a justification of why this research is being carried out. A brief description of research methodology is presented aligned with the research objectives, and the contributions to knowledge is summarised. The chapter finally concludes by outlining the structure of the thesis.

1.2 Research Context

The following sections discuss the context of the research, by describing how emotional intelligence is viewed as a concept to represent one’s ability to succeed on the job, as well as its significance in the construction industry. This leads to the identification of the need to enhance students’ EI in the built environment education.

1.2.1 A new concept to assess an individual’s potential to succeed

Traditionally, a person’s potential to succeed is normally assessed by intellectual intelligence which can be measured by an intelligence quotient (IQ). However, the literature on intelligence has made it clear that one’s success in career and personal life depends not only on IQ but also on other personal factors. It is believed that emotional, social, creative, and practical abilities also influence individuals’ differences in job performance and career success (Cantor, 1987; Sternberg, 1985; Thorndike, 1937; Wechsler, 1958). Hence, the traditional criteria used to assess a person’s abilities to work are deemed to be inadequate (Dainty et al., 2003). Goleman (1995) proposed that one’s performance should be judged not just by
intellect intelligence (IQ) or expertise, but also by the abilities of how well people handle themselves in relation to those with whom they work, which have been termed as “emotional intelligence” (EI). Later, Goleman (1995, 1998) even made strong claims about the contribution of EI to individual success. He pointed out that IQ only explains about twenty percent individual difference in job performance or career success, and suggested that the remaining eighty percent variance could be attributed to EI. Subsequently, Mayer and Salovey (1997) also suggested that general intelligence accounts for approximately ten to twenty percent of life success, defined as academic achievement and occupational status.

In recent years there has also been some work which has suggested that the ability of individuals to succeed in construction is also dependent upon EI traits such as empathy, emotional awareness, interpersonal skills, and other aspects of tacit knowledge (Chinowsky et al., 2004; 2006). In addition, Rosete and Ciarrochi (2005) in a study examining the relationship between EI and IQ found that an executive needs a high IQ to get to the management or executive levels, but once people reach that position, IQ does not discriminate between better or worse performing managers, instead EI becomes the main predictor to differentiate the star managers from the average performers. Furthermore, 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 (Ashkanasy et al., 2000; Goleman, 1995; 1998; 2001; Goleman et al., 2002). Given that the literature shows that EI is a strong predictor, even more powerful than IQ, in differentiating superior managers from average performers, therefore it should be taken as a new criterion to measure one’s ability to work and potential to succeed.

1.2.2 The nature of construction industry requires emotionally intelligent construction professionals

The construction industry is well known by its project-based nature which has made it one of the most challenging environments to manage people effectively in order to ensure project and organisational success (Loosemore et al., 2003). The temporary involvement climate has resulted in diverse groups of people being brought together to work for a short period of time to achieve both project and organisational goals.
To effectively work in such complex and dynamic environment requires a good interaction between project participants. Songer and Walker (2004) indicated that a good interaction involves individuals acting effectively together and/or toward one another. This, in turn, often demands high levels of emotional awareness and emotional regulation, two of the four defining dimensions of EI, amongst project participants. In fact, Jordan and Ashkanasy (2006) suggested that emotional self-awareness has a positive impact on effective team interaction as it allows team members to resolve discrepancies between personal goals and team goals. Therefore, it becomes apparent that EI plays a paramount role in daily construction activities.

In addition, the multidisciplinary characteristics of project teams also present particular challenges for managers if they attempt to successfully manage construction activities amongst diverse project participants, and to manage conflicts continuously in order to ensure the success of their projects. Edum-Fotwe and McCaffer (2000) listed five main skills that are prerequisite for the position of project management, these being leadership, communication, problem-solving, negotiation and marketing. Collectively, all of these are important components of the EI construct (Goleman, 1998). In fact, recent studies have shown a positive impact of EI on individuals’ leadership ability (Butler and Chinowsky, 2006; Scheusner, 2002); interview performance (Fox and Spector, 2000; Isen and Baron, 1991); management ability (Slaski and Cartwright, 2002; Zhou and George, 2003); team effectiveness (Jordan et al., 2002; Jordan and Troth, 2004); and individuals’ ability to perform cognitive tasks (Schutte et al., 2001). These studies have placed emphasis on the value of strong emotional competencies required to succeed in the construction industry.

In spite of the burgeoning body of research on EI and individual performance or success, the EI issue conducted within the construction context have proven it to be under-researched. The studies of EI in the construction domain have mainly focused on its effect on leadership style (Butler and Chinowsky, 2006; Sunindijo et al., 2007) and the measurement of EI (Chinowsky and Brown, 2004; Songer and Walker, 2004), and have mainly used a quantitative approach. Given that EI is increasingly being recognised as an important issue in the workplace, there is a need to explore the potential role of EI in construction industry by using a qualitative
approach to provide an in-depth understanding of how EI influences construction professionals’ daily work performance.

1.2.3 The need to enhance students’ emotional intelligence in the built environment education

Built environment education has traditionally concentrated on preparing students with strong technical, analytical and management skills for professional careers in the construction industry. However, those hiring construction graduates in the late 1980s have begun to voice their dissatisfaction with the skill levels of their new employees. They have complained about a lack of non-technical or ‘soft’ skills such as communication, teamwork, interpersonal skills, creative problems solving and flexibility (Bakos 1997; Davies 1998; Jagger and Connor 1998). More recently, there has been an increasing recognition of the important impact of these ‘soft’ skills can have on the overall career success and technical competence of construction professionals (Butler and Chinowsky 2006; Dainty et al. 2004; Hecker 1997; Shirazi and Hampson 1998; Songer and Walker 2004). Currently many of these ‘soft’ skills have been categorised as different emotional competencies, known collectively as emotional intelligence. In response to the EI deficiency exhibited in construction graduates, many reports have been published to raise the awareness of educators, practitioners and policy makers of the importance of enhancing students’ emotional skills, such as the ACOST Report (Advisory Community on Science and Technology, 1991) recommends that, for engineering education: ‘The overwhelming factual content should be reduced; more emphasis should be placed on the development of communication, leadership, teamwork and other personal skills’. Similarly, the Dearing Report (1997) also confirmed on the importance to grasp emotional skills for postgraduates by proposing that: “...in addition to an understanding of research methods and appropriate technical skills, they (postgraduates) should also address the development of professional skills, such as communication, self management and planning” (NCIHE (1997) Recommendation 31). It is clear that there are widespread calls have been made to the current built environment education to develop students’ emotional competences in order to cover the gap between today’s graduates’ capabilities and the future needs of the construction industry.
Although there is substantial EI research being conducted in the workplace and individuals’ success, little attention has been paid to emotions within the education literature (Hargreaves, 2000; Petrides et al., 2004; Pekrun and Frese, 1992), especially within the context of built environment education. Previous studies in built environment education stated that engineering students’ EI lags well behind their counterpart students in liberal arts (Chinowsky and Brown, 2004). However, it does not clearly point out to what extent built environment education develops students’ EI, and the relationship between EI and the types of programme taken still remains unclear. Further, there is a clearly lack of research-based literature about how students’ EI is shaped by studying in the built environment education; and the way to enhance current educational programmes in which they could have a positive impact on students’ EI development has not yet been offered. Given that there is a considerable body of evidence which suggests that EI has a positive impact on students’ academic success (Abdullah et al., 2004; Parker et al., 2004a, 2004b; 2005; Schutte et al., 1998), there is now a clear need to investigate the EI levels of built environment students and examine if their EI is well developed by current built environment education. In particular, there is a need to establish the strategy to enhance students’ EI through built environment education in order to better equip students with adequate emotional competencies to enter their future professions.

1.3 The Purpose of the Research

1.3.1 Research question

As further explored in Chapter Four, a research question is used to guide the research rather than a hypothesis. The major question directing the research is to investigate:

*If and how current built environment education develops students’ EI, how built environment education could be enhanced to develop students’ EI more effectively in the future?* This question contained a series of sub-questions (see Appendix A) which were pursued for two primary reasons. The first reason was interest in whether current built environment education develops students’ EI for their professional careers, and how it influences students’ EI development. Although
previous research has investigated the EI levels of students studying on civil engineering programme in the United States, the EI levels of students studying on other disciplines of built environment education still remain unclear, so little is known of whether graduates who work in the industry are fully equipped with the emotional skills that required by the construction industry. Furthermore, recent evidence suggests that engineering education does not fully support students’ EI growth (Chinowsky and Brown, 2004; Mo and Dainty, 2007; Sayeed and Jain, 2000) and indicates that students without adequately developed EI will have their educational development and professional preparedness affected (Chinowsky and Brown, 2004). Given that EI has been viewed as a strong predictor in influencing students’ academic achievement, ability to work, and potential to succeed, there is an urgent need to understand the EI levels of built environment students and how their EI is developed in the built environment education. Secondly, there is evidence that EI can be enhanced and learnt through appropriate learning interventions and trainings (Goleman, 1995; Mayer and Caruso, 1999; Jaeger, 2003; Bar-On, 1997). If this is also the case in the UK built environment education, then it is important to investigate how educational programmes can be changed or enhanced in a way to promote students’ EI to better meet the needs of industry. Furthermore, there is a paucity of research exploring these issues within the built environment domain. Understanding these questions will help universities and faculties to implement procedures and strategies to design courses that maximise students learning, academic performance and fully support their potential to excel in the industry. A better understanding of students’ EI levels and the ability of programmes to influence students’ EI could help educators and practitioners to have an accurate and comprehensive view to assess students’ capability and potential not just cognitively but also emotionally; and help students better perform in the class, and ultimately better prepare students for the work environment

### 1.3.2 Aim and objectives

The aim of the research is to measure and enhance the emotional intelligence of built environment students. Six objectives of this research have been originally devised. They are detailed as below. Table 1.1 shows the relationship between the research aim, the research objectives and the propositions.
Chapter One: Introduction

1. To explore the potential role and importance of EI in the context of the construction industry;

2. To examine the extent to which current built environment education develops students’ EI;

3. To examine whether different built environment educational programmes have a differential effect on students’ EI;

4. To investigate if and how industrial placements enhance students’ EI;

5. To explore the perspectives of built environment students on their EI development, and how these could be enhanced in the future; and

6. To propose recommendations to enhance students’ EI through built environment education.

Table 1.1: Research aim, objectives and related research propositions

<table>
<thead>
<tr>
<th>Research aim</th>
<th>Objectives</th>
<th>Propositions</th>
</tr>
</thead>
<tbody>
<tr>
<td>To measure and enhance the emotional intelligence of built environment students</td>
<td>O1: To explore the potential role and importance of EI in the context of the construction industry. O2: To examine the extent to which current built environment education develops students’ EI. O3: To examine whether different programmes of built environment education have a differential effect on students’ EI. O4: To investigate if and how industrial placements enhance students’ EI. O5: To explore the perspectives of built environment students on their EI development, and how these could be enhanced in the future. O6: To propose recommendations to enhance students’ EI through built environment education.</td>
<td>P1: Emotional intelligence competencies are likely to have a positive impact on construction professionals’ performance. P2: Built environment education does not sufficiently develop students’ EI. P3: Programmes with EI relevant content and simulation activities are more beneficial to develop students’ EI than other pedagogic interventions. P4: Industry sandwich placement experience has a positive effect on students’ EI development.</td>
</tr>
</tbody>
</table>
1.3.3 Propositions

From the research aims and objectives, four research propositions are developed through the literature review as set out below. Research propositions differ from hypotheses in that they are more tentative and allow for modifications in the light of emerging data (Cherns and Bryant, 1984).

- Proposition One: Emotional intelligence competencies are likely to have a positive impact on construction professionals’ performance.
- Proposition Two: Built environment education does not sufficiently develop students’ EI.
- Proposition Three: Programmes with EI relevant content and simulation activities are more beneficial to develop students’ EI than other pedagogic interventions.
- Proposition Four: Industry sandwich placement experience has a positive effect on students’ EI development.

1.3.4 Research scope

The research scope involves a wide range of literature review of EI and its relevance to built environment education, and a quantitative survey designed for built environment students as well as interviews with construction professionals and built environment students. These are broken down into four basic activities:

- Conducting a review of current prevailing EI theories and its parallel instruments as well as previous EI research, and identifying the suitable EI instrument for the study;
- Conducting a review of the role of EI in the education and EI pedagogic interventions used in the current educational setting;
- Investigating the EI levels of built environment students, and examining the relationship between the types of programme and EI; and
Propose recommendations to enhance students’ EI through built environment education.

1.4 Justification of the Research

1.4.1 Educational standpoint

As alluded to earlier, the literature has suggested that there is positive relationship between EI and academic achievement (Schutte et al., 1998; Parker et al., 2004; 2005; Abdullah et al., 2004). However, built environment graduates are consistently reported to lack the emotional competencies necessary to successfully work in their professions (Davies 1998; Jagger and Connor 1998). Recent evidence indicates that engineering students experience slow emotional growth in their college life in comparison to liberal arts students. In addition, a lack of EI growth is suggested to directly affect students’ educational development and professional preparedness (Chinowsky and Brown, 2004). Therefore, existing built environment education is called on to incorporate the concept of EI into the learning standards or curriculum target for students. Most of the current EI research in the education domain has focused on the exploration of EI measurement (Schutte et al., 1998), academic success (Drago, 2004; Jaeger, 2003; Parker et al., 2005) and students’ work performance (Lam and Kirby, 2002), and has been conducted outside of the UK. In addition, the EI literature suggests that EI increases with age and experience (Bar-On, 1997; Mayer et al., 1999). This may mean that students who have been on placement are more emotionally competent than students without work experience; however, very little is known about how built environment education influences students’ EI, especially different learning interventions such as industrial placement. Hence, there is a scope to explore the EI levels of built environment students in the context of UK, and to explore how current education can be enhanced in a way to promote students’ EI. Understanding these issues will have a great effect on students in terms of their professional preparedness. Also it will shed light on the areas of built environment education that need to be improved to enhance students’
EI. Doing this will also benefit the future development of the construction industry and its organisations.

### 1.4.2 Methodological standpoint

Whilst there has been little empirical work to explore the EI of built environment students in the UK context, a body of research has investigated EI in various work settings and industrial sectors (Ashkanasy et al., 2000; Goleman et al., 2002; Druskat and Wolff, 2001; Elfenbein and Ambady, 2002). Notwithstanding, the majority of the EI research currently conducted relies mainly on one paradigm, i.e. by qualitative or quantitative approach, seldom has research used a mixed-methods approach in the EI literature. As further discussed in Chapter Four, Mingers (1997) argued that no one paradigm can capture the richness of real-world situations, hence, adopting only one paradigm is inevitably gaining only a limited view of a particular intervention or research situation. In response to the very limited research and by using mixed methods approach in the EI literature, the study presented here uses a mixed methods approach by combining both quantitative data collection and analysis (phase two of the research) with qualitative data collection and analysis (phase one, three and four of the research) together to provide a comprehensive understanding of the EI levels of built environment students and the relationship between EI and built environment education.

### 1.5 Research Methodology

In order to address the research questions identified in section 1.3, a multi-methodological research design is adopted in an attempt to provide a richer and deeper meaning of the research questions. A pragmatic mixed-methods approach, combining both quantitative and qualitative approaches for data collection and analysis, has been identified as the most suitable for the current research, hence was employed (see Chapter Four). The research design is devised in line with the research aim and objectives and comprises four phases (see Figure 1.1).
Figure 1.1 Research design

The first phase is an exploratory pilot study with construction professionals with different levels of work experience and positions. From phase one (P1), the impact of EI on construction professionals’ performance is explored and the potential important role of EI in construction industry is established. This leads to the
rationale for examining whether current built environment education has well prepared students’ EI to enter the construction industry given that EI’s important role being revealed in the phase one of research. Therefore, the second phase (P2) is a quantitative survey for built environment students before and after the completion of programmes within an academic year with an aim to examining how well current built environment education has developed students’ EI. The third phase (P3) is to examine the relationship between students’ EI and the programme taken by examining the modular content, mode of teaching and learning, assessment used, and discussing this in relation to the literature. By doing this, one can discern the types of pedagogic interventions which appear to have a positive effect on EI. The final phase (P4) is to conduct in-depth interviews with placement students in order to investigate if and how students’ EI is developed by working in the construction industry and to give an insight into students’ perspectives regarding the enhancement of their EI. This allows respondents to discuss their experience of both university and industry and propose recommendations that could contribute to the development of EI. The data were analysed by using computer software packages SPSS and NVivo.

### 1.6 Contributions to Knowledge

The research is successful in achieving the aim and objectives stated in section 1.3. The main contributions to knowledge of this research are detailed below.

- This research has used a multi-methodology to provide a comprehensive understanding of the impact that built environment education has on students’ EI enhancement. In particular, it has examined the pedagogic interventions which tended to have a positive effect on EI and investigated the potential issues that contributed to students’ EI development through industrial placement.

- This research has investigated the EI levels of built environment students and indicated that current built environment education does not sufficiently support students’ EI development. In addition, students’ EI differed according to the type of programme taken. A statistically significant mean difference was
revealed between programmes CE and CMQS, and between programmes AEDM and CMQS.

- This research has explored the potential role of EI in construction industry and confirmed that EI indeed has a positive impact on construction professionals’ daily performance in that EI contributes to effective decision making, and helps to manage people more effectively. The result gave an insight into construction professionals’ perspectives on how EI has an impact on their daily work.

- EI was found to increase with age and work experience. Students with work experience were found to have higher EI score than students without work experience. It is worth to note that students who were older than 22 years old scored significantly higher than students who were younger than 22 years old.

- This research has examined the impact that an industrial sandwich placement has on students’ EI development, and explored the potential factors that contributed to this achievement. These being: a good mentor, support in the workplace and industry experience.

- Six recommendations were proposed for enhancing current built environment education to develop students’ EI. These were validated through discussions with students studying on such programmes.

1.7 Overview of the Chapters

The thesis is organised into seven chapters, and appendices containing additional information. Figure 1.2 presents a schematic representation of the thesis indicating how the chapters inter-relate so that the reader can have a clear view of the development of study. The content of the thesis is as follows:

**Chapter One** provides an introduction to the research, and sets out the general background and context. It investigates the research problems and establishes the research aims, objectives and propositions. This is followed by a justification of research and a brief description of the research methodology. Finally it outlines the contribution to knowledge and provides an overview of how the thesis is structured.
Chapter Two and Chapter Three review the relevant literature and provide a context for the current research. Chapter Two presents an overview of the theory of emotional intelligence by discussing its background, development, models and related EI instruments. It discusses the impact of EI in workplace by reviewing previous EI research which focuses on various relationships between EI and work-related outcomes. This chapter also highlights the importance of EI to construction industry and identifies a need for exploring the EI levels of construction professionals. Furthermore, it presents the results and findings of a pilot work and explores the potential role of EI in the construction industry as well as its impact on construction professionals’ daily work. Chapter Three reviews the role of EI in education and highlights the importance of EI in students’ academic achievement and learning process. It reviews previous EI interventions which have been used in educational setting and discusses the possibility of EI’s enhancement as well as its relevance to built environment education.

Chapter Four discusses the philosophical considerations in relation to the research and states the philosophical stance along with research methodology and design. It identifies the EI instrument used for this study in comparison with other alternatives and presents the justification for the interview and questionnaire design. The research sample, methods of data collection and analysis are detailed. Specialist computer software packages NVivo and SPSS are used to assist the data analysis for the purpose of transparency and credibility of present research.

Chapter Five presents a detailed analysis of data collected from the questionnaire survey and interviews. It examines the extent to which current built environment education develops students’ EI and examines the relationship between EI and the programmes taken in relation to different modular content, mode of teaching and learning and assessment used. It also investigates the issue of how students’ EI is developed through industrial placement. Further, students’ perspectives of their experience of university and industrial placement on EI development are explored.

Chapter Six discusses the research finding and results in the context of the literature (Chapter Two and Three) and presents the perspectives of 15 interviewed students on how built environment education could be enhanced in the future based on their own
experience. It proposes recommendations to enhance students’ EI through built environment education in relation to the extant literature.

**Chapter Seven** presents the conclusions derived from the research, restates the research aims, objective and propositions, and discusses the extent to which each objective and proposition has been addressed. It also presents a summary of recommendations to enhance EI through built environment education. It describes the contribution of research and ends with the limitations to the study and offers recommendations for future research.
CHAPTER 1 - Introduction
A need to measure and enhance the emotional intelligence of built environment students

CHAPTER 2 - Emotional Intelligence
The theoretical aspects, development and measurements of emotional intelligence & previous EI research & pilot study (P1)

CHAPTER 3 - Built Environment Education
The role of EI in built environment education & previous EI studies in the context of education

CHAPTER 4 - Research Design and Methodology
A pragmatic mixed-methods methodology

CHAPTER 5 - Results and Findings
The EI levels of students and its relationship with built environment education & the influence of industrial placement on EI (P2-P4)

CHAPTER 6 - Discussion and Recommendations
Discussions of emerging results and findings & recommendations to enhance students’ EI through built environment education (P4)

CHAPTER 7 - Conclusions and Future Research
Conclusion, contributions and limitations of the study & recommendations and future research

Figure 1.2 Structure of the thesis and data links from research phases

Key
P1=Phase 1 & P2=Phase 2
P3=Phase 3 & P4=Phase 4

- - - = data flow
| | = sequential flow
CHAPTER TWO: REVIEW OF EMOTIONAL INTELLIGENCE

2.1 Introduction

This chapter provides a context for the current work by discussing the general EI literature. This allows for theoretical constructs of EI to be discussed. The chapter divides the extant EI literature into two parts. The first part mainly reviews the theoretical aspect of EI. It begins with the historical background of EI and moves on to discuss the conceptualisation of EI in which two prevailing models of EI are reviewed in relation to the contents and method of assessments. Next, it goes on to explain the importance of EI and the existing EI measurement tools. This leads to a discussion in regard to which EI theory and measurement is used in the current study. The second part of the chapter mainly reviews previous EI research and studies conducted in other sectors and industries. Particularly, the chapter discusses the impact of EI on different work-related outcomes and review this in relation to the nature of construction. In doing so, the research propositions are developed in light of the emerging findings along with the literature review. The chapter concludes by identifying the need for an empirical investigation of the role and importance of EI in the construction industry. Furthermore, it presents the findings and results of a pilot work of how EI is relevant to the construction industry.

2.2 The Historical Background of Emotional Intelligence

Emotional intelligence (EI) as a term has been presented in the psychology field for a relatively long time (Greenspan, 1989; Leuner, 1966), although it was not until 1990 that the construct was introduced in its present form (Mayer and Salovey, 1990). The distal roots of EI can be traced back to the concept of ‘social intelligence’, coined by Thorndike (1920) to refer to “…the ability to understand and manage men and women, boys and girls- to act wisely in human relations” (Thorndike 1920, p.228). In the 1980s, Gardner (1983) included the concept of “social intelligence” as part of seven intelligences into his newly proposed “Multiple Intelligence
Theory”, which combines cognitive with emotional aspects of intelligence. He then further decomposed social intelligence into two parts; intrapersonal and interpersonal intelligence. The former relates to the ability to understand one’s own self, including one’s feeling, intentions and motivations, and to use such information effectively in regulating one’s life; whereas the latter concerns the ability to effectively communicate with and response to others, and to understand others, including their moods and intentions. Scheusner (2002) argued that the distinction between Gardner’s interpersonal and intrapersonal intelligence contributes to the foundations of emotional intelligence theory. After that, social intelligence is the term used for many decades to represent what has come to be known as emotional intelligence. Until 1990, the first formal definition of EI, along with the first model, appeared in Mayer and Salovey’s article. The concept of EI was initially proposed by Mayer and Salovey (1990) to represent the ability of people to deal with their emotions. Since that, a number of scholars such as Bar-On (1997), Cooper and Sawaf (1996), Goleman (1998), and Weisinger (1998) have generated their own notions of emotional intelligence. However, all these EI constructs share a common core of basic concepts. Emotional intelligence, at the most general level, refers to the abilities to recognise and regulate emotions in ourselves and in others (Goleman 2001).

2.3 What is Emotional Intelligence?

2.3.1 EI and IQ

In the past decade, the definition of intelligence within the education domain has tended to be equated with academic intellect and measured by the intelligence quotient (IQ) (Butler and Chinowsky, 2006). Contemporary perspectives suggest that intellectual ability alone is not a guarantee of academic success and see individuals as possessing multiple intelligences. The concept of intelligence thus needs to be expanded to encompass not only cognitive factors, but also social and/or emotional factors (Cantor, 1987; Mayer et., al, 1999; Sternberg, 1985; Thorndike, 1937; Wechsler, 1958). That, in turn, poses a new challenge to educators and
policy makers to establish a holistically educational strategy to develop not only cognitive ability but also emotional and social skills for students. In recent years, the popularisation of EI (Goleman, 1995) has been accompanied by a growing body of research, which concluded that EI is as a strong predictor for an individual’s success in many areas; and that EI should not be interpreted as a refute of traditional IQ. Rather, EI should be viewed as a complement to the emergence of intellect intelligence, which aims at complementing the traditional view of intelligence by emphasising the emotional, personal and social contributions to intelligent behaviour (Gardner, 1983; Mayer and Salovey, 1995; Wechsler, 1958). Goleman (2001) in the book entitled “The Emotionally Intelligence Workplace” proposed that IQ mainly predicts in which profession an individual can hold a job, however, once people are in a given job, role, or profession, EI emerges as a more powerful predictor in determining who can succeed and who cannot. Therefore, EI and IQ interplay and complement each other, and both are important determining factors of one’s success.

The notion is supported in several research and studies exploring the relationship between EI and IQ. In one of studies examining the relationship between EI and IQ in the roles studied (Mount, 2006), the results revealed that emotional competencies, such as self-confidence, empathy, organisational awareness, international flexibility, and teamwork, act as catalysts that enable the cognitive intelligence competencies and the individual skills and knowledge (expertise) competencies to achieve valued results. In other words, the EI competencies create an environment that allows the other competencies to be maximised to gain better results. Another study by Rosete and Ciarrochi (2005) examining the relationship between EI and IQ, and between EI and leadership effectiveness found that EI is related to IQ but is distinguishable from it. The findings suggested that an executive needs a high IQ to get to the management or executive levels, but once people reach that position, IQ does not discriminate between better or worse performing managers, instead EI becomes the main predictor to differentiate the star managers from the average performers.
2.3.2 The definition of EI

EI is a relatively new term for a construct that is aimed at complementing the traditional view of intelligence by emphasising the emotional, personal, and social contributions to intelligent behaviour (Gardner, 1983; Mayer and Salovey, 1995; Wechsler, 1958). There has been a controversy about how emotional intelligence should be conceptualised (trait EI vs. ability EI) and measured (self-report vs. maximum-performance measures). EI is characterised by some researchers as an ability, involving the cognitive processing of emotional information (Mayer and Salovey, 1997). This type of EI (also known as ability EI) is represented by Salovey and Mayer (1997), who defined emotional intelligence as a set of interrelated skills, as:

“...the ability to perceive accurately, appraise, and express emotion; the ability to access and/or generate feelings when they facilitate thought; the ability to understand emotion and emotional knowledge; and the ability to regulate emotions to promote emotional and intellectual growth” (p.10).

An alternative proposal is that EI should be regarded as a much broader concept, encompassing personality traits, motivational factors, and many different social skills (e.g., Bar-On, 2000; Boyatzis, Goleman and Rhee, 2000; Goleman, 1995, 1998). The trait EI is represented by the work of Goleman (1998) and by Bar-On (1997). Goleman (1998), in the popular book Working with Emotional Intelligence, defined EI as

“...the capacity for recognising our own feeling and those of others, for motivating ourselves, and for managing emotions well in ourselves and in our relationships” (p.37).

While Bar-On (1997) defined emotional intelligence as

“...an array of non-cognitive capabilities, competencies and skills that influence one’s ability to succeed in coping with environmental demands and pressures” (p.14).
Despite many theorists having generated their own concept of EI and models of EI’s dimensions (Bar-On, 1997; Cooper and Sawaf, 1996; Goleman, 1998; Weisinger, 1998); all these EI models can be grouped into one of the two EI Models: the Ability Model and Mixed or Trait-based Model.

2.3.3 Two EI models (the Ability Vs Mixed Model)

There are two predominant models of EI addressed in the literature (see Table 2.1 for a comparison of the two theories): the Ability Model (e.g. Mayer and Salovey, 1997; 2002) and Mixed or Trait-based Model (e.g., Bar-On, 1997; Goleman, 1995). The ability model is represented by Mayer and Salovey who view emotional intelligence as an actual domain of intelligence composed of specific emotional and mental abilities (Mayer and Salovey, 1997). Ability EI requires the use of maximum performance tests with correct and incorrect responses and pertains primarily to the realm of cognitive ability, which is accordingly most appropriately measured by performance tests (Petrides and Furnham, 2000). The latter, mixed or trait-based model, takes a narrow approach to EI combining emotional abilities with elements of personality, motivation, and social skill (Bar-on, 1997, Goleman, 1998). This type of EI pertains to the realm of personality which can be assessed by self-report questionnaire (Petrides and Furnham, 2000).

Mayer and Salovey’s (1997) EI model encompasses four interrelated abilities: perceiving, using, understanding and managing emotions. Each of the four abilities is discussed below.

(1) **Perception of Emotion** is the ability to perceive emotions in oneself and others as well as in objects, art, stories, music, and other stimuli. It entails identifying information conveyed by facial expressions, tone of voice, gestures, body posture, colour and other cues.

(2) **Emotional Facilitation** is the ability to generate, use, and feel emotion as necessary to communicate feelings or employ them in other cognitive processes. This entails the capacity to associate mental images and emotions. It also includes knowing how emotions influence cognitive processes such as deductive reasoning, problem solving, creativity and communication.
(3) **Understanding Emotion** is the ability to understand emotional information, to understand how emotions combine and progress through relationship transitions, and to appreciate such emotional meanings.

(4) **Managing Emotion** is the ability to be open to feelings, and to modulate them in oneself and others so as to promote personal understanding and growth.

The mixed model of EI, represented by the work of Goleman and colleagues (Goleman, 1998; Boyatzis, Goleman, and Rhee, 2000), includes emotional abilities, but also a number of elements that are best described as personality dimensions, as well as some aspects that may have little to do with emotions or personality (e.g., recognising the need for change; challenging the status quo, choosing team members based on expertise). The most recent version of the Goleman mixed model measures 20 competencies which can be organised into four dimensions: Self-Awareness, Self-Management, Social Awareness, and Social Skill. According to Goleman (1998), these EI abilities are considered independent (each contributes to job performance); interdependent (each draws to some extent on certain others with strong interactions); hierarchical (the EI capabilities build upon one another); necessary, but not sufficient (having an emotional intelligence does not guarantee that the competencies will be demonstrated); and generic (different jobs make different competence demands). Each of the four EI dimensions is discussed below (see Appendix B for Goleman’s EI model).

(1) **Self-Awareness** concerns knowing one’s internal states, preferences, resources, and intuitions. Self-awareness involves emotional awareness, which is deemed as the fundamental core ability of EI, and ability to know one’s strength and limits and self-confidence.

(2) **Self-Management** refers to managing ones’ internal states, impulses, and resources. The Self-Management cluster contains six competencies, including self-control, being trustworthy, conscientious, adaptable, taking initiative, and having a drive to achieve.

(3) **Social Awareness** refers to how people handle relationships and awareness of others’ feelings, needs, and concerns. It involves empathy, a service orientation
toward customers or clients, political awareness and understanding others as well as ability to cultivate opportunities through different kinds of people.

(4) **Social Skills** concerns the skill or adeptness at inducing desirable responses in others, including general communication ability, ability to influence others, manage conflict, inspire others via a vision, recognise and catalyse change, collaborate with others, and promote teamwork.

Although two EI models were established based on the different EI perspectives of developers, Petrides and Furnham (2000) argued that a similar distinction between the ability EI model and the trait EI model can be formulated based more upon the type of measurement rather than the theoretical approach.

Table 2.1: A comparison of the two theories of emotional intelligence

<table>
<thead>
<tr>
<th>Mayer and Salovey’s four branch ability model of emotional intelligence</th>
<th>Goleman’s four emotional competency model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceiving Emotion -- the capacity to accurately identify one's own and others' emotions and feelings, as well as ability to express these emotions.</td>
<td>Self-Awareness -- the ability to identify and recognise one's emotional states and to understand the link between emotions and performance.</td>
</tr>
<tr>
<td>Using Emotions -- the capacity to enhance the thinking process by using emotions.</td>
<td>Social Skills -- the ability to utilise social skills to build interpersonal relationships.</td>
</tr>
<tr>
<td>Understanding Emotions -- the capacity to comprehend complex emotions and how they operate in the social world.</td>
<td>Social Awareness -- the capacity to read, be sensitive to other people's emotions, in order to achieve results in service and organisational contexts.</td>
</tr>
<tr>
<td>Managing Emotions -- the capacity to manage and control one's emotions.</td>
<td>Self-Management -- the capacity to manage emotions-- to control one's emotions or to shift negative emotions to more positive emotions.</td>
</tr>
</tbody>
</table>

### 2.3.4 A comparison of different EI models

Despite different researchers having formed their own notions of emotional intelligence and developed parallel EI models, they all have some similarities and differences. The similarities and continuities between Salovey and Mayer’s (1990, 1993, 1994) earlier research and the work of other authors on emotional intelligence (Bar-On, 1997 and Goleman, 1998) lie in them sharing of a common reference to EI; i.e. the ability to accurately perceive, evaluate, regulate and express one’s own emotions (Songer and Walker, 2004). However, they do also have some important
differences. For example, Goleman’s (1998) construction of EI includes motivation and empathy factors that Mayer et al., (2000) consider to extend beyond the confines of EI. In a similar fashion, Bar-On (1997) includes a diverse range of factors including assertiveness, self-esteem, and independence. These factors, however, clearly go beyond the scope of Mayer and Salovey’s definition of EI. Apart from this, Mayer et al., (2000) suggested that their EI construction focuses on the link between the cognitive and emotional aspects of intelligence and should not be considered as just another set of personality dimensions. In fact, Druskat et al., (2006) summarised that Salovey and Mayer’s theory is rooted in their vision of EI as a type of intelligence; and Bar-On’s theory is influenced by his interest in personality, life success, and personal well-being; whereas Goleman and Boyatzis’s theory grows out of their interests in the competencies that support superior work performance. In short, the term EI is used by different researchers to mean different things, and different perspectives have led to many different approaches to measurement of EI that yield substantially different research findings (Mayer et al., 2000). Therefore, it is very important to clarify the term EI and model used in any research project.

This study borrowed the theory and model of EI developed by Goleman and Boyatzis (2000) for two primary reasons. Firstly, the author believed that EI encompasses a wide range of emotional competencies, skills and attributes that support superior work performance, and can be used to differentiate leading managers from average performers. This contention was in accordance with the EI theory and mixed model developed by Goleman and Boyatzis (2000). Besides, Goleman’s mixed EI model is specifically developed to measure and identify the emotional competencies in connection with work performance. This was in line with the requirement of this research, because one objective of the current research was to explore the potential role and importance of EI in the construction industry. To achieve this objective required an identification of the emotional competencies exhibited by construction professionals in their daily activities; and an examination of whether these emotional competencies being performed or not performed would result in any differences in work outcome. Thus, the Goleman’s mixed EI model was deemed as the most suitable EI model and was utilised in the current study. From the perspective of Goleman and Boyatzis (2000), EI is said to include four parts: Self-Awareness;
Self-Management; Social Awareness; and Social Skills. They broke down these four dimensions of EI into twenty different emotional competencies, including leadership, communication, conflict management, teamwork, collaboration etc (see Appendix B). Table 2.2 provides a clear and simple comparison of different measurement approaches.
Table 2.2 Emotional intelligence using ability, self-report, and informant approaches to measurement

<table>
<thead>
<tr>
<th>Test Publisher</th>
<th>Ability</th>
<th>Self-Report</th>
<th>Informant</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Definition of Emotional Intelligence</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>the ability to perceive accurately, appraise, and express emotion; the ability to access and/or generate feelings when they facilitate thought; the ability to understand emotion and emotional knowledge; and the ability to regulate emotions to promote emotional and intellectual growth</td>
<td>an array of noncognitive capabilities, competencies, and skills that influence one’s ability to succeed in coping with environmental demands and pressures</td>
<td>the capacity for recognising our own feeling and those of others, for motivating ourselves, and for managing emotions well in ourselves and in our relationships</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Test Scales</th>
<th>Emotional Perception</th>
<th>Intrapersonal</th>
<th>Overall Emotional Intelligence</th>
<th>Self-Awareness</th>
<th>Social Awareness</th>
<th>Self-Management</th>
<th>Social Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Identifying emotions in faces, emotions in designs, emotions in music, emotions in stories</td>
<td>Emotional self-awareness, assertiveness, self-regard, self-actualisation, independence</td>
<td></td>
<td>Emotional self-awareness, accurate self-assessment, self-confidence</td>
<td>Empathy, organisational awareness, service orientation</td>
<td>Self-control, trustworthiness, conscientiousness, adaptability, achievement orientation, initiative</td>
<td>Developing others, leadership, influence, communication, change catalyst, conflict management, building bonds, teamwork initiative</td>
</tr>
<tr>
<td>Emotional Facilitation</td>
<td>Translating feelings (Synesthesia), Using emotions to make judgments (Feeling Biases)</td>
<td>Empathy, interpersonal relationship, social responsibility</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emotional Understanding</td>
<td>Defining emotions, complex emotional blends, emotional transitions, emotional perspectives</td>
<td>Problem solving, reality testing, flexibility</td>
<td>Stress Management</td>
<td>Stress tolerance, impulse control</td>
<td>Adaptability</td>
<td>(General Mood) happiness, optimism</td>
<td></td>
</tr>
<tr>
<td>Emotional Management</td>
<td>Managing own emotions, managing other’s emotions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2.4 Why Emotional Intelligence?

In recent years, widespread attention has been given to the concept of emotional intelligence. Much of this can be attributed to the popular book *Emotional Intelligence* written by Goleman (1995). In this book, Goleman made strong claims about the contribution of EI makes to individuals’ success and work performance. He identified IQ as contributing 20% towards life success and intimated that the remaining 80% of life success may be attributable to emotional intelligence. More recently, Bar-On et al., (2006) conducted a study examining the impact of EI on occupational performance, and the results indicated that the ability of EI on identify occupational potential accounts for approximately four times (25%) more variance than IQ (6%) when compared with Wagner’s extensive meta-analysis of EI (Wagner, 1997). In addition, Stein and Book (2000) in their book entitled *The EQ Edge*, which draws on research across 30 professional and managerial career fields, revealed that anywhere from 47 percent to 56 percent of work/life success is the result of EI, with the range being related to job type. Although there is not a consensus amongst researchers as to the extent to which EI predicts one’s performance, these studies have revealed that EI is a strong predictor, even more powerful than IQ, in determining one’s success and performance (Abraham, 2000; Ashforth and Humphrey, 1995; Ashkanasy and Daus, 2002; Goleman, 1995, 1998).

Martin (2004) noted that people are sometimes successful not because of their knowledge of the tasks, but due to their ability to manage people socially and emotionally by using charismatic personalities in their communications. This is embodied in the EI concept as “the ability to effectively reason about emotions and use emotions to aid cognitive processes and decision making” (Mayer et al., 2000). It reflects the ability to understand and manage emotions and their interrelations with cognition both in the self and in others to enhance effective functioning. Martin (2004) suggested that people with high levels of EI have a natural aptitude for emotional perception and can utilise this to move people to respond positively to them. Recently, Mount (2006) conducted a study to examine the relationship between IQ and EI in five roles in an international petroleum industry, and the results revealed that EI competencies, such as self-confidence, empathy and teamwork, act as catalysts that enable the cognitive intelligence competencies and the individual’s
skills and knowledge (expertise) to achieve international business successes. In other words, the EI competencies created an environment that allowed the other competencies to be maximised, thereby giving them traction for performance. Most importantly, EI is thought to be highly malleable and can be developed through appropriate learning interventions, life experience and is amenable to training (Goleman, 1995; Mayer and Caruso, 1999; Jaeger, 2003, Lopes et al., 2006) (this is discussed later in section 3.3). This statement is supported in the research conducted by Sala (2000) in developing a programme to increase EI at work. The results showed an improvement in EI of individuals who had participated in an EI training programme compared to those who had not.

2.5 Can Emotional Intelligence be Measured?

The question ‘Can EI be measured?’ can be answered by reviewing the research on emotional intelligence measurements. It is commonly believed that EI is less constrained by social factors. Mayer et al., (2000) suggested that EI is “suggestive of a kinder, gentler intelligence- an intelligence anyone can have” (p.97). In fact, Goleman, as other researchers (Boyatzis, 2008; Jaeger, 2003; Mayer et al., 1999), claimed that unlike academic intelligence, EI is highly malleable and is thought to be developed and enhanced by appropriate teaching and learning interventions (this is discussed in later in section 3.4). The development of tests to measure the EI has been paralleled by the development of theoretical models of EI. The available tests of EI vary widely both in their content and method of assessment and different tests are valid for different purposes. The existing of EI tests can be broadly categorised under three measurement approaches: self-report, informants and ability-based or performance measurement (Mayer et al., 2000). They are detailed as follow. (Table 2.2 provides a comparison of such scales)

2.5.1 Self-report

Self-report measures ask people to endorse a series of descriptive statements, indicating to what extent the participants agree or do not agree with the statements. For example, one can ask questions of the sort, “By looking at their facial
expressions, I recognise the emotions people are experiencing.” (Schutte et al., 1998). Self-report measures are effective and time-saving and they tend to rely on the individual’s self-understanding. The potential problem of using self-report approach is that if a person’s self-concept is accurate, then these sorts of measures can often serve as an accurate measure of the actual ability or trait. However, if the person’s self-concept is inaccurate, then self-reported measures yield information concerning only the person’s self-concept, rather than the actually ability or trait (Mayer et al., 2000).

2.5.2 Informants

Informants are the second method used to measure EI. The use of informants generates information about how a person is perceived by others and it requires the participant to rate the target person on each item based on the level of agreement. For example, “Indicate the level (very high, high, average, low, very low) the person has attained for each of the following: stays open to ideas; readily adapts to changes; is a good listener.” The informant approach has advantages in that people can obtain broad aspects from others. However, Mayer et al., (2000) argued that the informant approach apt to measure a person’s reputation rather than one’s actual ability. The reputation is influenced by many things, such as how well the person treats those around him or her, and the informant’s beliefs about how personality operates (Funder, 1995).

2.5.3 Ability or performance measures

The third method to measure EI is to use a performance measure, e.g. to determine how smart a person is. Individuals are asked to solve problems such as “How much is thirteen multiplied by three?”, “What does the word ‘analyse’ mean?”, or “What city is the capital of France?” Mayer et al., (2000) advocated that ability testing is the gold standard in intelligence research because intelligence corresponds to the actual capacities to perform well at mental tasks, not just one’s beliefs about those capacities. However, Jordan et al., (2002) disagreed with the sentiment proposed by Mayer et al., (2000) who attempt to link EI to general intelligence. This is because the authors believe that it does not conform to Gardner’s (1983)
conceptualisation of multiple intelligences and particularly the constructs of interpersonal and intrapersonal intelligence upon which the idea of EI is predicated.

2.6 How to Measure Emotional Intelligence?

The most appropriate method of measuring EI is currently an area of controversy. Many instruments have been developed in parallel with various conceptualisations of EI over the past two decades. These EI instruments vary widely in both their content and their method of assessment and different instruments are valid for different purposes (e.g., Goleman 1995; Bar-On 1997; Sala, 2002). For use in this study, it was necessary to choose a psychometrically sound instrument which can measure EI effectively and accurately. According to Encyclopaedia of Applied Psychology (2004), four of these measurement tools are used with the highest frequency in research studies. These being, MSCEIT (Mayer, Salovey and Caruso Emotional Intelligence Test), EQ-i (Bar-On Emotional Quotient Inventory), ECI (Emotional Competence Inventory) and SSRI (Schutte Self-report Inventory). Each of these EI assessment tools have been well researched and statistically validated. Each instrument is elaborated below in relation to its content, measurable dimension and method of assessment.

2.6.1 MSCEIT (Mayer, Salovey and Caruso Emotional Intelligence Test)

The Mayer, Salovey, and Caruso Emotional Intelligence Test (MSCEIT) is the representative of ability scale measurement. MSCEIT is developed from an intelligence-testing tradition formed by the emerging scientific understanding of emotions and their function. It comes from the first published ability measure specifically intended to assess EI, namely Multifactor Emotional Intelligence Scale (MEIS), a twelve-subscale ability test. MSCEIT assesses people’s performance in the four dimensions of EI, using two tasks for each dimension. The tasks include decoding the emotional information conveyed by facial expressions and designs, evaluating what moods facilitate performance on various tasks, understanding blends
of emotions and emotional dynamics, and evaluating the effectiveness of strategies for regulating emotions in various situations.

The MSCEIT consists of 141 items and takes approximately fifty-five minutes to complete the inventory. Response scales vary according to the specific dimension being assessed by each item. Responses are scored by the publisher using a consensus based scoring approach. The MSCEIT yields a total score, two area level scores, four branch scores, and eight task scores. In addition to these 15 scores, there are three supplemental scores.

2.6.2 EQ-i (Bar-On Emotional Quotient Inventory)

The Bar-On Emotional Quotient Inventory (EQ-i) is a self-report measure of emotionally and socially intelligent behaviour, which provides an estimate of one’s underlying emotional and social intelligence. It is intended to predict the potential for performance, rather than performance itself (Bar-on, 1997). The EQ-i is the first EI measure to be published by a psychological test publisher and the first measure to be reviewed in the Buros Mental measurements Yearbook (Plake and Impara, 1999). The EQ-i is a paper-and-pencil test consisting of 133 self-report items, and uses a 5-points response scale with a textual response format ranging from "Very seldom or not true of me" (1) to "Very often true of me or True of me" (5). It takes approximately forty-five minutes to complete the inventory.

The EQ-i renders a total EQ score and the following five EQ composite scale scores comprising fifteen subscale scores: (1) Intrapersonal skill, (2) Interpersonal skill, (3) Stress Management, (4) Adaptability, and (5) General Mood (A brief description of the emotional and social intelligence competencies measured by the 15 subscales is found in Appendix C). Bar-On (2000), however, recently made a revision to his scale. He now views the General Mood factor as a facilitator of EI rather than a part of it. Thus, total EQ-i scores are now computed by only summing the first four scales. The comparability of the two scoring methods has not been reported.
2.6.3 ECI (Emotional Competence Inventory)

The Emotional Competence Inventory (ECI) is a multirater survey instrument that assesses self-ratings, manager ratings, direct report, peer ratings, and client ratings on a series of behavioural indicators of emotional intelligence competencies (Goleman, Boyatzis, and Hay Group, 1999). It provides the broadest perspective on EI. The current version of the ECI asks the respondent to describe himself and herself or another person on each item on a scale of 1 to 7. Each step is progressively labelled starting from “the behaviour is only slightly characteristic of the individual (the individual behaves this way only sporadically)” to the highest response indicating “the behaviour is very characteristic of this individual (the individual behaves this way in most or all situations where it is appropriate).”

The ECI measures 20 competencies which are organised into four clusters: Self-Awareness, Self-Management, Social Awareness, and Social Skill clusters (A brief description of the emotional intelligence competencies measured by the four clusters is found in the Appendix B). These competencies are measured by asking informants to rate the target person, as well as by having the target to evaluate oneself via self-report.

2.6.4 SSRI (Schutte Self-report Inventory)

The Schutte self-report inventory (SSRI; Schutte et al., 1998) is a one-dimensional measure of EI based on the original EI model developed by Mayer and Salovey (1990) which included three distinct EI components: appraisal and expression of emotions; regulation of emotions; and utilisation of emotions. It assesses the extent to which respondents recognise, understand, use and manage emotions in themselves and in others. The test contains 33 items, of which three are reverse-scored, which takes approximately 15 minutes to complete. For each item, participants are required to choose whether they agree or disagree with the statement (e.g., ‘When I feel a change in emotion, I tend to come up with new idea’) based on a 5-point Likert scale (1 = strongly disagree; 2 = somewhat disagree; 3 = neither agree nor disagree; 4 = somewhat agree; 5 = strongly agree). A high score indicates a higher level of EI. There is some debate within the EI literature as to whether SSRI is better assessed as
one-dimensional (single factor) or multi-dimensional (four-factor: emotion appraisal, mood regulation, social skill and utilising emotion) measurement. The developers of this scale suggested that it provides a measure of general EI, as well as measures of four EI sub-components, namely Emotion Perception, Utilizing Emotions, Managing Self-Relevant Emotions, and Managing Others’ Emotions (Schutte et al., 1998). Of note, however, several researchers have failed to replicate this factor structure (Petrides and Furnham, 2000; Saklofske et al., 2003). Ciarrochi et al., (2002) also replicated a four-factor structure but there were differences in some of the item loadings and classifications. Similarly, Saklofske, et al., (2003) replicated a 4-factor solution, but again, not all of the items loaded were on the same factors. Taken together, it would be rational to use SSRI to measure the overall EI rather than to measure the four EI sub-components because previous work on SSRI has established a satisfactory internal consistency (α = .78) and reliability for full-scale EI in comparison to the four-factor structure EI (Brown and Schutte, 2006; Schutte et al., 1998; 2001; Shi and Wang, 2007). Table 2.3 is a summary of the discussion on Emotional Intelligence/Competencies Instruments. The availability of the instruments is also provided.
Table 2.3 Emotional Intelligence/Competencies Instruments and Their Use (Source: adapted from Matthews et al., (2006) and Conte and Dean, (2006))

<table>
<thead>
<tr>
<th>Factor</th>
<th>MSCEIT</th>
<th>SSRI</th>
<th>EQ-i</th>
<th>ECI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of individuals tested</td>
<td>2112</td>
<td>137 adult, 9550 (13 to 17 year olds)</td>
<td>3881 (Air Force personnel)</td>
<td>596</td>
</tr>
<tr>
<td>Reliability Tests</td>
<td>Reasonable</td>
<td>Parts are reliable</td>
<td>Parts are reliable</td>
<td>Good</td>
</tr>
<tr>
<td>Dimensions Measured</td>
<td>Perception, facilitation, understanding, managing</td>
<td>Monitor and discriminate, Between emotions, Use emotions in thought and reactions</td>
<td>Intrapersonal adaptability, general mood, interpersonal stress management</td>
<td>Self-awareness, self-management, social awareness, social skills</td>
</tr>
<tr>
<td>Instrument Design</td>
<td>141 scaled mental ability items</td>
<td>33 mixed model items</td>
<td>133 mixed model items</td>
<td>Self-report and others’ assessment on 20 competencies in 4 clusters</td>
</tr>
<tr>
<td>Self-report</td>
<td>No (ability test)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes (informants)</td>
</tr>
<tr>
<td>Big Five Personality Test</td>
<td>Mostly distinguishable</td>
<td>Moderately to strongly relate for 4 of 5</td>
<td>5 of 5 factors strongly relate</td>
<td>No</td>
</tr>
<tr>
<td>Empathy</td>
<td>Moderately</td>
<td>Moderately</td>
<td>Moderately to strong</td>
<td>Strong</td>
</tr>
<tr>
<td>Significant Gender Difference</td>
<td>Women score higher than men</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Test/retest</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Covaried with other tests</td>
<td>SSRI and EQ-i (if take out Big Five does not)</td>
<td>Covaried with EQ-i</td>
<td>Covaried with SSRI</td>
<td>None</td>
</tr>
<tr>
<td>Instrument Available</td>
<td>Multi-Health Systems <a href="mailto:oeg@mhs.com">oeg@mhs.com</a></td>
<td>Free</td>
<td>Multi-Health Systems <a href="mailto:oeg@mhs.com">oeg@mhs.com</a></td>
<td>Hay/McBee EI Services <a href="http://www.eisglobal.com">www.eisglobal.com</a></td>
</tr>
</tbody>
</table>
2.7 Summary

The first part of EI literature review so far has focused on the theoretical aspect of EI and its development and different conceptualisations. The findings indicated that there is controversy about whether EI should be defined as an ability or as a broad concept which includes personal trait and social skills. In addition, the development of EI measures has gone on in parallel with the development of different theoretical models of EI. Two predominant EI models (the ability model and mixed models) were reviewed in this respect, and four psychometrically sound EI instruments were elaborated in relation to the content and the method of assessment. Currently there is no answer that says whose view of EI is right and which EI instrument is perfect (as each EI measurement is valid for its specific purpose). Therefore, it is necessary to clarify the definition of EI for a research project (as the developers of EI have used different definitions of EI, which have resulted in different types of dimensions for the various measures); this study borrowed the EI theory from Goleman and Boyatzis (2000) who defined EI as “an ability to recognise and manage one’s own and others’ emotions, to motivate oneself and restrain impulses, and to handle interpersonal relationships effectively”. Goleman and Boyatzis’ EI model involves four dimensions which can be broken down into twenty EI competencies; and each of these competencies were used as a cue to identify the EI competencies shown by target interviewees in the current work (see Appendix G). The following sections of the chapter discuss the impact of EI in workplace. Various relationships between EI and work-related outcomes will be explored, and the findings from other sectors and industries with regard to the influence of EI on performance will lead to a discussion of its relevance to construction industry.

2.8 Previous Emotional Intelligence studies

The previous sections of this Chapter have detailed the theoretical aspects, models and assessments for EI. This provided a context of general understanding of EI to the current work. Since emotional intelligence was first proposed by Mayer and Salovey in 1990, work on this topic is proliferating. Many scholars and
practitioners have conducted research by using a wide range of methodologies to explore EI measurement (Bar-On, 1997; Mayer et al., 2003; Sala, 2002); EI’s manifestation in work-related competencies (Goleman, 1995; 1998; 2001), EI’s application to everyday life (Ciarocchi et al., 2001), EI’s relation to effective leadership (Ashkanasy et al., 2000; Goleman et al., 2002), EI’s influence on team effectiveness (Druskat and Wolff, 2001; Elfenbein and Ambady, 2002; Jordan et al., 2002), and EI’s validity as a form of intelligence (Lopes et al., 2003; Mayer et al., 1999). This section aims to explore the role and importance of EI in the workplace. Specific attention is paid to various relationships between EI and work-related outcomes. In doing this, it develops a comprehensive understanding of how EI affects individuals’ work performance and behaviour, which can be applied to the context of the construction industry. The findings from previous research can be broadly categorised into five subjects where EI has been frequently intervened. These being: the relationship between EI and project management, EI and career successes, EI and work performance, EI and team effectiveness, and EI and leadership.

2.8.1 EI and project management

For most organisational management literature, emotions had to be viewed as disrupting in the workplace, preventing rational and objective behaviour. It is commonly believed that workers should leave their emotions at the door when they walk into work. In the last two decades, however, research has revealed that individuals’ emotions are unavoidable, and are thus inherently a part of organisational life. This is particularly true in the case of interpersonal relationships at work, which are inherently emotional in nature. Thus, there is an increasing interest in recognising the value of emotions in management practice, and the subject of emotions in the workplace is now one of the hottest topics in management today (Ashkanasy and Daus, 2002). Having reviewed EI related material, there are many examples demonstrating how EI has had a positive impact on the relationship between managers’ EI and employees’ work outcomes. Carmeli (2003) suggested that managers with high EI produce positive work attitudes and altruistic behaviours. Likewise, Zhou and George (2003) stated that managers with high EI are able to use emotion to facilitate cognitive processes, underlying problem identification and
opportunity recognition. According to Fredrickson (2003), managers with high EI could improve the performance of their employees by managing employees’ emotions that foster creativity, resilience and confidence. Furthermore, managers with high EI tended to be more adept at nurturing more positive interactions between employees resulting in better cooperation (Barsade, 2002), coordination (Sy et al., 2005), and organisational citizenship all of which contribute to improved performance (Mossholder et al., 1981; Wong and Law, 2002).

From the employees’ side, several research studies have found that employees with high EI are more likely to perform well and experience high job satisfaction because they are more adept at appraising and regulating their own emotions than those with low EI (Wong and Law, 2002 and Sy, et al., 2005). In contrast, employees possessing lower levels of EI benefitted greatly from a manager with high EI, who could help employees recognise and regulate their own and others’ emotions. Specifically, employees need a manager who could improve the work environment by “generating and maintaining excitement, enthusiasm, confidence, and optimism in an organisation” (George, 2000, p.1039). In addition, some researchers have theorised that job performance is influenced by employees’ ability to use emotions to facilitate performance, one of the four defining dimensions of EI. Employees could use both positive and negative emotions to their advantage to improve performance (George and Brief, 1996).

2.8.2 EI and career success

Although there are very little empirical data that directly test the relationship between EI and career success, research by Fox and Spector (2000) provided indirect support for the claim that EI may be important in recruitment and selection process. Fox and Spector noted that the employment interview is a complex interaction between employer and employee in which emotional management, a component of emotional intelligence, plays a central role. Although they acknowledged that the employment decision to hire is strongly affected by intelligence, their data also revealed that the positive affectivity of the interviewee also plays a major role in influencing this decision. Fox and Spector (2000) argued that emotional management skills associated with emotional intelligence contribute to interviewees’
ability to re-regulate their affective state during interviews and to display positive affect. As such, Fox and Spector concluded that emotionally intelligent individuals, who are able to regulate their affective state during the interview process, are more successful in securing a job than other less emotionally intelligence individuals. These findings mirror the work of Isen and Baron (1991), who found that employees who are able to regulate mood in an organisation are at a significant advantage in job interviews and in getting promotions.

### 2.8.3 EI and work performance

There are many empirical studies that have explored the effect of EI on work performance and have shown a positive association between EI and performance (Bachman et al., 2000; Fox and Spector, 2000; Jordan, et. al., 2002; Wong and Law, 2002). Bachman et al., (2000) demonstrated that EI is associated with performance ratings, and that EI is a differentiating factor between successful and unsuccessful debt collectors. In fact, Goleman (1998) completed a post hoc analysis of empirically derived competency studies across a broad range of industries and found that 67% of the competencies determined to differentiate performance can be categorised as emotional intelligence characteristics. Slaski and Cartwright (2002), using a sample of 224 managers in the retail industry, showed a strong negative relationship between emotional intelligence and workplace distress and stress. Conversely, they found a positive relationship between EI and emotional well-being, morale, quality of work life, and overall performance ratings.

Another study of EI into 69 undergraduate students working part-time jobs in the placement (Janovics and Christiansen, 2001) found that there is a positive relation between EI scores and supervisor ratings of job performance. The results remained statistically significant after controlling for cognitive ability, assessed by the Wonderlic Personnel Test (cf. Wonderlic and Associates, 1992). More recently, Bar-On et al., (2006) carried out EI research into U.S. Air Force (USAF) and the Israeli Defence Forces (IDF). The results demonstrated a significantly positive relationship between EI and occupational performance. The high-performing recruiters (defined as those who met or exceeded 100% of their annual recruitment quotas) had significantly higher EQs than low-performing recruiters (defined as those
who met less than 80% of their annual recruitment quotas) and vice versa. The authors suggested that individuals who are high on EI can be performed better in the workplace. Significantly, the results also proved that EI is a predictor in the workplace, in which EI is found to account for approximately four times (25%) more variance than IQ (6%) when explaining performance.

### 2.8.4 EI and team effectiveness

Previous research has validated the importance of EI of groups in terms of effective functioning. Druskat and Kayes (1999) investigated teams’ EI in a variable context and found that many of the elements of effective emotional functioning in teams come from norms that team members develop with each other rather than from the intelligence of particular individuals. Hence, the authors suggested that team EI is thought to be a matter of effective interpersonal behaviours rather than unchangeable traits. Later, Druskat and Wolff (2001) suggested that individuals with high levels of EI tend to be more effective at fostering healthy norms for team work. Jordan et al., (2002) conducted a study to examine the relationship between EI and team effectiveness. The results indicated that low EI teams, while not performing initially at a high level in relation to goal setting or process, can perform as well as high EI teams over time. However, the authors stated that the findings need to be confirmed only after further research is conducted. In addition, Jordan and Troth (2004), in particular, found links between emotional management (the fourth component of EI) and team performance. The results showed that teams with members who are able to regulate their experience and expression of emotions achieve a higher performance than those teams whose members are not able to control their emotions. Examining the low-performance teams, Jordan and Troth (2004) noted that a lack of emotional control results in higher levels of conflicts and therefore reduces the performance of team members who focus on their conflicts rather than arriving at a decision. More recently, Jordan and Ashkanasy (2006) conducted another study looking at EI and team effectiveness (defined as team goals focus and team process effectiveness). The results showed a significant relation between peer (team member) rating of work group EI and team effectiveness. Specially, the authors suggested that emotional self-awareness is a core predictor of group effectiveness. Similarly, Elfenbein (2006) demonstrated that a high average
level of individual EI of team members predicts stronger team performance. The results also showed that EI is an important predictor of a range of team-level performance measures, including ratings by senior staff members, retention, and self-reported outcomes such as performance, liking of colleagues, and team learning.

2.8.5 EI and leadership

There is not a consensus amongst researchers as to what the definition of leadership should be. Leadership concerns the interaction of leaders with other individuals. It is widely accepted that the quality of interactions is highly affected by emotional awareness and emotional regulation (Songer and Walker, 2004; Wong and Law, 2002). Recent research has proven that leaders’ influence on group members’ emotions can substantially affect job attitudes and performance. Wong and Law (2002) found that leaders with high EI and emotional maturity are more likely to use supportive behaviours and treat their followers with psychological benefits, as they are more sensitive to feelings and emotions of themselves and their followers. This, in turn, influences their followers’ job satisfaction and performance. Likewise, McColl-Kenney and Anderson (2002) demonstrated that leaders strongly influence their subordinates’ feelings of frustration and feelings of optimism, which in turn influence objective sales performance. Similarly, Dansereau et al., (1995) found that leaders can affect the performance of their subordinates by supporting their feelings of self-worth. In fact, Pescosolido (2002) argued, and his case examples illustrated, that leadership involves a process of managing group members’ emotions in order to improve performance. Moreover, Goleman and his colleagues, in the recent work Primal Leadership, stressed that “the foremost job of leaders today is to drive the collective emotions of their organisations in a positive direction and to clear the smog created by toxic emotions” (2002, p.5).

Other research conducted between EI and leadership has shown a correlation between EI and transformational leadership. Barling (2000) found that managers who score high on the EQ-i inventory are perceived by their subordinates as displaying more transformational leadership behaviours. Similarly, Gardner and Stough (2002) conducted another EI research with effective leadership behaviours in upper level management. The results also showed a strong correlation between
transformational leadership and overall EI. Additionally, a negative relationship was found between a “laissez-faire” leadership style and EI. More recently, Butler and Chinowsky (2006) completed an EI research on upper-level managers of construction industry. The results indicated a strong relationship exist between EI and transformational leadership behaviour. Particularly, the empathy and interpersonal relationships were revealed as the two important predictors for transformational behaviour. In addition, it was found that construction leaders have a strong ability to cope with stress on a regular basis, but a lack of empathy.

Another empirical study of the relation between EI and leadership suggested that emotionally intelligent individuals may be more successful in producing inspiring visions or in generating enthusiasm and hope for their ideas (Cote et al., 2004). Thus, leaders with high EI may perform better than their counterparts.

The EI literature presented so far has demonstrated that EI is an important factor in determining individuals’ performance and work effectiveness. Previous findings suggest that EI has been associated with various work-related outcomes, including project management, work performance, career success, team effectiveness and leadership. Individuals with high EI appear to be more adept at appraising and regulating emotions (Sy, et al., 2005; Wong and Law, 2000); and knowing how to release negative emotions which might result in disrupt behaviours in the workplace (Jordan and Ashkanasy, 2006). With regard to leaders with high EI, they are more likely to perform transformational leadership (Butler and Chinowsky, 2006; Gardner and Stough, 2002) and know how to improve their followers’ performance by fostering creativity and confidence (Fredrickson, 2003). Besides, they are aware of how to use emotions to facilitate the process of cognitive processes, making realistic decisions (Zhou and George, 2003), and nurture more positive interactions between employees which may result in better performance (Barsade, 2002). As such, it can be proposed that there is a positive impact of EI on the performance of construction professionals. Construction professionals possessing high levels of EI are thought to be performed better and managed more effectively than those with low levels of EI. They are more adept in using and managing their emotions to facilitate their work and to guide the process of making a decision. However, it should be noted that different jobs normally demand different emotional competencies (Goleman,
Chapter Two: Emotional Intelligence

1995; 1998); as such construction professionals in different positions may exhibit different EI competencies.

**Proposition 1: Emotional intelligence competencies are likely to have a positive impact on construction professionals’ performance**

### 2.9 How is EI Relevant to the Construction Industry?

The construction industry has been referred to as one of the most challenging environments to manage people effectively to ensure project and organisational success. One of the key characteristics of the construction industry is that it is project-based which results in a number of problems, such as multidisciplinary, temporary teams and transient workforce (Loosemore et al., 2003). Each of these problems presents particular challenges for both managers attempting to manage people successfully and project participants striving to work cooperatively. This section discusses the characteristics of the construction industry and reviews this in relation to the EI competencies required by the construction industry.

#### 2.9.1 EI and its role in the construction industry

The project-based nature of construction industry has resulted in diverse groups of people, often with very different priorities and goals, being brought together for short-term periods of time to achieve both project and individual organisational objectives (Loosemore et al., 2003). These objectives, however, are not necessarily compatible and they might not align with people’s personal objectives. To be achieved these objectives may require individuals to suppress their own desire for achievement to work toward a common goal. This can often lead to an affective response when individuals need to compromise their own goals as a result of striving for collaborative goals (Weiss and Cropanzano, 1996). To successfully manage and coordinate these competing individual interests and goals with those central to the project, it is essential that construction project managers possess higher levels of EI. In fact, Edum-Fotwe and McCaffer (2000) listed five general skills that are prerequisite for the position of project management, these being leadership,
communication, problem solving, negotiation and marketing. Collectively, these skills have been termed as ‘social skills’, which are one of the four defining dimensions of ‘Emotional Intelligence’ (Goleman 1998). According to Goleman’s EI model, project managers, first and foremost, need to be aware of their emotions (Emotional Self-awareness) and accurately understand themselves (Self-regard); they also need to be understand the team members’ emotions (Empathy) to relate well with them (Interpersonal relationship). In order to get the work done, managers also need to be self-reliant and decisive (Independence), in making realistic (Reality-Testing) and effective solutions to problems as they arise (Problem-solving). This often requires managers to have the ability to work well under pressure (Stress Tolerance) and maintain a positive approach (Optimism).

The project-based nature of construction also results in the forming of temporary teams. As referred to earlier, construction activities involve bringing together different combinations of the clients, designers, contractors and suppliers to work together for relative short periods. They frequently need to rapidly establish co-operative working relationships whilst being employed by different organisations on different conditions of contract (Dainty et al. 2007). To successfully manage construction activities and effectively work in a project-based environment, a good interaction between project participants is required. A good interaction involves individuals acting effectively together and/or toward one another (Songer and Walker, 2004). This, in turn, often demands high levels of emotional awareness and emotional regulation amongst project participants. Jordan and Ashkanasy (2006) suggested that emotional self-awareness has a positive impact on team effective interaction as it allows team members to resolve discrepancies between personal goals and team goals. As such, the construction professionals, first and foremost, need to be aware of their emotions (Emotional Self-awareness); and accurately understand their emotions and show it in an appropriate manner (Self-regard). This allows them to keep disruptive emotions and impulses in check. They also need to understand other team members’ emotions (Empathy) when working within a project-based environment and to work well with them (Interpersonal Relationship). They need to work on different places during project stages and to get familiar with the environment (Adaptability) and to work for long hours (Stress Tolerance).
2.9.2 Limited EI studies in the construction domain

Despite the burgeoning body of research on EI and individual performance or success, there have been relatively few empirical studies on EI conducted within a construction context. Chinowsky and Brown (2004) and Songer and Walker (2004) are amongst the few pioneers who have investigated EI in the context of the construction. Chinowsky and Brown (2004) research the impact of civil engineering curriculum on students’ EI in the United States by using Bar-On EQ-I to measure students’ EI, and the results indicated that the EI development of civil engineering students lags well behind their comparison sample (liberal arts students). In fact, the authors intimated that the engineering educational programme in some way inhibits EI growth. However, it remains unclear as to whether programmes aimed specifically at developing managers in the construction industry, develop these EI competencies more effectively. In addition, Chinowsky and Brown (2004) suggested that the lack of EI growth will directly affect students’ educational development and professional preparedness. Furthermore, students without adequately developed EI would lack problem solving capabilities, as well as other professional attributes such as leadership, communication skills, creativity and an understanding of the external variables impacting upon their business.

More recently, Butler and Chinowsky (2006) carried out an EI study with construction industry executives and examined the relationship between EI and leadership behaviours. The study used Emotional Quotient Inventory (EQ-i), developed by Bar-On, to measure EI. The authors demonstrated a positive impact of EI on construction executives’ leadership behaviour and suggested that construction organisations should recognise the value of EI given to its significant role in the performance. Specially, five specific components of EI, namely empathy, stress tolerance, independence, optimism and interpersonal relationships, were found to relate to transformational leadership.

Another EI study was conducted by Songer and Walker (2004) to explore EI amongst different roles from seven general contracting sector organisations in the United States. The study used Bar-On EQ-i to measure EI and found that general contracting employees score considerable lower than average interpersonal skills. The results also indicated that field engineers, project engineers and executives all
score significantly higher on the interpersonal scale than superintendents who are thought to possess more field experiences than them. With regard to office experience, it was found that participants possessing greater work experience score higher on *Empathy* and *Social Responsibility* than those with less work experiences. Another interesting finding shown in this study was personnel in smaller organisations score higher than larger organisations for interpersonal skills. However, the authors did not provide information for this cause.

### 2.9.3 The need for exploring the role and importance of EI in the construction industry

Although the topic of EI has been extensively researched for the past two decades, it is widely believed that the study of EI is still in its infancy (Bar-On, 2006; Mayer et al., 2006; Druskat et al., 2006). More empirical research is needed to establish the extent of its relationship with managerial performance (Davie et al., 1998; Newsome et al., 2000). Despite many studies exploring the effects of EI on work performance, there have been few empirical studies on EI undertaken within the construction context. This could be because fewer people realising the important role of emotions in the workplace, or people even misunderstanding the function of emotions and thinking they will prevent rational and objective behaviour. Another reason might be because project success in the construction is often measured in monetary terms, hence people-related issues are often considered to be a lower level in the project process. Evidence is provided by Huy (1999) who observed that the role of emotions in organisational context has not traditionally been understood or valued, especially in capital-intensive situations where the display of emotions could be viewed as inappropriate for sustaining a desired organisational image. Accordingly, Huy (1999) inferred that the value of this emotional capability and its ability to unleash emotional energy has been underestimated and viewed as non-relevant.

In addition to the misunderstanding of EI in the industry, the complexity and dynamism of construction’s project-based nature also results in a requirement of high levels of EI for both project managers and construction professionals who get involved in the process of construction project. Project managers need high levels
of EI to manage people effectively and to ensure that project and organisational goals are met, while construction professionals need high levels of EI to establish good interactions between project participants. Given that the important role of EI has been shown in other fields and sectors and the unknown effect of EI in the construction industry, and that inadequate research has been conducted in the construction domain; there is an urgent need to explore the potential role and importance of EI in the construction industry.

It is also important to note that most EI studies conducted in the construction to date have relied solely on self-reported quantitative data, in the form of questionnaires. Such an approach allows for large amounts of data to be collected from large groups and have a high validity. However, they may not capture the in-depth aspects of why and how EI supports construction professionals in better performance. Thus, more EI research is called on to conduct in the construction domain by using qualitative approaches. The current work fills a significant gap in the extant EI literature by combining both quantitative and qualitative methods together to provide a rich and better understanding of how EI affects the performance of construction professionals.

In order to verify if EI is indeed relevant to the construction industry as discussed above, an inductive pilot study was conducted to examine the impact of EI on construction professionals’ daily work before commencing the main research study. This pilot study aims specifically to verify the relevance of EI to construction industry by investigating its role and significance in the workplace and justify the rationale of the main study designed in Chapter Four. Due to the small sample size, the results can only be used inductively.

2.10 A Pilot Study to Examine the Relevance of EI to Construction Professionals

This section presents the findings form the first stage of the study described in Chapter Four: an exploratory pilot study consisting of six semi-structured interviews of construction professionals at various positions and with different levels of
experience. The informants were asked to describe real workplace incidents where they had successfully regulated their emotions (positive critical accidents) or failed to regulate their emotions (negative critical accidents) during the interview. The purpose was to investigate how EI is applied to their daily work with a view to understanding the role and importance of EI in the context of the construction industry.

2.10.1 Pilot study sample

The pilot study sought to understand how EI affects construction professionals’ performance, hence it was important to select participants who had experience with the central phenomenon. An invitation letter which contained the research objectives, research introduction, EI definition, and benefits of the study to respondents, was randomly sent to 100 construction professionals from different construction companies listed on the ‘Top 100 Construction Companies’ that had published in Construction News 2008. However, there were only two people willing to get involved in the study. Given that the researcher only had very little responses at the beginning, a convenient snowball sampling, by asking responders to refer the researcher to other construction professionals that they knew about, was deemed appropriate and practical to the pilot study. Six construction professionals finally made up of the sample.

The pilot study consisted of six construction professionals (one female and five males) aged between 29 and 64 years old. The work experience of the interviewees ranged from minimum of 4.5 years to maximum of 40 years. Four interviewees had achieved chartered status in the construction industry. All were employed and had worked full-time. Organisational size ranged from 70 employees to 5,000 employees. Respondents were recruited from different positions, including senior HR manager, construction project manager, architect, building surveyor, senior project engineer and service quality manager. Table 2.4 presents a profile of respondents in the pilot study.
Table 2.4: Demographic information on participants

<table>
<thead>
<tr>
<th>No</th>
<th>Age</th>
<th>Gender</th>
<th>Position</th>
<th>Work experiences</th>
<th>Background education</th>
<th>Company Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>CP1</td>
<td>29</td>
<td>Male</td>
<td>Architect</td>
<td>4.5 (yrs)</td>
<td>BA in Architecture</td>
<td>70</td>
</tr>
<tr>
<td>CP2</td>
<td>32</td>
<td>Female</td>
<td>Senior project engineer</td>
<td>9 (yrs)</td>
<td>BEng (Civil Engineering); BBus (Business Administration); MSc (Construction innovation and management); CEng MICE (Chartered Engineer, Member of the Institute of Civil Engineering)</td>
<td>400</td>
</tr>
<tr>
<td>CP3</td>
<td>43</td>
<td>Male</td>
<td>Service quality manager</td>
<td>26 (yrs)</td>
<td>BSc in Building Surveying; MSc in Property Asset Management, Chartered surveyor, Chartered MRICS</td>
<td>5000</td>
</tr>
<tr>
<td>CP4</td>
<td>47</td>
<td>Male</td>
<td>Chartered building surveyor</td>
<td>30 (yrs)</td>
<td>EngD, MSc in Construction Law and Arbitration, BSc in Building Surveying, MRICS, Chartered Building Surveyor, MCIOB, Chartered Builder</td>
<td>2000</td>
</tr>
<tr>
<td>CP5</td>
<td>53</td>
<td>Male</td>
<td>Construction project manager</td>
<td>39 (yrs)</td>
<td>Diploma</td>
<td>2000</td>
</tr>
<tr>
<td>CP6</td>
<td>64</td>
<td>Male</td>
<td>Senior HR manager</td>
<td>40 (yrs)</td>
<td>BA in Social Science</td>
<td>970</td>
</tr>
</tbody>
</table>

2.10.2 EI facilitates effective decision making

As discussed in section 2.1, the construction industry has been considered as one of the most challenging environment to manage people successfully. This is well reflected in the current study as many informants indicated that working in the industry was very challenging and often confronted many obstacles. The frequency of encountering obstacles was implicitly indicated as at a high level. One informant responded that,

“My job has too many obstacles. Life is full of obstacles. What you do every single day, there would be obstacles.”

Construction project manager-54yrs

Another informant stated,

“There are many difficulties, hard to pick one.”

Senior HR manager-64yrs
It was believed that the generation of problems had inevitably led to a negative or passive emotional response vary on different levels, saying that “it was hard for me and I felt depressed.” and “someone walks in and says ‘I can’t built that piece of wall’, my immediate response is ‘yes, you can’. There obviously is the frustration, you can’t do it.”.

When reporting positive critical incidents, it was found that informants who could successfully manage and regulate negative or passive emotions were able to avoid its distractive influence on their problem-analysis ability, therefore enabling informants to think logically and thus contribute to effective decision making.

“A number of years ago, I was one of 3 senior HR managers in the company. The HR director had retired and they appointed one of another people who was much younger than me. That’s quite difficult. In fact, it was decided I should actually take over in the department which enable me to use my experience, you know work with the person that was appointed. My colleagues went to the other way and had a quarrel. That was hard time really.... I was thinking ‘should I leave them to find another job, or should I stay with it?’... I just thought through my position really in a logical way and I did Swot Analysis, you know the strength, weakness and opportunities, then I decided the opportunities really outweigh the weakness and situation; and then I work for 5 years or so.”

Senior HR manager-64yrs

In another case, informants indicated that emotional regulation helped them to be free from the detachment of negative emotions, and enabled them to focus better on the problem per se.

“One of my mangers came and said I have to cancel the people who are going to clean the drains, because we can’t get that equipment into the building… Now it’s the frustration, but you need to manage it to solve the problem...I was thinking ‘How important is it? What’s the gravity of the event? Can we solve the event immediately, or do we have enough time to solve it in another way?’ You go through that literally, what’s the consequence of it? What do we need to do to resolve it? And how can we resolve it in the most experienced way.”
However, failing to recognise the relationship between emotions and behaviours could result in mishandling the situation and damaging the work environment. One informant reported a negative critical incident in which although he felt right to not support the unfair claim by his subordinate, the informant failed to pay attention to the emotional state of his subordinate and responded to him in an un-empathetic way. This had led to a minor incident becoming a big event and causing seriously adverse effect to the company.

“Many years ago, I had a security guard. Where it was a very difficult site, there was an area of work where someone was doing slate roofing. Generally, we won’t allow vehicles into the job, but there as an incident where there was a shortage of manpower, so reluctantly, we allowed the slaters to bring their vehicles on to the site, they then had an argument about entry to the site with this security guard. The security guard said he has been run over by them (two slaters) and abused. The investigation into it, the witnesses to the event said he wasn’t knocked to the ground and the two drivers of the vehicle said he wasn’t knocked to the ground. Clearly he was pretty upset. He came to my office and asked me to support him in his claim that he had been run over on site and they (slaters) should be removed from site. I didn’t support him because two drivers of the vehicles said he wasn’t knocked to the ground, he might be shown off…. He then appeared on TV one day, said we failed to support him and his employer had subsequently sacked him. It’s such a discrimination, and he actually won the case at court…I think he shot the company down…I was upset because I could support him in a different way, but not to accept the decision which was the right decision to do what we did.”

The above quotes illustrate the potentially important effect that emotional regulation and emotional awareness can have on the outcome of an event in that they both help to facilitate one’s thought in making a decision. It also reveals a need for construction professionals to increase their knowledge of emotional intelligence, and better understand the causes and consequences of emotions in order to respond to
others in an appropriate manner without evoking peoples’ opposite emotions that can cause conflicts.

2.10.3 EI resolves conflicts

As detailed earlier, EI refers to a long list of attributes or competencies that are drawn from a number of aspects of personality (Goleman and Boyatzis, 2000), and effective communication is one of these competences. In this pilot study, effective communication was consistently reported to be essential in dealing with daily work. One informant particularly highlighted an integral part of his job was communication.

“I suppose an architect is kind of a mediator, like communicating with this person or other person. We kind of have an overview of everything...Sometimes you have to go to this person to discuss this; you have to go to another person to discuss another. Sometimes you might resolve it, but when you go back, then the table turns, someone else is not right, then you have to go and discuss again.”

Architect-29yrs

In addition, most informants indicated in positive incidents that the cause of many conflicts was often poor communication. Hence effective communication was revealed to help to clear confusion and eliminate misunderstanding. Many reported that to resolve the conflict, they actually undertook the initiative to approach to and communicate with people. By doing this, informants showed their concern and respect to people, got to understand others’ viewpoints and were able to find out the cause of conflicts, and therefore resolved the problems.

“People don't seem to do things according to my procedures and I get frustrated, so in order to turn it around, I try to explain the reasons for my procedures and that it also protects them from a legal point of view....What I have done was I explained to them the reasons why we are doing this, and I actually went to individuals and spoke to them.”

Senior project engineer-32yrs
Also:

“We were working at a system we have in the company of paying people for using their own cars. I arrived at the conclusion which I thought was actually not going to cost people money, but would be simply for the business term to administer. So it was introduced but with a lot more problems we really unanticipated... To resolve the problem, I listened to what they said, asked them questions, and tried to understand exactly what issue there really was. When we understood it was really interpretation of what we were trying to do, then we would be able to sort of address it”

Senior HR manager-64yrs

In contrast, ineffective communication was reported in negative critical incidents that would cause misunderstanding and impair work efficiency.

“I was chairing a meeting, I put some specifications together for the project without discussing the project with the end users. I went to put together some solutions without communicating to the relevant people. Then they thought that decisions were being made about project without them being consulted, and they were not happy to accept it.”

Building surveyor-47yrs

2.10.4 EI enhances management

It was agreed that EI took up a paramount role in the construction industry. In particular, informants emphasised the key to effective managing people was mainly dependent on how emotionally intelligent an individual is in approach and response to others. One informant responded,

“It’s very important. If you can’t understand people and how they behave in construction, you won’t be able to manage them. You have to have sixth sense, I would say in understanding how people would react. Like if you are working for me as a painter or decorator, and I say to you ‘I would like you to paint that wall, and I also want all those walls doing’, and I say it in that strict tone, you
Chapter Two: Emotional Intelligence

will probably think ‘what’s up with him? However, if I say ‘there are 1 2 3 4 walls that needed to be decorated in this room, and you are a professional decorator, so I will leave it to you to finish these within your time or so’, that will come across better than the first one. So how you speak to people and how you put things across, you can get different reaction.”

Service quality manager-26yrs

In another case, an informant reported that the way to resolve complaints from his colleagues was to approach them with emotional understanding and communicate with them in an empathetic way.

“We got a lot of complaints. There was sort of response was emotional. Act of respect, my response was really to talk to them and said ‘look, this is not really how you think it is. Let’s just look at your particular situation and let’s work out what you’re going to receive, what tax you’re going to pay and when you’re going to pay it.’ That’s what we did...Eventually, we started the new system and everybody started to work along now”

Male HR manager-64yrs

The above two quotes illustrate that it is essential for construction professionals, specially managers or leaders, to understand the connection between peoples’ emotions and their behaviours, and to be able to aware of others’ emotions, as well as display an appropriate emotion (passion or restrain) when speaking. It appears that EI helps people to communicate effectively and influence others to get what they want, thereby enhancing their performance.

It was also interesting to note that one informant mentioned about a phenomenon in the construction industry where managers normally experienced overly stressed during the process of project management, and highlighted the importance of recovering from such emotional stress in that period. This may indicate a requirement for construction participants to have high levels of EI, because an integral part of EI is stress management which enables people to withstand adverse events and stressful situations without “falling apart” by actively and positively coping with stress.
“When you go through construction projects, they all have very similar growth pattern. You’ve got the honeymoon period right at the beginning, then you’ve got the main production slot where everybody is reasonably happy and there are pressures but it is not silly. Last month of the job, about six weeks, the last few period of the jobs become intense, immediately afterwards, there is nothing. To be honest with you, if you don’t have that two month afterwards, you’re just an emotional wreck, because you stress too much. It’s quite important that you get some chance to recover.”

Construction project manager-54yrs

In further addressing the importance of EI, a senior HR manager added that his company had used EI to assess employees’ ability for certain positions, especially for management positions, and that EI had taken into account in the process of recruitment.

“We start to take it (EI) into account in our recruitment about 4 years ago, especially for those manager positions. We use a range of psychometrics, the major one we use for recruitment is OPQ (Occupational Personality Questionnaire). We also use another system for team development like MBTI (Myers-Briggs Type Indicator).”

Senior HR manager-64yrs

EI Changes over Career

When asked how informants perceived their EI had changed in the construction, all but one possessing the least work experience indicated that their experience at work had helped to develop EI over their career. One informant reported,

“When I was younger, I said probably I didn't manage my emotions very well....since I’ve got more experience in construction, I think my ability to manage peoples’ emotions has been got a lot better, because you experiences all the time and come across people and know what’s look for.”

Service quality manager-46yrs
Also:

“It has to be improved, because you become aware a bit more that you are going to be more reliant on other people and reliant on your ability to motivate them and get them on side.”

Male HR manager-64yrs

One informant particularly addressed that the increasing work experience along with his age had made him become wiser in dealing with people. It appears that one’s emotional intelligence increases with age and work experience.

“I think now fewer events make me lose my temper. I have been managing people since 1975, I have been working in management for 20 years. I think emotional reaction in any situation is relative to the personal impact on the individual. As I’ve got older, you might say I’ve become wiser whatever. You sort of become more intolerant but in the same breath, you also become more tolerant. You don’t suffer fools easily, and you actually suss out people who are trying to pull the wool over your eyes faster than what you would have done in your younger days, you look for the signs of inadequacies and shortcomings. I certainly don’t get as stressed as I used to.”

Construction project manager-54yrs

This sentiment was echoed by student interviewees who reported not receiving great EI improvement during the placement was because they considered themselves as older and mature students who possessing more life or work experience than the younger respondents (see section 5.5.1).

2.10.5 Summary

From the results presented above, it can be summarised that EI has revealed to be essential for construction professionals to successfully complete the daily work. Therefore, proposition one which predicted that “Emotional intelligence competencies are likely to have a positive impact on construction professionals’ performance.” was supported. While informants did not use the term ‘Emotional
Intelligence’ in describing how they had successfully resolved problems or conflicts in the workplace, all indicated that it was very important to understand and manage the emotional state of themselves as well as others, because it allowed informants to regulate their thought and behaviours more effectively and contribute to effective decision making. In addition, emotional regulation was found to help informants to disconnect with negative emotions and focus better on the problem itself. However, failing to recognise the emotional state of others would evoke peoples’ resistant emotions and could cause conflicts. In addition, effective communication, an integral part of EI, was cited consistently as an important factor to clear confusion and mitigation of misunderstanding amongst people. Furthermore, all informants believed that EI was the key to effectively managing people in the construction industry. In particular, informants addressed the importance of having an emotionally intelligent approach and response to others in order to get what they want and achieve a better performance.

2.11 Chapter Summary

This chapter has provided a comprehensive understanding of the background, theories, models and instruments of EI by reviewing the general EI literature. Two predominant EI models (the ability model and mixed models) were reviewed in relation to the content and measurable dimensions. Four psychometrically validated EI instruments, namely MSCEIT, EQ-i, ECI and SSRI, were also elaborated in relation to its content and method of assessment. This provided a foundation for discussing what is the most suitable EI instrument being used in this study in Chapter Four.

The chapter has reviewed previous EI studies being conducted in other organisations and industries, and the findings uncovered that EI is an important factor in management and a powerful predictor of one’s ability to succeed on the job. Various relationships between EI and work-related outcomes were reviewed, these being, the relationship between EI and project management; EI and career success; EI and work performance; EI and team effectiveness; and EI and leadership. The review of extant EI research from various sectors and fields has enabled the context
of current work to be established. This provided the foundation to discuss the relevance of EI to construction industry in relation to its unique characteristics. The review of previous EI studies conducted in the construction domain has indicated a need to explore the potential role and importance of EI in the construction industry. In response to the need, an exploratory pilot study was conducted to investigate how EI influences construction professionals’ daily work. As the result, the findings showed that emotional competencies were found to have a positive impact on construction professionals’ performance, in support of proposition one. Hence, it was worth to examine the extent to which current built environment education develops students’ EI in order to enable them to successfully work in the construction industry. The next chapter reviews the role of EI in the context of the general education, EI pedagogic interventions being adopted in the educational setting, and discusses the relevance of EI to built environment education.
CHAPTER THREE: EMOTIONAL INTELLIGENCE AND EDUCATION

3.1 Introduction

This chapter starts with the role of EI in education by discussing the effect of EI on academic achievement. Next, it discusses the possibility of how EI can be enhanced through reviewing the previous research on EI development and training. After that, a critical discussion of what teaching and learning interventions help to improve EI is provided in relation to the EI literature. Finally, the relevance of EI to built environment education is discussed. Given that the important role of EI displays in education and inadequate EI research in the built environment domain, an urgent need is identified to develop effective strategies to enhance the EI of built environment students.

3.2 Emotional Intelligence and its Role in Education

Education has traditionally focused on developing students’ cognitive and analytical abilities, but in recent years there has been a growing focus on the vital role of emotions when enhancing the teaching and learning process (Glaser-Zikuda et al., 2005; Hargreaves, 1998; 2000; Love and Guthire, 1999; Love and Love, 1995). Hargreaves (1998, 2000) indicated that teaching and learning involve significant emotional understanding. Inaccuracies in the emotional understanding of teachers were shown to lead them to misread their students’ learning, thus seriously impairing their ability to help students to learn. In contrast, teachers with high levels of emotional understanding were found to help them to create a safe, comfortable classroom atmosphere that makes their students learn more effectively (Holt and Jones, 2005). In addition, students’ emotions were found to have critical importance for their willingness to learn, and their volitional control of learning processes (Wosnitza and Volet, 2005). Further, Freshwater and Stickley (2004) explored the role of EI in nurse education and suggested that when teachers pay little or no attention to students’ emotional development, they fail to communicate with students the
significance of human relationships. Moreover, when students’ emotional development is neglected, the individual is denied the opportunity of fully developing intellectually. As such, successful academic learning is argued to be maintained through effective emotional development (Greenhalgh, 1994), and emotion and cognition should be considered as equally important to the learning standard (Hargreaves, 1998; 2000); this realisation has also led to assertions as to the effect of emotions on students’ learning and achievement (Pekrun et al., 2002).

Glaser-Zikuda et al. (2005) stated that emotions, such as interest and anxiety, are part of the learning process as well as cognition and motivation. For example, positive emotions were found to facilitate self-regulated learning (Boekaerts et al., 2000) and allowed self-evaluation and self-improvement (Trope et al., 2001) whereas negative emotions hindered student’s academic motivation and weaken their confidence to learn, hence reducing academic achievement (Assor et al., 2005). Jaeger (2003) offered similar views by adding that emotion cannot be separated from learning as students who are not emotionally engaged in what is taught will not pay attention and so not learn effectively. These views represent a growing body of research that has started to reject the traditional perspective of emotion as an irrational encumbrance on intellectual learning, and embrace the idea that even the minutes’ emotion can have a positive and rationalising impact on the facilitation of learning (Isen, 1993). Given that emotions are not simply a support for teaching and learning, but a vital and integral part of teaching and learning themselves (Goleman, 1995; Hargreaves, 2000), the existing educational system is called on incorporating the emotional dimensions of teaching and learning into learning standards or curriculum target for students, and into professional standards or competencies for teachers and administrators (Hargreaves, 1998). As a direct response to the calling from education domain, many schools and colleges start to introduce EI intervention programmes into their educational strategies and programmes, however, EI programmes have rarely been applied in universities (see section 3.4.1).

3.2.1 EI and academic achievement

Research studies in the last two decades have produced a considerable body of evidence and demonstrated that there is a positive relationship between EI and
students’ academic achievement. One such study examined EI of first-year students and their examination performance, revealing a positive association between EI and end-of-year marks (Schutte et al., 1998). The results also indicated that students with higher levels of interpersonal EI skills and intrapersonal EI skills are able to better handle the transition from school to university. Another study, examining the transition from high school to university found that academically successful students (1st-year GPA of eighty percent or better) have significantly higher scores than less-successful students (1st-year GPA of fifty-nine percent or lower) on several dimensions of EI: intrapersonal abilities; adaptability; and stress management (Parker et al., 2004a). The students with higher levels of these abilities appeared to cope better with the social and emotional demands of making the transition from school to university compared to students scoring low on these abilities. Later, the study was extended to the secondary school environment examining the relationship between EI and academic achievement in first year psychology students at a Canadian university (Parker et al., 2005). The results were found to be consistent with previous findings in that EI is a significant predictor of academic success.

In addition, the positive relationship between EI and academic achievement was showed in a study conducted by Abdullah et al., (2004). Students with higher levels of EI experienced lower levels of negative academic affect associated with academic tasks, which means that students who are able to regulate their negative affects related to academic tasks are more likely to do well during examinations and achieve more academically. On the contrary, inability to regulate anxiety interferes with test performance distracted students’ attention from the tasks in which they were involved. Further, the research by Drago (2004) demonstrated again that academic achievement is related to students’ ability to recognise, use, and manage their emotions, which suggests the need to incorporate EI training into college degree programs to help students increase their EI. Another study (Wilkins, 2004) suggested that EI skills are associated with retention rates amongst learners, which implies that EI should be considered when designing methods to enhance learner success. Furthermore, La Civita (2003) suggested that several factors of EI predict students’ GPA, or the ability to achieve academically. Boyce’s (2001) research also suggested that there is no correlation between cognitive ability and academic success, but that a correlation between EI and academic success exists.
positive associations between EI and academic performance were also found in a study of postgraduate students by Jaeger (2003). These findings once again confirmed that EI is both theoretically and practically important to education, and approved the importance of developing students’ EI in order to succeed in academic tasks.

3.3 Can Emotional Intelligence be Taught/Enhanced?

The question “Can emotional intelligence be taught or enhanced?” can be answered by reviewing the research and studies on EI development and training. The literature on emotional intelligence has advocated that EI can be developed and improved through a systematic and continuous learning period, yet the extent to which EI can be developed still remains unclear. Gardner (1983) observed that social intelligence (in the sense of multiple intelligences, which encompass inter and intra-personal intelligences), is not static, but can, indeed, be developed. Later, Goleman (1995) argued that unlike intellectual intelligence which remains fairly stable throughout adult life, emotional intelligence is highly malleable, so that individuals who have generally low emotional competencies may be able to improve their overall abilities to identify, express, and regulate emotions. Further, Bar-On (1997), alike other researchers (Jaeger, 2003, Lopes et al., 2006; Mayer and Caruso, 1999), proposed that EI actually continues to develop with age and maturity and therefore can be learnt.

Many empirical studies have been conducted to verify this notion. One such study investigated whether EI can be developed in managers by allocating participants into either a four-week EI training group or a control group without EI training, and comparing their EI score before and after the four-week intervention. The results showed that the participants in the training programme receive significant EI increases while control group scores for EI remain constant (Slaski and Cartwright, 2003). Another study conducted by Sala (2000) in developing a Mastering EI Programme (MEI) to increase people’s EI in the workplace over one year’s duration showed an improvement of the EI level of individuals who had participated in the training programmes. Other studies that track people’s development over the years
also suggested that emotional skills can be developed (Kagan, 1998; Vaillant, 2000). Furthermore, some school-based programmes of social and emotional learning for children and adolescents have been found to yield beneficial effects (Hawkins et al., 2004; Kusche and Greenberg, 2001). In accordance with these findings, it could be inferred that it is possible to enhance individuals’ emotional intelligence through an appropriate learning period. However, it must be noticed that to attain dramatic EI improvement requires a long period of time of training. Because the foundation of social and emotional competencies are often laid down early in life and reinforced over several years, they tend to become synonymous with our self-image and thus need focused attention over time to bring about change argued by Cherniss et al., (1998). Educators and instructors should, therefore, be aware of the crucial role to integrate the learning experience of reflective thinking in any programme to develop students’ EI.

3.4 What Pedagogic Interventions are Shown to Improve EI?

The previous sections have discussed the role of EI in education from different perspectives and demonstrated that EI is highly malleable and can be learnt and developed. But exactly how should such a training programme to be designed and tailored to different groups (especially built environment students) to be most effective? What kinds of learning intervention are most effective to develop people’s EI? And what issues need to be considered in implementing the EI strategy? The literature has not yet provided good answers to these questions. Nonetheless, in this section, by reviewing the established school-based EI intervention programmes and other EI training practices, it is possible to gain an insight into current trend of the EI training within education. Besides, a review of the elements and pedagogical activities that have been used and examined in other educational domains can offer some valuable suggestions which can be borrowed and applied in the context of built environment education. Most importantly, by examining current teaching and learning activities in the built environment education and discussing these in relation to the EI pedagogic activities in other subjects and
faculties, several teaching and learning activities are identified which appear to influence EI development in a positive way.

3.4.1 School-based EI intervention programmes

There is an increasing recognition of the importance of enhancing students’ emotional development and social competencies through education. Effective educational strategies to address students’ social and emotional needs can help to promote academic performance and citizenship (Pool, 1997), and decrease the likelihood that students will engage in self-destructive and risky behaviours such as violence (Mestre, et al., 2006; Petrides et al., 2004) and substance use (Brackett and Mayer, 2003; Brackett et al., 2004). This realisation has resulted in many schools and colleges beginning to design and implement school-based programmes to promote students’ social and emotional learning (SEL) within the standard educational programme.

The SEL programme refers to the knowledge, skills, and competencies that children/students acquire through social and emotional education, instruction, activities, or promotion efforts (Matthews et al., 2002). Unlike traditional didactic approaches such as lectures, the SEL views students as an active learner and employs interactive teaching strategies which require students to be actively engaged with both teachers and peers as part of the learning process. These integrative teaching strategies utilise techniques, such as group works, discussions, cooperative learning, and role plays (Dusenbury et al., 1997), as well as dialoguing, guide practice, where both teachers and peers reinforcement to attain students’ emotional development (Matthews et al., 2002). The established school-based EI programmes were categorised by Topping et al., (2000) into seven typology interventions, namely behaviour analysis and modification interventions; counselling and therapeutic interventions; social skills training; peer-mediated interventions; cognitive and self-managed interventions; multiple interventions; and miscellaneous. In a survey examining the effectiveness of such interventions improve students’ emotional intelligence showed that behaviour analysis and modification intervention; social skills training; and peer tutoring and peer reinforcement are found to more effective than other EI interventions in developing EI (Topping et al., 2000). Despite the fact
that there is research promoting the emotional and social competencies of students, most of the educational programmes established so far have been largely focused on enhancing the emotional competencies of children, college students and practitioners, rarely few teaching and learning strategies have concentrated on university students. Therefore, there is a need to bridge the gap in the literature by investigating how built environment education could be enhanced to develop students’ EI more effectively in the future. The next section reviews previous EI research which has been conducted in the university education domain.

3.4.2 Previous EI interventions being used in university

Only a few studies have integrated EI into university education with an aim to examine the effectiveness of such EI interventions on students’ EI development. One such study by Jaeger (2003) examining the role of EI in a graduate-level academic course in the United States found that EI is positively related to academic performance. Most importantly, the results showed that students’ emotional capability can be taught and developed in the traditional graduate classroom. In this study, students randomly registered for five sections of the general management course, one of which included the teaching of EI and was named as EI-embedded management curriculum. In the EI-embedded courses, the instructor introduced the concept of EI into course materials. In addition to the common content of management concepts, students were required to discuss the component of EI as crucial factors for successful managers and successful group experience. Furthermore, students were also required to read relevant EI materials and books, and incorporate EI into their group project experience and so on. The results showed that students attending the EI-embedded management curriculum over a semester are found to score significantly higher on EI than the comparison group who enrolled the non-EI curriculum.

Another study conducted by Reilly (2005) incorporated the EI concept into the negotiation courses for law students. In this study, students took different roles in a simulated negotiation exercise which emphasised the importance of understanding other players’ emotions, and learning how to use this information to effectively connect and communicate with others. The results suggested that by combining
traditional lectures with role-plays and simulated exercises, students’ ability to understand emotion can be trained and their EI is increased. Similarly, another study by Cain (2003) introducing the concept of EI into law school internship programme found that students benefitted from the learning of EI; students’ EI competencies, such as empathy, emotional awareness, interpersonal skills were reported as being developed. In the internship programme, students were given lectures on the theory of EI. In addition, small group discussions and videotapes were integrated into the class and students were asked to identify the emotions of the clients and attorney shown in the videotape and identify the reasons. Moreover, the simulation of a law firm meeting was adopted to help students to develop a good sense of emotional understanding and learn to express themselves in a constructive manner. The author finally suggested that the most effective EI learning intervention is adopting a ‘mix’ of techniques which should combine role-playing, videos, small group discussions and presentation together to develop students’ EI and enable them to become more capable in their future job.

A 50-year longitudinal study conducted by Boyatzis et al., (2002) analysing and comparing different cohorts of students who took a modified MBA programme (which was specially designed to develop their cognitive and emotional intelligence competencies) with control group students who took a typical MBA programme. The results revealed that students’ cognitive and emotional intelligence competencies can be developed in a modified MBA education, but not with a typical MBA curriculum (Boyatzis et al., 2002). Although the authors did not explicit explain to what dramatic improvements in students’ cognitive and emotional intelligence competencies from the modified MBA programme could be attributed; the components of the MBA program that had changed from earlier programme gave an insight into the issues that need to be considered when designing a sound programme to develop students’ EI in built environment education. Such changes in the modified MBA programme summarised by the authors included (1) an explicit philosophy of education and pedagogy (Boyatzis et al., 1995); (2) a course on leadership assessment and development using self-directed learning theory as the basis for its design (Boyatzis, 1994, 1995; Goleman et al., 2002); (3) a focus on specific competencies in selected courses while addressing course material, such as the marketing course that assessed students on presentation skills or the operations
management course using group projects assessing their group process competencies (Boyatzis et al., 2008); (4) a dramatic increase in the percentage of courses requiring field projects in companies, group work, and student collaboration; and (5) opportunities to participate in voluntary activities. In fact, the authors implied that the leadership course and the wide range of learning activities integrated into the modified MBA program has caused the dramatic improvement in students’ cognitive and emotional competencies (Boyatzis et al., 2002).

### 3.4.3 EI Curriculum design

The design of the curriculum is an essential aspect of supporting students learning. Although the literature surrounding the strategy of enhancing the EI competencies of built environment students is fairly limited, the available evidence has suggested that emotional intelligence is given secondary attention in engineering education, as students’ EI fails to increase at significant levels during four years of civil engineering study as compared to liberal arts students (Chinowsky and Brown, 2004). Mayer and Cobb (2000) suggested that emotional intelligence may well be fostered by courses in the liberal arts and creative arts because of these subjects using and fostering emotional perception and understanding. More explicitly, Freshwater and Stickley (2004), in a study exploring the role of EI into nurse education, suggested some or few of the elements listed below should be included when designing an emotionally intelligent curriculum. These being:

- reflective learning experiences;
- supportive supervision and mentorship;
- modelling;
- opportunities for working creatively with the arts and humanities;
- focus on developing self and dialogic relationships;
- developing empathy;
- commitment to emotional competency.
Apart from this, Elias et al., (1997) suggested that optimally designed EI programs should not be an add on to the regular curriculum, but they should be fully integrated into the overall school academic programme. In other words, when enforcing emotional education in the schools, instructors and policy makers should realise that it is not appropriate to create a special class for teaching emotional skills, but rather to complement regular academic subjects by blending lessons on emotions with other topics (e.g., Arts, Health, Science) (Salovey et al., 1999). Thus students can learn about emotional competencies through daily teaching and learning activities embedded in the classes.

When it comes to the issues of implementing strategy, Zeidner et al., (2002) suggested that to successfully integrate EI into educational curricula and to prepare students with adequate EI skills in their future professions, teachers and other staff also need to be fully trained and involved in the EI programmes in order to fulfil their professional role in successful implementing EI interventions. Holt and Jones (2005) added that teachers are a powerful force in modelling motivation, conflict resolution, and other EI skills. As such, the professional development programmes need to be firstly conducted to teachers before implementing the EI programme to students, because teachers cannot teach what they themselves never learned until teachers themselves are “emotionally intelligent”. This notion resonates with Haskett (2003) who discovered a significant link between EI and teachers’ effectiveness. In addition, the impact of EI on mentoring relationships has been examined in the workplace and the educational environment where mentoring relationships were shown to impact students’ retention and staff turnover, as well as successful completion of coursework and other projects (Bennouna, 2004).

3.5 Teaching and Learning

Since very little research has directly explored the effect of different pedagogic interventions on EI enhancement, this section mainly reviews the pedagogic interventions and good teaching and learning practices that have been used in other subjects and faculties which appear to have a positive effect on students’ EI. This information forms the basis of recommendations to enhance students’ EI in the
context of built environment education in Chapter Six. In particular, student-centred learning, role-play simulations, industrial placement and peer assessment are found to be beneficial in this respect. Each of these is discussed below with references to the supporting literature.

### 3.5.1 Student-centred learning

Student-centred learning is defined as a teaching approach that shifts the responsibilities of organising, analysing, and synthesising content from teacher to student (Brush and Saye, 2000). This approach places students at the centre of the class, engaging in learning rather than passively as the audience of a lecturer. In student-centred learning, students work in groups to solve the problems. There are no lectures, instead students engage in self-directed learning and the tutor acts as a facilitator, mentor or guide. Empirical studies indicated that direct, teacher-centred instruction hinder students’ emotional and motivational aspects of learning (Brophy and Good, 1986; Weinert et al., 1989). In contrast, student-centred or open instruction (e.g., project-oriented work) was found to have a positive impact on students’ emotion and achievement (Giaconia and Hedges, 1982) by allowing students to regulate their cognitive and emotional process in learning.

### 3.5.2 Experiential learning

The literature suggests that experiential learning can facilitate emotional learning and development for several reasons. 1) people can understand how their behaviours in relation to an expression of their emotions; 2) people can experience how their emotions cannot be separated from the body or the mind; 3) people are able to recognise how moods are created and how they can be managed; 4) people can build their esteem and regard for others (Fry et al., 2005). In addition, Menkel-Meadow (1994) found that the personal learning process (include cognitive and emotional learning) is accelerated through experiential learning as people learn more effectively by being actively involved in the learning process. There were two basic ways of making experiential learning as an integral part of course design (Beaty, 2005). The first was to provide opportunities for experience in the form of structured and pre-planned practical work which will develop skills and technique within the
controlled environment of the university, for example, role-play activities and real-world simulation. The second way was to give students the opportunity to learn from experience within a naturalistic environment in a work placement, such as industrial placements and field trips (Beaty, 2005). Amongst these experiential learning techniques, both role-play simulation and industrial placement were found to be effective in developing students’ emotional intelligence competencies. Each of these is addressed below.

3.5.2.1 Role-play simulation

Role-play is a form of simulation which has been found to be particularly useful in helping students to understand not only their emotions but also those of others, and to effectively communicate and interact with others, and subsequently on the development of EI (Cain (2003; Reilly, 2005). Van Ments (1989) defines role-play as:

“...one particular type of simulation that focuses attention on the interaction of people with one another. It emphasises the functions performed by different people under various circumstances. The idea of role-play, in its simplest form, is that of asking someone to imagine that they are either themselves or another person in a particular situation. They are then asked to behave exactly as they feel that person would. As a result of doing this, they or the rest of the class, or both, will learn something about the person and/or situation. In essence, each player acts as part of the social environment of the others and provides a framework in which they can test out their repertoire of behaviours or study the interacting behaviour of the group.”

Previous research using role-play as a pedagogic intervention has been found to result in good teaching and learning outcomes. In the case of engineering, Morgan et al. (2004) found that role-play ensures a deeper understanding of the variety of conflicting perspectives in professional practice. It also helped to develop important micro-skills in problem solving, such as recognising a plurality of perspectives, negotiating and decision making. These micro-skills can be linked to EI because they involve the control of emotional expression and being able to
understand other’s emotions for effective negotiations. Besides, through simulated activities, people learn to understand and regulate their emotions to make the right decision, and appreciate the consequence that emotions may have on the decision making. For example, they may forgo making a decision when they are angry. The impact of role-play simulation on the development of problem-solving skills and subsequently the development of EI is indisputable. In the example from law education, role-play and simulated exercises were adopted in the negotiation course which increased students’ emotional understanding and EI (Reilly, 2005). The author explained that role-play and simulated exercises allow students the opportunity not only to analyse, but also to experience and feel (and even fuse into their own personalities and constitutions) the principles, theories, and concepts of negotiations. This led to an enhancement of the ability to understand both their emotions and those of others, and to effectively communicate and interact with others, and eventually increase students’ EI. Furthermore, role play and simulation was reported to be an effective way for students to learn about the legalities of the construction process (Agapiou, 2006) and communication skills (Nestel and Tierney, 2007).

3.5.2.2 Industrial placement

There is substantial evidence to show that work experience has a positive effect on the improvement of emotional intelligence (Bar-on, 2000; Goleman, 1998; 2002; Mo and Dainty, 2007). Accordingly, one of the best and practical ways for students to gain work experience is to take part in the placement, such as a sandwich course programme. Industrial placement gives students opportunities to assess their capability and take action to self-improve and develop the remedial area. Besides, it provides students future career orientation and enables students to experience and learn to manage themselves and others in different situations. As students engage in the actual activities in the work placement, they are required to work and relate to a wide range of people from different positions and backgrounds. Students also need to adapt to a new environment and new status in the workplace, such challenges will lead to the professionalism of interpersonal relationship, communication and cooperation, and subsequently emotional intelligence. Further, the work placement offers students the first opportunity to apply theoretical, classroom-based knowledge
in a practical work situation whilst learning and practicing skills in the real world. Therefore, students gain a more realistic view of how the world of work operates. Being in the placement, students are also introduced to work ethics and gain insight into the interpersonal skills needed to survive in the working world (Schaafsma, 1996), this might raise their attention to develop skills in relation to emotional intelligence.

### 3.6 Assessment Methods

Effective assessment methods are seen to be very important in maximising students’ learning, motivating students, evaluating the subject, and providing informative feedback to lecturers and to students on their learning progression (Zou, 2008). There are a range of assessment methods commonly used in university education to evaluate students’ learning and to determine their learning outcomes and grades. According to Overton (2005), the main assessment tools encountered in built environment disciplines are: 1) unseen written examinations; 2) written assignments or essays; 3) laboratory/practical/fieldtrip reports; 4) project reports and software developed; 5) poster presentations; 6) oral presentations, and 7) MCQs (multiple choice questions). Amongst these assessment methods, peer assessment is considered to have a positive effect on the EI development which addressed below.

#### 3.6.1 Peer assessment

Peer assessment is defined by Topping (1998, p.250) as “an arrangement in which individuals consider the amount, level, value, worth, quality or success of the products or outcomes of learning of peers of similar status” (p. 250). Peer assessment activities can vary in a number of ways and may operate in different curriculum areas or subjects. A wide variety of products or outputs can be peer assessed, including writing, portfolios, oral presentations, test performance, and other skilled behaviours (Topping, 2009). Previous research has proven that peer assessment has a positive effect not only on cognitive learning but also emotional development. For example, peer assessment helped students to identify their own strengths and weaknesses, target areas for remedial action, develop professional
transferable skills, and enhance their reflective thinking and problem-solving abilities during the learning experience (Sluijsmans et al., 1999; 2002; Topping, 1998). In addition, peer assessment allowed students to observe and critically assess how other people perform and interact when faced with problems that can only be resolved by teamwork. These factors were likely to raise student’s emotional awareness, a key dimension of EI, as is the understanding of personal weakness they may have in certain areas of learning (Dochy et al., 2003). Further, peer assessment enables students to communicate and collaborate with others and thus they in turn are able to acquire communication and collaboration skills. Moreover, periodic peer assessments were found to promote team effectiveness and enabled students to improve their own skills, because of students who were unaware of their unproductive or disruptive behaviours to the team were given opportunities to change in an early time (Michaelsen et al., 2004). This would lead to an improvement of interpersonal skills in terms of how to effectively interact and approach other team members, and consequently enhancing students’ EI. Additionally, judgment by peers also provided a more significant motivator to produce high-quality work than did the assessment of a single instructor (Searby and Ewers, 1997). As a result, when peers were accountable to each other, the time spent comparing work and discussing ideas and concepts in teams was more productive. Furthermore, when students became assessors, they were required to show a more thoughtful understanding of the processes involved in the activity (Searby and Ewers, 1997) which would contribute to effective learning. Moreover, peer assessment has been shown to improve students’ interpersonal relationships in the classroom (Sluijsmans et al., 2002), and students’ interest, interactivity, self-confidence and empathy with others (Topping, 2009), these factors are collectively categorised into the dimension of emotional intelligence.

3.7 How is EI Relevant to Built Environment Education?

This section discusses the relevance of EI to built environment education. It starts with a striking phenomenon in the built environment education where there is a clear mismatch between the skills development of graduates in the university and skills required by employers of recent graduates. It goes on with the calling from current
education system to pay more attention to enhance students’ EI. It summarises by identifying a need to establish strategies that bridge the gap between students’ emotional competencies development and industry’s requirements.

3.7.1 The mismatch between what employers appear to want and what built environment education provides

Built environment education has traditionally concentrated on preparing students with strong technical, analytical and management skills for professional careers in the construction industry. However, those hiring built environment graduates in the late 1980s began to voice their dissatisfaction with the skill levels of their new employees. They complained about a lack of non-technical skills such as communication, teamwork, creative problems solving and flexibility (Bakos 1997; Davies 1998; Jagger and Connor 1998). The evidence can be seen in several reports and studies indicating that industry professionals believed that engineering students continue to graduate with strong technical skills but are still missing critical leadership and management skills (NSF, 1995). A survey of employers’ views about newly qualified postgraduate engineers revealed a general perception that there is a shortage of graduates with appropriate ‘soft’ skills; these included interpersonal skills, communication skills and project management and planning (Jagger and Connor, 1998). Another study exploring the skills required by employers of science and engineering graduates found that employers highly valued ‘soft’ personal skills, such as self-awareness, confidence and the ability to interact and communicate; and they commonly noticed failure in communication and presentation (Ketteridge and Fry, 1999). Collectively, many of these ‘soft’ skills can be categorised as different ‘emotional competencies’, known as ‘Emotional Intelligence’, which have proven to have a positive impact on the overall career success and superior performance of construction professionals (Butler and Chinowsky, 2006; Dainty et al., 2004; Hecker, 1997; Shirazi and Hampson, 1998; Songer and Walker, 2004). Furthermore, Cherniss (2001) noticed that many corporate executives view current graduate education as too theoretical and lacking considerations for the social and emotional development of students. Haworth (1996) added that employers have raised critical concerns about the often poorly developed intrapersonal and interpersonal skills of many advanced-degree recipients. In summary, there is a clear mismatch between
what employers appear to want and what built environment education provides. Universities consider that they have developed students with many key skills during their degree studies, whereas employers claim such a development is inadequate.

3.7.2 The built environment education calls on developing EI related skills for students

In response to the EI skill shortage of built environment students, there have been recent calls to pay more attention to EI-related competencies in the built environment education. Early in 1980, the Finniston Report called for engineering education to be broadened away from purely engineering science to include more awareness of the place of the engineer in society and skills development. Over ten years later, an ACOST (Advisory Community on Science and Technology, 1991) Report recommended that in engineering education: ‘The overwhelming factual content should be reduced; more emphasis should be placed on the development of communication, leadership, teamwork and other personal skills’. After that, American civil engineering educators and practitioners appealed to the future engineering education that they should focus on the improvement of non-technical abilities and skills of civil engineering graduates who, in future, will be involved in an increasing complex and interactive society (Bakos, 1997, p.15). In addition to this, the Dearing Report (1997) also confirmed on the importance to grasp the ‘soft’ skills for postgraduates by proposing that “…in addition to an understanding of research methods and appropriate technical skills, they (postgraduates) should also address the development of professional skills, such as communication, self management and planning” (NCIHE (1997) Recommendation 31). Recently, the ABET (American Accreditation Board of Engineering and Technology Criteria, 2005) set forth the attributes needed for the engineering graduates of 2020 as being: strong analytical skills, creativity, ingenuity, professionalism and leadership. Although these surveys do not use the term ‘EI competencies’; they provide prima facie evidence of the importance of incorporating EI into the current built environment education under the guise of ‘soft’ skills. Consequently, there is an urgent need to explore and develop students’ EI in the built environment education.
3.7.3 Studies of EI in built environment education

Despite there is a number of EI research studies being conducted in other subjects in the educational domain, there have been only few empirical studies of EI implemented in built environment education. Chinowsky and Brown (2004) probably are the first researchers to evaluate EI as measured by emotional quotient (EQ) of engineering education in United States, and the results indicated that the EI development of civil engineering students lags well behind their comparison sample (liberal arts students). They suggested that the lack of EI growth will directly affect students’ educational development and professional preparedness. In addition, students without adequately developed EI will lack problem-solving capabilities as well as other professional attributes such as leadership, communication skills, creativity and an understanding of the external variables impacting upon their business. Another study by Sayeed and Jain (2000) compared students with and without an engineering background with regard to their interpersonal skills, a dimension of EI, revealed that students without a background in engineering turn out to be more open, more understanding of others with more focus on feelings of other people, compared to students with an engineering background. In other words, students with engineering backgrounds tended to have lower levels of emotional competencies compared to students without engineering background. These surveys imply that built environment education fails to develop EI. In response to the EI skills shortage seen in built environment graduates, there is currently an urgent need for built environment curricula to place more emphasis on the development of EI competencies. However, the kinds of built environment courses which are apt for developing such competencies remain unclear. This study investigates the EI levels of built environment students and explores the impact of different programmes on students’ EI. It explores the potential issues that contribute to EI enhancement in the industrial placement, and suggests a way to enhance students’ EI through built environment education.
3.7.4 Summary: the need for effective strategies to enhance students’ EI through built environment education

Currently, there is substantial EI research being conducted in the workplace, however, little attention has been paid to emotions within the education literature (Hargreaves, 2000; Petrides et al., 2004; Pekrun and Frese, 1992). There have been only few empirical EI studies undertaken in the context of the built environment education, and these have mainly focused on the measurement of EI (Schutte et al., 1998), academic achievement (Drago, 2004; Jaeger, 2003; Parker et al., 2005) and have conducted mainly in the United States by using a quantitative approach; whereas no EI research has been conducted in the UK educational environment. Furthermore, concerns have been expressed as to the appropriateness of the skills and abilities of construction graduates since late 1980’s. In particular, employers have raised concerns about the extent to which emotional skills, such as communication, leadership, teamwork and management, are exhibited by graduates. A need consequently is identified to understand the EI levels of built environment students in UK, and how well built environment education develops students’ EI. Without such knowledge, it is impossible to know whether current built environment education has prepared students to enter their future professions, or if graduates are fully equipped with the emotional skills required by the construction industry.

Previous studies have demonstrated a strong link between EI and academic success (Jaeger, 2003; Parker et al., 2004; 2005), unfortunately, the literature suggested that engineering students’ EI lags behind that of liberal arts students (Chinowsky and Brown, 2004) and students without an engineering background (Sayeed and Jain, 2000). Besides, several reports and studies have indicated that both employers and the professionals in the construction industry believed that engineering students continue to graduate with strong technical skills but are lacking of skills and attributes which collectively contribute to EI (Bakos 1997; Davies 1998; Jagger and Connor 1998). Furthermore, students without adequately developed EI would have their educational development and professional preparedness hindered (Chinowsky and Brown, 2004). Despite widespread calls on educators and policy makers to pay more attention to develop students’ EI competencies, built environment education literature so far has not yet offered any good example of teaching and learning
practice to enhance students’ emotional intelligence. Very little is known of how curricula should be designed and taught in a way that students’ EI can be enhanced, and this is particularly true in the built environment education. Given the inadequate EI research on the built environment education and the EI shortage displayed by engineering students, a need is identified to examine the kinds of teaching and learning interventions which are apt for enhancing EI and explore how built environment education can be enhanced to develop EI. A better understanding of students’ EI levels and the ability of such programmes to influence students’ EI development may help to improve the programmes thus producing graduates that better able to meet the future requirements of the construction industry.

3.8 Chapter Summary

This chapter has reviewed the role of EI in education and indicated that emotion is a vital and integral part of teaching and learning process (Hargreaves, 2000) whereby the successful academic learning is argued to be maintained through effectively emotional development (Greenhalgh, 1994). Hence emotional intelligence (EI) and intellectual intelligence (IQ) should be considered as equally important in the learning process. This was followed by a review of the relationship between EI and academic achievement (section 3.2.1). By reviewing the previous research on EI trainings and development, and the possibility of EI to be learnt and enhanced were discussed and findings indicated that EI can indeed be developed and improved with an appropriate training. In addition, previous school-based EI intervention programmes and EI training curricula in other subjects and domains have reviewed. This provided an insight into the pedagogic interventions which intended to influence EI in a positive way. Although the literature has not explicitly said about what pedagogic interventions are more effective in improving the EI of students. By reviewing the EI literature, several teaching and learning activities were identified which had a propensity to enhance EI. These included student-centred learning, role-play simulation, industrial placement and peer assessment. This chapter has discussed the relevance of EI to built environment education and reviewed EI studies in the educational domain. The findings from previous EI research in the built
environment education indicated an urgent need to explore the EI levels of built environment students and to develop strategies to enhance students’ EI.

Overall, the literature (Chapter Two and Chapter Three) showed that EI is an important predictor in identifying one’s ability to work and potential to succeed; and indicated that the EI in the construction industry and built environment education is under-researched. The literature also identified the need to explore the potential role and importance of EI to the construction industry; the need to understand how well current built environment education develops students’ EI; and the need to enhance students’ EI through built environment education. Hence, these three needs combine together to form the aim of the current research which is to measure and enhance the EI levels of built environment students. In fulfilling this aim, six objectives are established and each objective is addressed and explained in relation with the literature in Chapter Four. The next chapter presents the research design and methodology for the research; restates the research aim, objectives and related propositions in connection with the literature; discusses the philosophical considerations of the research; states the philosophical stance along with research methodology and design; and discusses the methods of data collection and analysis.
CHAPTER FOUR: RESEARCH DESIGN AND METHODOLOGY

4.1 Introduction

Chapter Two and Chapter Three provided the context for the current study and suggested that EI in the construction domain is under-researched and the value of EI has been underestimated; hence there is a need to explore the role of EI in the construction industry, and to measure and enhance students’ EI within built environment education. This chapter presents the research design and methodology adopted to meet the aim and objectives set out in Chapter One. The research aim and objectives are initially restated and followed by a discussion of the philosophical considerations in relation to the research, as such a philosophical stance is provided. The justification for designing interview questions and the rationale for choosing the SSRI questionnaire as an EI measurement are discussed. Methods of data collection and procedures are described in relation to the propositions derived from the aim and objectives. Additionally, specialised computer software-NVivo and SPSS are used to assist both quantitative and qualitative data analysis for the purpose of transparency and credibility of the research.

4.2 The Justification for Current Study

The findings from the preceding literature reviews in Chapter Two and Chapter Three indicated that EI has been shown to have a positive effect on a variety of work-related outcomes, such as work performance, leadership, team effectiveness and project management. Given that the construction industry is unique in its complex and dynamic work environment, this indeed demands high levels of EI of construction professionals, especially project managers, if they are to be successful or want to manage people more effectively. However, few EI studies have been undertaken in the context of the construction domain, and the question of how EI affects construction professionals’ performance in their daily work still remains unclear. In response to the limited EI research in the construction domain, there is
therefore a need to explore the potential role and importance of EI in the construction industry. In addition to the requirement of industry, the existing built environment education has also been called on to pay more attention to developing the skills and attributes that collectively contribute to EI for students. Both employers and industry professionals have continuously expressed their dissatisfaction with the skill levels of recent graduates. They have complained about a lack of emotional skills such as communication, teamwork, creative problem-solving and flexibility (Bakos 1997; Davies 1998; Jagger and Connor 1998). As a direct response to the underlying impact of EI on construction industry and the deficiency of EI exhibited by built environment students, a research aim has been set up to measure and enhance the EI levels of built environment students. To fulfil the aim, it was first necessary to understand how EI is relevant to the construction industry; why EI is important to construction professionals; how EI affects construction professionals’ performance; and what is the EI level of built environment students. Secondly, the EI literature suggested that EI can be enhanced and improved through an appropriate learning intervention (see section 3.3). Therefore, the question of how to develop students’ EI through built environment education can be achieved by examining and comparing students’ learning experiences in built environment education and identifying the types of learning interventions which appear to develop EI in a positive way. Given that learning experiences in built environment education involve not only pedagogical interventions, such as different modes of teaching, learning and assessment used, but also learning from industrial sandwich placement, it has been necessary to take both sides into account in the current research and so two requirements are identified. One is to examine the extent to which current built environment education develops students’ EI and the relationship between EI and the types of programmes taken. The findings from this will form the basis of recommendations for how current built environment education can be enhanced in a way to develop students’ EI. The other requirement is to investigate if and how an industrial placement develops students’ EI. A better understanding of how students’ EI is developed via pedagogic interventions and placement-learning interventions would enable the built environment education to be enhanced to produce graduates who are better able to meet the requirements of industry and are more self-fulfilled in their jobs. These three requirements are combined together to gain an overall understanding of the role of EI in the construction industry and how
students’ EI is developed by experiencing different learning interventions. This requires a multi-methodological research design and a mixed methods approach to provide a richer and deeper understanding of research questions from different angles. This forms the research aim and objectives described in the following sections.

### 4.3 Research Aims and Objectives

#### 4.3.1 Aim of the research

The aim of the research is to measure and enhance the emotional intelligence of built environment students. The research aim can be broken down into six objectives, as detailed below.

1. To explore the potential role and importance of EI in the context of the construction industry;
2. To examine the extent to which current built environment education develops students’ EI;
3. To examine whether different built environment educational programmes have a differential effect on students’ EI;
4. To investigate if and how industrial placements enhance students’ EI;
5. To explore the perspectives of built environment students on their EI development, and how these could be enhanced in the future;
6. To propose recommendations to enhance students’ EI through built environment education.

Each objective is elaborated below and explained in relation to the previous literature.
4.3.2 Research Objectives and Propositions

4.3.3 Objective 1

The first objective is to explore the potential role and importance of EI in the context of the construction industry. There are many studies that have explored the effect of EI on work performance in other industries and sectors (Bachman et al., 2000; Fox and Spector, 2000; Jordan, et al., 2002; Wong and Law, 2002); however, few empirical studies have researched EI in the construction domain. Very little is known about how EI affects construction professional’s performance, or how successful they are in using EI to enable themselves to work and manage more effectively. Exploring the role of EI in the construction industry involved identifying the EI competencies used or displayed by construction professionals in their daily performance, and examining whether the EI competencies being performed or not performed result in any differences in work outcome. Previous research from other sectors has suggested that emotional abilities are associated with various work-related outcomes which encompass overall performance (Bar-On et al., 2006), teamwork (Jordan et al., 2002; 2004), decision making (Lopes et al., 2006), leadership (Butler and Chinowsky, 2006; Gardner and Stough, 2002), interpersonal facilitation (Mayer and Salovey, 1995), stress tolerance (Bar-On, 2002) and job performance (Lopes et al., 2006). Thus, the proposition one is formulated:

Proposition 1: Emotional intelligence competencies are likely to have a positive impact on construction professionals’ performance.

By conducting in-depth interviews with experienced construction professionals at various stages of their careers, it is possible to provide an understanding of how EI is applied by those in different positions and with different levels of experience in their daily work. In addition, by discussing the impact that EI has on an individual’s daily work with both construction professionals and placement students, the role of EI in the construction industry is established.
4.3.4 Objective 2

The second objective is to examine the extent to which current built environment education develops students’ EI. Although many studies have researched EI within management; EI into leadership (Butler and Chinowsky, 2006; Cherniss, 2001; Gardner and Stough, 2002); and EI into performance (Fredrickson, 2003; Sy et al., 2005); currently no study has explored the construct within the context of built environment education in UK. To achieve this objective, it is first necessary to understand the EI levels of students by using an EI instrument to measure their EI. Without such knowledge, it is impossible to know whether students studying on the built environment education have low or high EI. Secondly, it is necessary to understand if and how students’ EI changes or develops over an examined period; and, if so, whether such changes differ between types of programme. This requires a comparison of the EI levels of students from different programmes over a period of time with an aim of examining if the existing built environment programmes do develop students’ EI and which types of programmes are beneficial in this respect. A better understanding of students’ EI level and the ability of such programmes to influence students’ EI may help to enhance built environment education to produce graduates that are better able to meet the needs of the construction industry.

Previous research by Chinowsky and Brown (2004), who are probably the first researchers to evaluate the EI of engineering education in the United States, indicated that engineering students do not receive enough EI growth in comparison with their counterpart sample (liberal arts students). Given that the nature of built environment education focuses heavily on technical and analytical skills and is oriented toward rote problem solving, which are considered to be barriers for EI development, accordingly, the second proposition of the research is that:

**Proposition 2: Built environment education does not sufficiently develop students’ EI.**

This proposition is explored by comparing and contrasting the EI level of undergraduates before and after the completion of four different programmes of built environment education over an academic year. This shows how students’ EI has differed or changed in response to their learning experiences and the findings are
used as the basis for further examining good teaching and learning activities which appear to influence EI in a positive way.

4.3.5 Objective 3

The third objective is to examine whether different programmes of built environment education have a differential effect on students’ EI. Although previous research stated that engineering education does not support students’ EI development (Chinowsky and Brown, 2004), it remains unclear, however, as to whether modular content or pedagogical interventions that are aimed specifically at developing EI related competencies develop students’ EI more effectively in the context of built environment education. The literature (Chapter Three) indicated that some pedagogical interventions, such as arts-embedded modular content, role-play simulations and peer assessments, were found to be beneficial in developing students’ EI (Reilly, 2005; Topping, 1998; 2009); however, no research has verified this in built environment education. In addition, the literature implicitly implied that one’s educational learning experiences may differ according to the specific subject content. For example, students majoring in the arts and social sciences may be exposed to more human and emotional issues than their counterparts majoring in the natural sciences or in engineering. As a result, the modular content and the mode of teaching, learning and assessment used by different programmes might also lead to different levels of EI growth. Accordingly, the third proposition of the research is that:

**Proposition 3: Programmes with EI relevant content and simulation activities are more beneficial to develop students’ EI than other pedagogic interventions.**

This proposition is investigated by analysing the impact of different programmes on students’ EI in relation to the modular content of programmes, and the mode of teaching, learning and assessment used; and discussing with relevant students; and then relating these findings to the literature on EI training and development. This allows the identification of the types of pedagogic interventions which have a positive effect on EI development. The investigation of this objective is encompassed within proposition 2.
4.3.6 Objective 4

The fourth objective is to investigate if and how industrial placements enhance students’ EI. Most theorists developing models of EI have stated that EI competencies are highly malleable (Bar-On, 1997, 2000; Mayer et al., 2000; Mayer and Cobb, 2000), and thus can be developed and enhanced via appropriate learning interventions (Boyatzis et al., 2002; 2008; Goleman, 1998). However, more empirical work is needed, using reliable and valid measures, to identify the interventions that significantly improve the EI abilities (Matthews et al., 2002). Although many previous researches have tested the possibility of different learning interventions have on EI enhancement, very little is known about whether industry sandwich placements are especially good in this respect. In particular, it is unclear whether and how EI can be improved or enhanced through an industrial placement learning period; or if so, what factors might contribute to the development of EI. Hence, the investigation of this objective provides some initial evidence of the potential factors that might influence students’ EI via the learning period of industry placement. This gives an insight of how to make good use of the effect that placements have on the development of EI and to maximise their function in order to fully equip graduates with enough emotional competencies before entering their future careers. In addition, the EI literature suggested that EI can be improved through challenges and life experiences (Bra-On, 2000). So if specific life experiences are important for EI development, then university graduates may go through some of the most significant experiences that shape their abilities to handle emotions in the period of industry sandwich placement. For example, they have to be responsible for work, consider making career choices, work with a diverse group of people, and are treated as independent and mature adults. Accordingly, the fourth proposition is that:

Proposition 4: Industry sandwich placement experience has a positive effect on students’ EI development.

This proposition is explored by conducting semi-structured interviews with placement students and discussing with them the impact that industry experiences had on their EI development through daily work and then relating this to their EI
levels. It is thus possible to identify the potential factors that promote EI development. This objective is encompassed within proposition 2.

4.3.7 Objective 5

The fifth objective is to explore the perspectives of built environment students on their EI development, and how these could be enhanced in the future. The previous objectives (objective 2 and 3) to examine the relationship between students’ EI and built environment education were based on a quantitative dataset. Rather than the quantitative findings which are revealed in objective 2, 3 and 4, this objective gives an insight into students’ perceptions of the impact that built environment had on their EI from a qualitative angle. The investigation of this objective is in support of objectives 2, 3 and 4 and helps to offer a rich and comprehensive understanding of how well built environment education develops students’ EI through different angles. This objective is explored by conducting semi-structured interviews with students and asking them about the effect of different learning experiences, such as university learning experience and industry learning experience, on their EI development. By discussing and comparing the impact of different learning experiences on students’ EI in the built environment education (university vs. industrial placement) and then by relating this to students’ EI score, it is possible to find out which learning experience is better able to develop EI and why.

4.3.8 Objective 6

The sixth objective is to propose recommendations to enhance students’ EI through built environment education. As alluded to in Chapter Three, educators and employers have called on current built environment education to establish strategies to enhance students’ emotional competencies; however, the literature has not yet offered any good suggestions on this aspect. In addition, most previous research on linking the concept of EI into the educational context was mainly based on the opinion of educators, professionals, consultants, and psychologists. Little research has been conducted which has taken into account the views of students. Therefore, this objective is established to address the needs of the existing educational setting. The investigation of this objective provides some ideals for enhancing EI via built
environment education based on students’ learning experiences. This offers the guidance that future educators and practitioners can take in helping students to develop their EI. This objective is explored by conducting semi-structured interviews with students and asking them to describe good teaching and learning activities that they have experienced which appeared to influence EI in a positive way; and then discussing with them about how this could be enhanced based on their experiences. By relating students’ perceptions to the extant literature on EI development, it is possible to propose recommendations for enhancing students’ EI in current built environment education.

4.4 Research Framework

It is customary for every research project to consider four areas before conducting the research, these being ontology, epistemology, methodology and method (Crotty, 1998). Ontology is concerned with the existence of and relationship between different aspects of society, such as social actors, cultural norms and social structures (Jupp, 2006), while epistemology is concerned with the question of what is (or should be) regarded as acceptable knowledge in a discipline. In particular, it is concerned with the question of whether the social world can and should be studied according to the same principles, procedures and ethos as the natural sciences (Bryman and Bell, 2003). Methodology refers to the philosophical stance or worldview that underlies and informs a style of research (Jupp, 2006). Method refers to the techniques of data collection and analysis. The following sections briefly discuss the different philosophical approaches being advocated by the research and the relevance to paradigm.

4.4.1 Ontological considerations

Ontology has one central question: “what is the nature of reality?” (Creswell and Plano Clark, 2006); this applied to the current research is: “what is the nature of emotional intelligence (EI)?” As alluded to in Chapter Two, the term EI used by different researchers often means different things, and different perspectives have led to different approaches to measurement of EI and yielded substantially different
research findings (Mayer et al., 2000). Therefore, it is very important to clarify the term and model that are used in the present research. The current study assumes the stance that EI is an existing construct which encompasses personality traits, a series of emotional and social skills that are closely linked to emotional process; and that supports superior work performance. This is reasonable as emotional processes influence social interactions; and emotional and social skills are closely intertwined when it comes to managing emotions in interpersonal situations (Lopes et al., 2006). This standpoint is in line with the EI model proposed by Golemen and Boyatzis (2000) which defines EI as ‘the capacity for recognising our own feeling and those of others, for motivating ourselves, and for managing emotions well in ourselves and in our relationships’. From the perspective of Goleman and Boyatzis (2000), EI refers to a long list of attributes or abilities that are drawn from a number of aspects of personality, which fall into one of the four dimensions of EI: Self-awareness; Self-management; Social Awareness; and Social skills. Thus, the current research utilises Goleman’s EI model as an instrument to identify the EI competencies demonstrated by interviewees in the work place and guides the coding process in the qualitative data analysis. In addition, this EI model has been well established and widely used in various sectors and organisations in relation to the relationship between EI various work-related outcomes; such as leadership, behaviour, performance and career success (Ashkanasy et al., 2000; Butler and Chinowsky, 2006; Goleman et al., 2002; Jordan and Troth, 2004).

4.4.2 Epistemological positions

From an epistemological perspective (what is the relationship between researcher and that being researched), the research adopts both positivism and interpretivism to guide the flow of thought and philosophy in which the research objectives are formulated and problems are accomplished. Although literally the conceptions of these two positions seem in contrast with each other, Hussy and Hussey (1997) argued that there is a continuum of ontological and epistemological assumptions; and in practice, research investigations can be placed on this continuum between these two extreme approaches; where at one end of the continuum lies positivism, while at the other end lies phenomenology (a form of interpretivism). Consequently, three
philosophical research positions were used to lead this study, these being objectivist ontology, positivist epistemology and interpretivism:

**Objectivism** is an ontological position that asserts that social phenomena and their meanings have an existence that is independent of social actors. It implies that social phenomena and the categories that we use in everyday discourse have an existence that is independent or separate from actors (Bryman and Bell, 2003).

**Positivism** is an epistemological position that advocates the application of the methods of the natural sciences to the study of social reality and beyond (Bryman and Bell, 2003). Positivism is often associated with quantitative approaches (Creswell, 2007).

**Interpretivism** is a term contrasting epistemology to positivism which subsumes the views of writers who have been critical of the application of the scientific model to the study of the social world and who have been influenced by different intellectual traditions. It is predicated upon the differences between people and the objects of the nature of science and therefore requires the social scientist to grasp the subjective meaning of the social action (Bryman and Bell, 2003). Interpretivists endeavour to describe, interpret, and understand a situation from the perspective of the scientist (Creswell, 2007).

### 4.4.3 Multimethodology

Many previous EI research studies have been conducted in one paradigm either by qualitative or quantitative methodology. It has been widely accepted that the paradigm used will shape the way in which the researcher perceives the world (Aldridge et al., 1999). Although there is a controversy about whether research should be conducted in a single paradigm or in a specific way of combining different paradigms together, Mingers (1997) argued that no one paradigm could capture the richness of real-world situation. In support of this argument, he further explained that the real-world problem situations are highly complex and multidimensional. Different paradigms each focus attention on different aspects of the situation, thus adopting only one paradigm is inevitably gaining only a limited view of a particular intervention or research situation. In contrast to one paradigm, multimethodology,
which refers to combining together more than one methodology (in whole or part) within a particular intervention, is deemed to be more effective to deal with the real world situation.

In addition, the reason for using a multimethodological research design in this research is that it is in line with the context of the current study. As alluded to earlier, this study aims to explore the EI levels of students and enhance students’ EI through different learning experiences, such as pedagogic interventions and industrial placements, in built environment education. This requires researching EI in three different arenas: construction industry, university education and industry placement. Thus, only looking at any single aspect, either from construction industry or university education, would not have led to a full understanding of the research situations in which the problems are based. It requires using different methods to accomplish the aim and objectives through various stages. In addition, these research stages pose different tasks and problems, as such combining different methods together will provide a comprehensive understanding of the research questions and yield a better result. As a result, a multimethodological research design is deemed the most suitable research approach to be utilised in the current study; and a mixed-methods research, combining both quantitative and qualitative methods for data collection in different research stages, is chosen as a suitable design to use in addressing the research question which was identified in Chapter One (section 1.3.1).

### 4.4.4 Mixed-methods research and paradigm

Mixed-methods research defined by Creswell (2003) is a research design with philosophical assumptions as well as methods of inquiry research. It focuses on collecting, analysing, and mixing both quantitative and qualitative data in a single study or series of studies. Its central premise is that the use of both quantitative and qualitative approaches in combination provides a better understanding of research questions than either approach alone. Pragmatism is the most commonly used paradigm associated with mixed-methods research (Jupp, 2006). Pragmatism rejects the traditional view which suggests that the paradigms underlying quantitative and qualitative approaches (positivism and constructivism respectively) are
Chapter Four: Research Design and Methodology

essentially incompatible and in conflict (Jupp, 2006). Instead, it focuses on the consequences of research; and on the primary importance of the questions asked rather than multiple methods of data collection to inform the problems under study (Creswell and Plano Clark, 2006; Rossman and Wilson, 1985). Thus, it is pluralistic and oriented toward “what works” and practice (Patton, 1990). Hence, a pragmatic mixed-methods approach is taken to be the most appropriate in this research.

When it comes to the procedure of how to conduct mixed-methods research, three general strategies are addressed in the literature; these being sequential procedures, concurrent procedures, and transformative procedures (Creswell, 2003). The present study follows sequential procedures, whereby the quantitative data collection and analysis is undertaken first, followed by a qualitative data collection and analysis (or vice versa). In line with this principle, this study begins with an exploratory qualitative research with construction professionals in order to explore the role of EI in the construction industry; and this is followed by a quantitative EI questionnaire survey with undergraduates in the built environment education with the purpose of examining the extent to which current built environment education develops students’ EI. It is followed by semi-structured interviews with placement students to investigate if and how their EI is developed by working in the industry, in an attempt to identify the potential factors that might nurture EI in a positive way. Furthermore, students are asked about teaching and learning experiences which are thought to develop EI based on their own experience. These form the basis of recommendations for how built environment education can be enhanced to promote student’s EI through appropriate teaching and learning interventions and experiences.

4.4.5 Research design

Having established the ontological and epistemological perspectives for the research, a research design was devised to ensure that the data collection and analysis were conducted in a logical and structured manner that accomplished the research aim and objectives. Effective research design shows how the research questions are aligned to the relevant data sources and research methods (Jupp, 2006), and as such, the current research design comprised four research phases aligned with six objectives.
Chapter Four: Research Design and Methodology

The first phase was an exploratory pilot research with construction professionals with a view to exploring the role and importance of EI in the construction industry. This involved identifying the EI competencies which were displayed by construction professionals in managing their daily work and investigating if and how these EI competencies influenced their work performance. The findings from this stage as shown in Chapter Two, have verified a need to investigate how well current built environment education develops students’ EI and directed the investigation of the main phase of study.

The second phase was a purely quantitative EI questionnaire survey to built environment students before and after the completion of different programmes within an academic year. This involved measuring and comparing students’ EI in an examined period and examining the relationship between students’ EI and the types of programme taken. The findings from this stage laid out a foundation for interviews in the following phase. The third phase was to examine the effect of different programmes on student’s EI by examining the content of individual modules, mode of teaching, learning and assessment used, and discussing these effects with students on the relevant courses and then in relation to the literature. It discerned the kinds of pedagogic interventions which appeared to have a positive effect on EI development.

The final phase was to conduct in-depth interviews with placement students in order to investigate how students’ EI is developed by working in the construction industry with a view to identifying what potential factors will contribute to the development of EI. In this phase, students were also required to complete an EI questionnaire in order to have an EI score for a further comparative purpose and as a variable in relation to their performance. In addition, students were asked about what teaching and learning experiences were apt for developing their EI, and how current programmes could be enhanced based on their own understanding. By combining the qualitative and quantitative findings together, recommendations for enhancing student’s EI through built environment education were proposed. Figure 4.1 presents the research methodology employed in this study in a graphical format. Table 4.1 provides an overview of the specific methods used for data collection and analysis in relation to the research objectives and expected outcomes.
Chapter Four: Research Design and Methodology

Research Aims and Objectives

Literature Review
EI theories, EI and its role in the built environment education & Gaps in the extant literature

Research Propositions

Research Design and Multimethodology
A mixed-methods approach chosen

Survey of Methodologies

Pilot study with potential

Phase 1: Pilot Study
Semi-structured interviews with 6 construction professionals

Phase 2: Questionnaire Survey
Questionnaire survey to 420 built environment students

Phase 3: Built environment programmes analysis
An examination of the pedagogic interventions in the built environment programmes (module specification & curriculum map)

Phase 4: Semi-structured Interviews
30 placement students + 15 undergraduates

Qualitative Data Analysis & Interpretations of Findings

Quantitative Data Analysis & Interpretations of Findings

Conclusions and Recommendations

Figure 4.1 Overview of research design
Table 4.1: Summary of research objectives and related methods of data collection/analysis and expected outcomes.

<table>
<thead>
<tr>
<th>Research Objectives</th>
<th>Method of Data Collection and Analysis</th>
<th>Expected Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) To explore the potential role and importance of EI in the context of the construction industry</td>
<td>• Semi-structured interviews with construction professionals (n=6)</td>
<td>• EI influences construction professionals’ daily performance</td>
</tr>
<tr>
<td></td>
<td>• Interview analysis by NVivo8.0</td>
<td></td>
</tr>
<tr>
<td>2) To examine the extent to which current built environment education develops students’ EI</td>
<td>• SSRI questionnaire survey to undergraduates from the Department of Civil and Building Engineering (n=420)</td>
<td>• Built environment education does not sufficiently support students’ EI development</td>
</tr>
<tr>
<td>3) To examine whether different built environment educational programmes have a differential effect on students’ EI</td>
<td>• Deceptive statistics and inferential statistics analysis by SPSS14.0</td>
<td>• Students’ EI differ according to the types of programme taken</td>
</tr>
<tr>
<td></td>
<td>• An examination of modular content, teaching and learning activities and assessment used in different programmes</td>
<td>• Certain pedagogic interventions tend to develop EI</td>
</tr>
<tr>
<td>4) To investigate if and how industrial placements enhance students’ EI</td>
<td>• In-depth semi-structured interviews with placement students (n=30)</td>
<td>• Industrial placements have a positive effect on students’ EI</td>
</tr>
<tr>
<td></td>
<td>• SSRI questionnaire survey to all interviewed students (n=30)</td>
<td>• Industrial placements are better than university in developing students’ EI</td>
</tr>
<tr>
<td>5) To explore the perspectives of built environment students on their EI development, and how these could be enhanced in the future</td>
<td>• Deceptive statistics and inferential statistics analysis by SPSS14.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Interview analysis by NVivo8.0</td>
<td></td>
</tr>
<tr>
<td>6) To propose recommendations to enhance students’ EI through built environment education</td>
<td>• Semi-structured interviews with undergraduates (n=15)</td>
<td>• Recommendations proposed by students together with other issues drawn from literature</td>
</tr>
<tr>
<td></td>
<td>• Interview analysis by NVivo8.0</td>
<td></td>
</tr>
</tbody>
</table>
4.5 Research Ethical Considerations

Before carrying out the research, certain ethical concerns were raised and given enough consideration to ensure the credibility of research. Some of these concerns are discussed below.

4.5.1 Informed consent

All participants, regardless of the degree of their contributions, age or status were fully informed of the purpose and procedure of this research, including the expected duration of interview. No form of deception or coercion was employed in order to gain the co-operation of participants. A well-informed oral consent was employed and all participants in this study had a clear picture of the subject purpose, as well as their role and position in it, before taking part in the research. In addition, a summary of findings of this study was offered to participants if required.

4.5.2 Confidentiality

During the quantitative and qualitative data collection, participants were under no obligation to continue if they felt the urge to withdraw their participation. The information provided by participants was treated in strict confidentiality and the findings were only used for research purposes. In addition, anonymity was granted to all participants.

4.6 Questionnaire Design, Content and Chosen

The following sections discuss the design and content of interview questions and the rationale of why SSRI (self-completion questionnaire) was chosen as the most appropriate EI instrument in the current research.
4.6.1 Interview: design and content

Eleven questions (see Appendix A) were initially designed to achieve objectives one to six (see table 4.1). These questions evolved from a review of the EI literature and built environment education, and through a discussion with two academics. In doing this, several iterations and revisions of the questions were made. Jankowicz (2005) recommended that pre-testing of the questionnaire should be carried out and that it should include different groups, such as colleagues and potential users of the data. Therefore, the questions were piloted with 3 colleagues and 3 undergraduates who were in the construction field. In doing this, the research ensured that the questions were directed, specific and simple while avoiding double-barrelled questions, leading or emotive questions, or questions which were too complex or ambiguous. Finally, six main questions were formulated in such a way that each question addressed specific variables in the objectives (see Appendix E and F).

The interview questions included two sections. The first section requested general demographic information from interviewees which included their age, gender, position, work experience, educational background and job responsibilities. This information was used for further descriptive and analytical analysis of data. The second section involved six main questions and each question served a different purpose.

The first and second questions were designed to ask interviewees about real workplace incidents where they had successfully regulated or failed to regulate their emotions and which resulted in any differences in performance (see Appendix E and F). The purpose was to elicit information about EI competencies demonstrated by participants and to investigate how the informant’s emotional competencies or emotional progress affected his or her work performance and outcome from both positive and negative critical events. The interviewee was firstly asked to give a positive example as it has been found that most people find it easier to tell about their high points, success or times when they felt effective (Spencer and Spencer, 1993).

The third question (How would you rate your ability in accurately perceiving, understanding, managing your own emotions and those of others before and after the placement) was designed to explore the extent to which students perceive their EI
was developed after they had taken part in the placements. This question was redesigned for construction processional to compare their EI when they first enter the construction industry and now. The fourth question (*How do you perceive your industrial experience has developed your emotional competencies in comparison with your learning experience in the University*) was designed to investigate which learning experience (university learning experience vs. placement working experience) was better able to develop EI. This question was redesigned for construction professionals to describe how their EI had changed over their career, for comparative purposes.

The fifth question (*How do you perceive the role of emotional intelligence in managing people in the industry?*) was designed to explore the role and importance of EI in the construction industry from the perspective of individuals. The final question (*What characteristics or abilities do you think are needed to do your job*) was designed to obtain additional examples if an interviewee did not come up with enough information. To get a complete ‘story’/incident, each question was further explored by using key probes, such as “what was the situation?”; “who was involved?”; “what did you think about or feel?”; “what did you actually do?”; and “what was the outcome or what happened next?”.

**4.6.2 Two EI models (Ability Vs Mixed Models)**

In order to measure participants’ EI accurately and effectively, it was necessary to choose a simple, practical, and psychometrically sound measure which was also appropriate for the subjects under investigation. As shown in the EI literature (Chapter Two), 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. To find out which EI tool was suitable for current research, it was very important to clarify the EI concept and model used, because different perspectives of EI will lead to different approaches to the measurement of EI and yield different research findings (Mayer et al., 2000). Hence, it was first necessary to gain an understanding of currently predominant models of EI before discussing which EI measurement to adopt.
As reviewed in Chapter Two (section 2.3.1), two predominant models of EI were addressed in the EI literature: the Ability Model (e.g. Mayer et al., 2002) and Mixed or Trait-based Model (e.g., Bar-On, 1997; Goleman, 1995). The former views EI as an actual domain of intelligence composed of specific emotional and mental abilities, which are accordingly most appropriately measured by performance tests (Mayer et al., 2002). The latter, mixed model, takes a narrow approach to EI combining emotional abilities with elements of personality, motivation, and social skill, which can be assessed by self-report questionnaire (Bar-on, 1997, Goleman, 1998). As alluded to earlier in Section 2.3.4, the author viewed EI as including various emotional and social skills that support superior work performance, which in turn is in accordance with the theory and model of EI developed by Goleman and Boyatzis (2000). Besides, Goleman’s EI model is specifically designed to identify emotional competencies in connection with work performance which fulfils the requirement of current research. Consequently, a mixed EI model was deemed best suited to the current study.

4.6.3 Rationale for EI instrument chosen

Through a review of the EI literature (Chapter Two), four frequently used tools for measuring EI were revealed 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., 2000); the Emotional Competence Inventory (ECI) (Goleman, 1999); and the Schutte Self-Report Inventory (SSRI) (Schutte et al., 1998). Although these instruments are all psychometrically sound EI measures, the most appropriate method for measuring EI is currently an area of controversy.

As referred to earlier in Chapter Two (section 2.3.4), the EI concept initially used was based on Goleman's EI theory which refers to a long list of attributes or abilities that are drawn from a number of aspects of personality. Given that Goleman’s EI model focuses on trait EI which, as mentioned in section 2.3.1, was best measured by self-report inventories (Petrides and Furnham, 2001); therefore, it was reasonable to exclude the MSCEIT (Mayer et al., 2000) which is regarded as an ability-based test. Similarly, the Emotional Competence Inventory (ECI) (Boyatzis et al., 2000) is an
informant method that tends to measure personal reputation rather than real EI, argued by Mayer and Salovey (2000), thus it was deemed to be unsuitable for current study. The two remaining self-report measures are the $EQ-i$ (Bar-On, 1997) and the measure SSRI developed by Schutte et al., (1998). The $EQ-i$ is better known and has received more research attention; however, this measurement was originally designed for an individual’s well-being and requires participants to take approximately one hour to finish the test, which is far beyond the time deemed acceptable for the informants targeted in this research. Thus, this was not given consideration.

Consequently, the Schutte Self-Report Inventory (SRRI) was chosen as the most suitable instrument for measuring EI from a number of different mixed models, self-report scales. Other reasons for choosing SSRI included the fact that the elements of SSRI have a theoretical foundation and are based on an earlier version of an EI model developed by Salovey and Mayer (1990). Secondly, SSRI has been found to significantly correlate with eight theoretically related constructs, including awareness of emotion, outlook on life, depressed mood, ability to regulate emotions, and impulsivity (Hedlund and Sternberg, 2000). Thirdly, it has been shown to consistently measure aspects of personality relevant to emotional intelligence (Brackett and Mayer, 2003; Saklofske et al., 2003; Schutte et al., 1998). In addition, it also has a good internal reliability ($\alpha = .78$) and high consistency ($\alpha = .90$) in comparison to the other instruments (for example, Bar-on EQ-i and MSCEIT). A recent investigation revealed that the SSRI is used in the majority of research exploring EI (Ciarrochi et al., 2001; Petrides and Furnham, 2000; Van Rooy and Viswesvaran, 2004). In addition, previous work on SSRI has established a satisfactory internal consistency and reliability for full-scale EI (Brown and Schutte, 2006; Schutte et al., 1998; 2001; Shi and Wang, 2007). Besides, this instrument is free of charge. In particular, the SSRI was developed to help determining what makes some individuals more successful and productive than others (Schutte et al., 1998) which makes it more applicable than other EI measurements to the current study. Table 4.2 is a summary of discussion and availability on Emotional Intelligence/Competencies Instruments (cf. Conte and Dean, 2006).
Table 4.2: Summary of Emotional Intelligence/Competencies Instruments and Their Use (Source from Conte and Dean, 2006)

<table>
<thead>
<tr>
<th>Factor</th>
<th>MSCETT</th>
<th>SSRI</th>
<th>EQ-i</th>
<th>ECI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dimensions Measured</strong></td>
<td>Perception of emotions, Emotional facilitation, Understanding emotions, Managing emotions</td>
<td>Overall emotional intelligence</td>
<td>Intrapersonal, Adaptability, General mood, Interpersonal, Stress management</td>
<td>Self-awareness, Self-management, Social awareness, Social skills</td>
</tr>
<tr>
<td><strong>Instrument Design</strong></td>
<td>141 scaled mental ability items</td>
<td>33 mixed model items</td>
<td>133 mixed model items</td>
<td>Self-report and others’ assessment on 18 competencies in 4 clusters.</td>
</tr>
<tr>
<td><strong>Response Format</strong></td>
<td>ability scale</td>
<td>Self-report</td>
<td>Self-report</td>
<td>Self-report and Informant report (Peer, Supervisor)</td>
</tr>
<tr>
<td><strong>Reliability Evidence</strong></td>
<td>Adequate internal consistency reliability for overall scale; Test-retest (2 weeks) = .86</td>
<td>Internal consistency of .90; 2 weeks test-retest reliability of .78</td>
<td>Alpha=.76 for overall scale; has been independently confirmed outside of Bar-On’s lab</td>
<td>Internal consistency reliability ranges from .45 to .77 for self-assessment, and from .54 to .90 for peer and supervisor assessment</td>
</tr>
<tr>
<td><strong>Big Five Personality Test</strong></td>
<td>Mostly distinguishable</td>
<td>Moderately to strongly relate for 4 of 5</td>
<td>5 of 5 factors strongly relate</td>
<td>None</td>
</tr>
<tr>
<td><strong>Empathy</strong></td>
<td>Moderately</td>
<td>Moderately</td>
<td>Moderately to strong</td>
<td>Strong</td>
</tr>
<tr>
<td><strong>Significant Gender Difference</strong></td>
<td>Women score higher than men</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td><strong>Test-retest</strong></td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td><strong>Covaried with other tests</strong></td>
<td>SSRI and EQ-i (if take out Big Five does not)</td>
<td>Covaried with EQ-i</td>
<td>Covaried with SSRI</td>
<td>None</td>
</tr>
<tr>
<td><strong>Instrument Available</strong></td>
<td>Multi-Health Systems <a href="mailto:oeg@mhs.com">oeg@mhs.com</a></td>
<td>Free</td>
<td>Multi-Health Systems <a href="mailto:oeg@mhs.com">oeg@mhs.com</a></td>
<td>Hay/McBee EI Services <a href="http://www.eisglobal.com">www.eisglobal.com</a></td>
</tr>
</tbody>
</table>
Chapter Four: Research Design and Methodology

4.6.4 Schutte self-report inventory (SSRI)

The Schutte self-report inventory (SSRI; Schutte et al., 1998) is a one-dimensional measure of EI based on the original EI model developed by Salovey and Mayer (1990) which includes three distinct EI components: appraisal and expression of emotions; regulation of emotions; and utilisation of emotions. It assesses the extent to which respondents recognise, understand, use and manage emotions in themselves and in others. The test contains 33 items, of which three are reverse-scored, which takes approximately 15 minutes to complete. For each item, participants are required to choose whether they agree or disagree with the statement (e.g., ‘When I feel a change in emotion, I tend to come up with new idea’) based on a 5-point Likert scale (1 = strongly disagree; 2 = somewhat disagree; 3 = neither agree nor disagree; 4 = somewhat agree; 5 = strongly agree) (see Appendix D). A high score indicates a higher level of EI. There is some debate within EI literature as to whether SSRI is better assessed as a one-dimensional (single factor) or multi-dimensional (four-factor: emotion appraisal, mood regulation, social skill and utilising emotion) measurement. Given that the inconsistent subscale reliabilities reported in the literature (Ciarrochi et al., 2001; Schutte et al., 1998), and satisfactory internal consistency and reliability for full-scale EI (Brown and Schutte, 2006; Schutte et al. 1998; 2001; Shi and Wang, 2007), it was decided to use a total scale score only in the current investigation.

4.7 Methods of Data Collection

Both quantitative and qualitative approaches were employed for data collection. The purpose was to reduce and eliminate disadvantages of each individual approach whilst gaining the advantages of each, and of the combination of a multi-dimensional view of the subject (Fellows and Liu, 1997). In addition, the biases inherent in any single method could be neutralised or cancelled, thus enhancing the validity of findings (Creswell, 2003). The methods used for data collection in this study were mainly semi-structured interviews and self-completion questionnaires.
4.7.1 Sample selection

Before the data were collected, it was incumbent on the researcher to clearly define the target population. Although there are a number of different methods used to create a sample, they generally can be grouped into one of two categories: *probability* samples or *non-probability* samples. Probability sampling, as the name suggests, is based on the idea that the people or events are chosen as the sample, because the researcher has some notion of the probability that these will be a representative cross-section of the people or events in the whole population being studied (Creswell, 2003). On the other hand, non-probability sampling is conducted without such knowledge about whether those included in the sample are representative of the overall population (Salma, 2001).

In the study, the researcher did not have sufficient knowledge about whether the sample chosen would represent the whole population and did not know how many people would make up the population because the research was voluntary-based. Under these circumstances, it was decided to use the method of non-probability sampling as the basis for the sample selection. Given that qualitative inquiry seeks to understand the meaning of a phenomenon from the perspectives of participants, it is important to select a purposive or purposeful sample from which the most can be learned (Merriam, 2002). A purposive sample is a form of non-probability sampling (Polit and Hungler, 1999) which means researchers intentionally select participants who have experience with the central phenomenon or the key concept being explored (Creswell, 2007). Another justification for using the non-probability purposive sampling was that it stems from the idea in which the research process is one of “discovery” rather than testing of hypotheses. It is a strategy which Lincoln and Guba (1985) describe as ‘emergent and sequential’. Almost like a detective, the researcher follows a trail of clues, which leads them in a particular direction until the questions have been answered and things can be explained (Robson, 1993). As a result, this type of sampling was used to select both quantitative and qualitative samples.
Data collection

In this study, data were collected from four sources. The first source of data included 6 semi-structured interviews with construction professionals (1 female and 5 males) in different work positions and with different levels of work experience. The second source of data included a questionnaire survey of the Schutte Self-report Inventory (SSRI) for 420 undergraduates drawn from four different programmes in the built environment education. This included MEng/BEng Civil Engineering (CE), Construction Engineering Management (CEM), BSc Architectural Engineering & Design Management (AEDM) and BSc Commercial Management & Quantity Surveying (CMQS). The third source of data was collected from a series of relevant documents such as module specifications and curriculum maps. The fourth source of data included in-depth interviews with 30 placement students (25 males and 5 females) and 15 undergraduates (12 males and 3 females). Table 4.3 shows the total number of participants in this study.

Table 4.3: Total number of participants in this study

<table>
<thead>
<tr>
<th>Methods of data collection</th>
<th>Number of participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pilot interviews</td>
<td>6 (colleagues + students)</td>
</tr>
<tr>
<td>Semi-structured interviews</td>
<td>30 (placement students) +15 (undergraduates)</td>
</tr>
<tr>
<td>Questionnaire survey</td>
<td>420 (390 undergraduates + 30 placement students)</td>
</tr>
<tr>
<td>Pilot study</td>
<td>6 (construction professionals)</td>
</tr>
<tr>
<td>Total number of participants</td>
<td>477</td>
</tr>
</tbody>
</table>

4.7.2 Questionnaire

The quantitative survey aimed to examine the extent to which current built environment education develops students’ EI with a view to examine the influence of particular modules taken on students’ EI development. In addition, the questionnaire survey was applied to all interviewed participants in order to further examine the relationship between the levels of EI and performance.

In this study, the target population for the questionnaire survey were students enrolled in the built environment programmes at Loughborough University and the total number were calculated at around 400, hence, 400 SSRI questionnaires were
distributed to undergraduates before and after the completion of programmes within an academic year. The SSRI questionnaires were distributed to the participants in the classroom and collected on the spot to ensure a high response rate. An introduction, including the research purpose and the explanation of EI, was given to the participants before they took the test. Students were instructed to complete the questionnaire and were informed that participating in this research was voluntary, and that all information regarding their identity would be kept confidential and the findings would only be used for research purposes. Most importantly, anonymity was granted to each participant. The first EI assessment was conducted in the beginning of the autumn term (October) 2006. In total, 243 students returned questionnaires while only 233 questionnaires were fully completed and the response rate was 58.3%. The questionnaires which were only half completed or contained ambiguous information were excluded from the research. The second EI assessment was implemented at the end of summer term (June) 2007 with 187 students fully completing the questionnaire and the response rate was 46.8%. Although the total numbers of surveyed students in the first EI assessment and second EI assessment were different, more than half were the same students.

4.7.3 Interview method

The primary means of data collection was through semi-structured interviews to interviewees. The interviews were carried out in two phases. The first phase was an exploratory pilot study of construction professionals, and the purpose was to explore the potential role and importance of EI in the context of the construction industry by investigating the influence of EI on construction professional’s performance. The second phase of semi-structured interviews was the main study phase which aimed to investigate if and how industrial placement affects and develops students’ EI as well as proposing recommendations of how built environment education could be enhanced to develop EI from the perspectives of students.

The semi-structured interviews were conducted face to face. The advantages of using face to face interviews are that they enable the interviewer to follow up and probe responses, motives and feelings; and their potential added value is that the
recording of nonverbal communications, like facial expressions and gestures, thus enriches the qualitative aspects of the data (Jupp, 2006); while the main drawback is that they tend to be more costly and time consuming than telephone or video-conference interviews.

One-to-one interviews took place either at the interviewees’ work place or at a meeting room in the Civil and Building Engineering Department during the period from February to June 2008. All interviews were tape-recorded and transcribed verbatim. Each interview with a student lasted from thirty minutes to one hour and thirty minutes. The purpose of the interview and the explanation of EI were explained to all participants before interviews. In addition, participants were asked if they had any questions prior to the interview. In doing this, the author provided a clear context of current research, helped create a rapport with participants, and made the interview a shared conversation in which specific topics were pursued as they arose naturally. Next, each participant was asked to complete the SSRI questionnaire before the actual interview. The questionnaire contained a basic concept and explanation of EI, which gave a brief understanding of EI in relation to our thoughts, social interactions and behaviours, thus offering participants a general picture about what EI is and providing them with a good understanding of EI prior to the actual interview. Besides, the questionnaire dataset could be used for further examining the relationship between EI and participants’ performance. Each interview began with a set of direct questions concerning the informant’s age and position, as well as their work experiences and educational background. Next, interviewees were asked to recall incidents that had occurred on the industrial placement or in the work place which they considered a “high point” story: one in which they felt particularly effective on the job and to describe the actual events in as much detail as possible. After the high point story, the interviewee was asked to recall a “low point” story: one where he or she felt less effective or frustrated with his or her performance. The interviewer attempted to capture two or three high- and low-point stories from each interview. These interviews enabled the researcher to have an insight into the interviewees’ competencies that related to emotional intelligence.

As illustrated earlier, the purpose of the interviews was to explore the role and importance of EI in the construction industry and to investigate how students’ EI is
shaped by working in the industry. This involved identifying and comparing the EI competencies displayed or performed by construction professionals and placement students in the daily task. Thus, an appropriate interview technique was required to identify these competencies accurately and precisely. Traditional interviewing methods do not work well to identify competencies for the reasons argued by Spencer and Spencer (1993, pp.115): first, most people do not know their competencies, strengths and weakness, or even what their job likes and dislikes really are; second, people may not reveal their real motives and abilities, because most interview questions are “leading” and most people can give “socially desirable” answers: what they think the interviewer wants to hear. As a result, an individual’s self-reports of background, strengths, and preferences do not provide reliable information about their competencies. Therefore, Spencer and Spencer (1993) believed that the basic principle of the competency approach which concerns what people think or say about their motives or skills is not credible. Only what they actually do, in the most critical incidents they have faced, can be believed.

In the light of this principle, the Behavioural Event Interview (BEI) method was used in the research as it aims to get behind what people say they do to find out what they really do. This is accomplished by asking people to focus on the most critical situations they have faced in order to produce data on their most important skills and competencies. As such, interviewees tell vivid “short stories” about how they actually handle the toughest, most important parts of their jobs, and, in doing so, reveal their competencies to do the job. A question like “please can you give me an example, where even though it was difficult, you were able to control or filter your negative emotions in a constructive way?” was designed in accordance with this purpose (see Appendix E and F). In addition, the author avoided asking “leading” questions, choosing to use the key probes during the interview. The probing questions were ‘what event led up to the situation?’; “what was the situation?”; “who was involved?”; “what did you think about, feel?”; “what did you actually do?”; “what was the outcome-what happened?” in order to draw out more complete “stories” from interviewees. Another purpose for using probing questions was to elicit more information about whatever the respondent had already said in response to a question (Berg, 2006).
4.8 Data Analysis

This section discusses the method of data analysis used for both quantitative and qualitative datasets as well as the related computer software that was used to assist with the result analysis.

4.8.1 Questionnaire data analysis

The data obtained from questionnaires were analysed using descriptive and inferential statistical methods and by using the Statistical Package for the Social Science (SPSS) for Windows 16. The descriptive statistical method is the simplest method of analysis which displays a general overview of the results and it analyses the response in mean, frequency and percentage; whereas the inferential statistical method concentrates on the nature of the relationship between two variables and on the construction of measures of relationship. It enables a researcher to make generalisations beyond the specific sample data (Morgan et al, 2004).

In the present study, descriptive statistics were used to assess the EI levels of undergraduates from a range of built environment programmes and to examine the EI changes of students taking different programmes within the period of an academic year. The results were represented in the form of tabulation and pie chart, as well as bar chart (see Chapter Five). Meanwhile, an inferential statistical method, namely One-way (or Single Factor) ANOVA was employed in the study. It is a parameter test used to test the differences (usually mean difference) between groups in the populations from which the samples are drawn. Therefore, One-way ANOVA tests were undertaken in the current research in order to determine whether there were significant mean differences between students’ EI and the types of programme they were taking in built environment education.

4.8.2 Computer-assisted analysis

Qualitative analysis is about working intensively with rich data. The decision to use NVivo for interview data analysis was because it is a reliable computer software especially designed for assisting qualitative data analysis. The tools provided by
NVivo support the analyst in making use of multiple strategies concurrently; this includes reading, reflecting, coding, annotating, taking memos, discussing, linking, visualising, with the results of those activities recoded in nodes, memos and models. Each of these strategies is integrated in a process of learning from the data; Bazeley (2007) argued that they work best when they are carried out as integrated activities.

Other advantages of using NVivo for data analysis summarised by Silverman (2005) are: firstly, it speeds up the pace of handling large volumes of data, hence freeing the researchers to explore numerous analytical questions. Secondly, it helps researchers demonstrate that their conclusions are based on rigorous analysis. This adds to the trust placed in research texts by readers. Thirdly, it helps with sampling decisions, be these in the service of representativeness or theory development. Last but not the least, NVivo has a built-in ‘modeller’, which allows the user to map out ideas in visual displays whose ‘nodes’ are linked to the underlying data associated with them.

4.8.3 Using NVivo to analyse interview data

All interview data were transcribed verbatim by the researcher and analysed with NVivo version 8.0. Each transcript was read through several times to identify meaningful statements and then categorised by the answers to six main questions. At the beginning of the analysis process, three approaches were used for coding data, these being descriptive coding, topic coding and analytical coding. Descriptive coding is more like quantitative coding which involves storing information about the cases being studied (Richards, 2005). Topic coding is labelling text according to its subject and analytical coding is central to qualitative enquiry. This is the coding that leads to theory ‘emergence’ and theory affirmation (Richards, 2005). Coding in NVivo is stored in nodes which are the containers for categories in the project, ideas or topics that the researcher is interested in.

To effectively develop a coding system, the present study followed the instruction provided by Richards (2005) to make sure the process of data coding was conducted in an effective and appropriate manner. In the first stage, each transcript was read between the lines, and each word and phrase was explored for meaning and concepts; each concept’s possible meaning was further explored as a way of ‘breaking open’
text, to be recorded in both codes, nodes and memos. In doing this, many free nodes were created to catch ideas, thoughts or topics when they occurred. In this stage, free nodes do not presume any relationship or connections, because they serve simply as ‘dropping-off’ points for data. Later, new nodes were added when new concepts or ideas were generated during the process of data coding. After a number of free nodes were built up, the nodes representing similar kinds of things were then organised and moved into a hierarchical structure tree system (also known as tree/parent nodes). In the second stage, the tree/parent nodes were rearranged and moved into a higher level of tree system based on the categories and subcategories until the main themes emerged.

4.9 Data Validity and Reliability

In qualitative studies, the trustworthiness of data can be assessed by considering four types of criteria: credibility, transferability, dependability and confirmability (Guba and Lincoln, 1989). Credibility means establishing that the results of qualitative research are believable from the perspective of the participant in the research (Law et al., 2005); transferability means the degree to which the results of qualitative research can be transferred to other contexts or settings (Guba and Lincoln, 1989); dependability means whether we would obtain the same results if we could observe the same thing twice; and confirmability means the degree to which the results could be confirmed or corroborated by others (Law et al., 2005).

In this study, credibility was enhanced by engaging sufficiently with participants to obtain meaningful data and further enhanced by the researcher’s knowledge in the field of EI. The researcher had been specifically trained to use EI instruments and successfully completed the EI courses held by Occupational Psychology Services Ltd; and been granted a certificate by MHS (Multi-Health System Inc.) as an accredited trainer to use different kinds of EI measurement (i.e., Bar-On EQ-i; ECI). External checks were carried out by presenting the final themes to participants via electronic mail; the replies received did not detract from or add to these. Transferability was assessed by providing enough description and information of the current study’s context and detailed methodology to make sure readers would be able to determine
how closely their situation matched that being reported here, and whether current research finding could be transferred to his or her present situation. Dependability and confirmability were assessed by using multiple methods of data collection for obtaining consistent and dependable data as well as data that were most congruent with reality as understood by the participants. Additionally, the research purposefully sought variation and diversity in sample selection to allow for a greater range of application of the findings by readers of the research.

4.10 Summary

This chapter has outlined the research methodology and research design adopted in the current research. A methodology was formulated along with four propositions that derived from the aims and objectives of the study. The current study was unique in that it researched EI in three different but interrelated areas (construction industry, built environment education and industrial placement); and different research stages required using different methodologies to achieve research propositions; as a result, a multimethodological research design was utilised in an attempt to provide richer and fuller meanings for the research questions. In addition, a mixed-methods research, combining both quantitative and qualitative approaches for data collection was devised in line with the research aims and objectives. The current research design encompassed four stages in which the research questions were fully explored. Stage one was an exploratory study on construction professionals with an aim of exploring the role and importance of EI in the construct industry. Stage two was a quantitative survey of EI for undergraduates in the built environment education with a view to examining the extent to which current education enhances student’s EI. Stage three was an examination of the built environment programmes in terms of its modular content, mode of teaching, learning and assessment used. Stage four was a qualitative research aimed to investigate if and how an industry placement learning period affects student’s EI development; and to propose recommendations of how current built environment education could be enhanced to develop students’ EI. Data were analysed by using computer-assisted software SPSS for quantitative purposes and
Nvivo for qualitative purposes. The next chapter presents the main results and findings of the current research.
5.1 Introduction

This chapter presents the main results and findings from the current study. As alluded to in Chapter Four, the current study was composed of four research stages; hence the data were collected from four sources in this respect. This included a pilot study of construction professionals, questionnaire survey of more than 400 undergraduates, an examination of built environment programmes, and interviews with 45 placement students and other undergraduates. The quantitative data were analysed by SPSS 16.0 in terms of descriptive statistics and inferential statistics; whilst the qualitative data were analysed by NVivo 8.0.

5.2 Findings from Questionnaire Survey

This section mainly presents the results and findings from the questionnaire survey. The survey was conducted with more than 400 undergraduate students with a view to examining the EI levels of built environment students and the potential effect of built environment education on the EI development. The quantitative data were analysed by using SPSS 16.0 in terms of descriptive statistics and inferential statistics. The results are presented in the form of tabulations and figures.

5.2.1 Questionnaire survey sample

The questionnaire survey was conducted with undergraduates who enrolled in the programmes of built environment education at Loughborough University. 400 questionnaires based on the Schutte Self-report Inventory (SSRI) were distributed amongst students in the Department of Civil and Building Engineering before and after the completion of an academic year. In total, 420 full-time undergraduates took part in the study, and 68% students had no work experience (n=329) while 32% students had been on placement (n=91). In order to compare EI differences between placement students and none-work experience undergraduates, students who
stated that they had participated in an industrial placement were grouped into a placement students’ dataset. Therefore, there were three different cohorts of students: 1) non-work experience undergraduates in the 1st EI test, 2) non-work experience undergraduates in the 2nd EI test, and 3) placement students.

In the first EI test, 233 undergraduates were surveyed, involving 183 males and 50 females with a mean age of 19.2 (S.D.=1.52) years (range from 18 to 24). 85% students had no work experience (n=198) while 15% students had been on placement (n=35). The majority of participants were Part A (first-year) students (80%, n=184), while 12% of respondents were Part C (third-year) students (n=29) and the remaining 8% of participants (n=20) were Part D (fourth-year) students. In the sample of students without work experience (n=198), there were 91 MEng/BEng Civil Engineering students (CE), 30 from the BSc in Construction Engineering Management (CEM), 39 students from BSc Architectural Engineering and Design Management (AEDM) and 38 from the BSc Commercial Management and Quantity Surveying (CMQS).

In the second EI test, 187 students (45 females and 142 males) participated with a mean age of 20.1 (S.D.=1.38) years (range from 18 to 24). 70% students had no work experience (n=131) and 30% students had been on placement (n=56). The majority of participants were Part A (first-year) students (37%, n=70), while 23% of respondents were Part B students (second-year) (n=43); 46 Part C (third-year) students (25%) and the remaining 15% of participants (n=28) were Part D (fourth-year) students. In the sample of students without work experience (n=131), there were 43 CE students, 14 CEM students, 37 AEDM students and 37 CMQS students. 100% of participants were identified as full-time students. Although the total number of surveyed students over the test and re-test period were different, more than half were the same students in both EI assessments. Table 5.1 shows the numbers of participating students by programmes.
Table 5.1: Numbers of participating students by programmes

<table>
<thead>
<tr>
<th>Module Programmes</th>
<th>No of 1&lt;sup&gt;st&lt;/sup&gt; EI Test</th>
<th>No of 2&lt;sup&gt;nd&lt;/sup&gt; EI Test</th>
<th>Placement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civil Engineering (CE)</td>
<td>91</td>
<td>43</td>
<td>42</td>
</tr>
<tr>
<td>Construction Engineering Management (CEM)</td>
<td>30</td>
<td>14</td>
<td>28</td>
</tr>
<tr>
<td>Architectural Engineering &amp; Design Management (AEDM)</td>
<td>39</td>
<td>37</td>
<td>5</td>
</tr>
<tr>
<td>Commercial Management &amp; Quantity Surveying (CMQS)</td>
<td>38</td>
<td>37</td>
<td>16</td>
</tr>
<tr>
<td><strong>Total number</strong></td>
<td><strong>198</strong></td>
<td><strong>131</strong></td>
<td><strong>91</strong></td>
</tr>
</tbody>
</table>

5.2.2 EI changes

As was alluded to in Chapter One, one of the objectives of the study was to examine the extent to which current built environment education develops students’ EI (section 1.3.2). Thus, three sub-questions were formulated to achieve the objective:

Is there a difference between the first EI test and second EI test of the levels of emotional intelligence? How does EI change over the period of an academic year? Is the difference or change related to the type of programme? Each of the questions is addressed in the following sections.

Table 5.2 provides the Means, Standard Deviation and EI changes in relation to different built environment programmes, namely Civil Engineering (CE), Construction Engineering Management (CEM), Architectural Engineering and Design Management (AEDM) and Commercial Management and Quantity Surveying (CMQS) programmes, over the test-retest period. The results revealed that EI scores generally declined for all built environment programmes over the period of an academic year. The overall EI score went down from an average score of 119.7 (S.D.=14.9) to 117.3 (S.D.=17.7), or a loss of 2.4 points. The biggest EI reduction was evident for students studying on the CMQS programme where students’ EI declined from 115.5 to 110.7 with a standard deviation of 16.3 and 19.5 respectively. This was followed by the AEDM programme where students’ EI suffered a decline of 2.8 points. Similarly, the CEM and CE programmes both experienced a slight decrease in the level of EI, from an average score of 118.9
(S.D.=13.9) to 117.8 (S.D.=13.4) and from an average score of 120.0 (S.D=13.4) to 119.9 (S.D.=15.4), respectively.

Table 5.2: Average EI score of students from CE, CEM, AEDM and CMQS programmes and the EI changes over the test-retest period.

<table>
<thead>
<tr>
<th>Programme</th>
<th>1st EI Test</th>
<th>2nd EI Test</th>
<th>Entire Sample</th>
<th>EI Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>Mean</td>
<td>S.D.</td>
<td>No</td>
</tr>
<tr>
<td>Total EI</td>
<td>233</td>
<td>119.7</td>
<td>14.9</td>
<td>131</td>
</tr>
<tr>
<td>CE</td>
<td>126</td>
<td>120.0</td>
<td>13.4</td>
<td>43</td>
</tr>
<tr>
<td>CEM</td>
<td>30</td>
<td>118.9</td>
<td>13.9</td>
<td>14</td>
</tr>
<tr>
<td>AEDM</td>
<td>39</td>
<td>123.5</td>
<td>16.9</td>
<td>37</td>
</tr>
<tr>
<td>CMQS</td>
<td>38</td>
<td>115.5</td>
<td>16.3</td>
<td>37</td>
</tr>
</tbody>
</table>

Table 5.3: One-way analysis of variance summary table comparing different programmes taken by students.

<table>
<thead>
<tr>
<th>Variable</th>
<th>df</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entire Sample</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between groups</td>
<td>1</td>
<td>899.959</td>
<td>899.959</td>
<td>3.500</td>
<td>.062</td>
</tr>
<tr>
<td>Within groups</td>
<td>327</td>
<td>84076.314</td>
<td>257.114</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>328</td>
<td>84976.274</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Civil Engineering</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between groups</td>
<td>1</td>
<td>854.582</td>
<td>854.582</td>
<td>5.045</td>
<td>.060</td>
</tr>
<tr>
<td>Within groups</td>
<td>42</td>
<td>7114.395</td>
<td>169.390</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>43</td>
<td>7968.977</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction Engineering Management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between groups</td>
<td>1</td>
<td>158.559</td>
<td>158.559</td>
<td>0.501</td>
<td>.481</td>
</tr>
<tr>
<td>Within groups</td>
<td>74</td>
<td>23408.125</td>
<td>316.326</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>75</td>
<td>23566.684</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Architectural Engineering and Design Management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between groups</td>
<td>1</td>
<td>431.309</td>
<td>431.309</td>
<td>1.339</td>
<td>.251</td>
</tr>
<tr>
<td>Within groups</td>
<td>73</td>
<td>23510.771</td>
<td>322.065</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>74</td>
<td>23942.080</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*. The mean difference is significant at the 0.05 level.
To determine whether the EI reduction in overall emotional intelligence scores over an academic year was statistically significant, an ANOVA test was applied (see Table 5.3). The result revealed that no statistically significant difference was found between EI test and retest for the entire sample, $F (1, 327) =3.5$, $p=0.06$. ANOVA tests were also used to identify if the EI reductions existing amongst programmes were statistically significant during the examined period. Separating the sample by programmes revealed no statistical significance for any of the four programmes, the CE programme $F (1, 132) =0.001$, $p=0.98$; CEM programme, $F (1, 42) =5.05$, $p=0.06$; AEDM programme $F (1, 74) =0.50$, $p=0.48$; and CMQS programme $F (1, 73) =1.34$, $p=0.25$.

### 5.2.3 EI and programmes

In addition to the EI reductions that occurred in overall EI score and programmes, the results showed that the levels of students’ EI differed according to the types of programmes taken. On average, students from the AEDM programme scored the highest in comparison with those on the other programmes. An analysis of the entire sample found that AEDM students scored an average of 122.1 with a standard deviation of 17.7, while CMQS students displayed the lowest EI score, which scored an average of 113.2 with a standard deviation of 18.0. The CE and CEM students both averaged similar scores of 120.0 (S.D. =14.0) and 118.5 (S.D. =13.6) respectively.

In order to confirm whether the observed differences between programmes were statistically significant, ANOVA tests were applied to determine if a high confidence level could be obtained in these factors. An ANOVA test revealed a statistical difference in mean scores between programmes, $F (3, 325) =4.53$, $p=0.004$ (see Table 5.5). The post hoc Tukey HSD test was used to determine where the differences occurred in the programmes. The post hoc Tukey HSD test assumes equal variances, which was necessary since the Levene homogeneity-of-variance statistic was not significant in the ANOVA ($p=0.28>0.05$). Results of the post hoc analysis revealed statistically significant mean differences between the CE and CMQS programme ($p=0.016<0.05$, $d=0.43$), and between the AEDM and CMQS
programme (p=0.003<0.05, d=0.50) (see Table 5.6). The effect size was medium or typical using Cohen’s (2004) guidelines.

Table 5.4 Test of Homogeneity of Variances

<table>
<thead>
<tr>
<th>Levene Statistic</th>
<th>df1</th>
<th>df2</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.280</td>
<td>3</td>
<td>325</td>
<td>.281</td>
</tr>
</tbody>
</table>

Table 5.5: One-way analysis of variance comparing different built environment programmes taken by students on their EI test

<table>
<thead>
<tr>
<th>Programmes</th>
<th>df</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between groups</td>
<td>3</td>
<td>3411.719</td>
<td>1137.240</td>
<td>4.531</td>
<td>.004</td>
</tr>
<tr>
<td>Within groups</td>
<td>325</td>
<td>81564.555</td>
<td>250.968</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>328</td>
<td>84976.274</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5.6: Tukey HSD Post Hoc tests

<table>
<thead>
<tr>
<th>(I) Module programme</th>
<th>(J) Module programme</th>
<th>Mean Difference (I-J)</th>
<th>Std. Error</th>
<th>Sig.</th>
<th>95% Confidence Interval</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE</td>
<td>CEM</td>
<td>1.440</td>
<td>2.753</td>
<td>.953</td>
<td>-5.67</td>
<td>8.55</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AEDM</td>
<td>-2.169</td>
<td>2.275</td>
<td>.776</td>
<td>-8.04</td>
<td>3.71</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CMQS</td>
<td>6.803*</td>
<td>2.285</td>
<td>.016</td>
<td>90</td>
<td>12.70</td>
<td></td>
</tr>
<tr>
<td>CEM</td>
<td>CE</td>
<td>-1.440</td>
<td>2.753</td>
<td>.953</td>
<td>-8.55</td>
<td>5.67</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AEDM</td>
<td>-3.609</td>
<td>3.001</td>
<td>.626</td>
<td>-11.36</td>
<td>4.14</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CMQS</td>
<td>5.363</td>
<td>3.008</td>
<td>.284</td>
<td>-2.41</td>
<td>13.13</td>
<td></td>
</tr>
<tr>
<td>AEDM</td>
<td>CE</td>
<td>2.169</td>
<td>2.275</td>
<td>.776</td>
<td>-3.71</td>
<td>8.04</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CEM</td>
<td>3.609</td>
<td>3.001</td>
<td>.626</td>
<td>-4.14</td>
<td>11.36</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CMQS</td>
<td>8.972*</td>
<td>2.578</td>
<td>.003</td>
<td>2.31</td>
<td>15.63</td>
<td></td>
</tr>
<tr>
<td>CMQS</td>
<td>CE</td>
<td>-6.803*</td>
<td>2.285</td>
<td>.016</td>
<td>12.70</td>
<td>-90</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CEM</td>
<td>-5.363</td>
<td>3.008</td>
<td>.284</td>
<td>13.13</td>
<td>2.41</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AEDM</td>
<td>-8.972*</td>
<td>2.578</td>
<td>.003</td>
<td>15.63</td>
<td>-2.31</td>
<td></td>
</tr>
</tbody>
</table>

*. The mean difference is significant at the 0.05 level.
A similar analysis was used to examine the entire sample separating by programmes. ANOVA tests revealed that students differed significantly on whether they had or had not taken the AEDM programme (F=4.486, p =0.035), and similarly in the CMQS programme (F=11.981, p=0.001) (see Table 5.7). This means students studying on the AEDM programme tended to have a higher EI score (M=122.1; S.D.=17.7) than those who had taken another programme; whereas those studying on the CMQS programme had a lower EI (M=113.2; S.D.=18.0) than the average of other programmes. However, there were no significant differences in relation to EI score in the CE programme (F=1.348, p=0.246) and CEM programme (F=0.008, p=0.93).

Table 5.7: One-way analysis of variance summary table comparing different programmes taken by students on their EI test.

<table>
<thead>
<tr>
<th>Variable</th>
<th>M</th>
<th>SD</th>
<th>df</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civil Engineering</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between groups</td>
<td>120.0</td>
<td>13.0</td>
<td>1</td>
<td>348.927</td>
<td>348.927</td>
<td>1.348</td>
<td>.246</td>
</tr>
<tr>
<td>Within groups</td>
<td>117.9</td>
<td>17.4</td>
<td>327</td>
<td>84627.347</td>
<td>258.799</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>328</td>
<td>84976.274</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction Engineering Management</td>
<td>118.5</td>
<td>13.6</td>
<td>1</td>
<td>1.984</td>
<td>1.984</td>
<td>.008</td>
<td>.930</td>
</tr>
<tr>
<td>Between groups</td>
<td>118.8</td>
<td>16.5</td>
<td>327</td>
<td>84974.290</td>
<td>259.860</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>328</td>
<td>84976.274</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Architectural Engineering and Design Management</td>
<td>122.1</td>
<td>17.7</td>
<td>1</td>
<td>1150.024</td>
<td>1150.024</td>
<td>4.486</td>
<td>.035</td>
</tr>
<tr>
<td>Between groups</td>
<td>117.7</td>
<td>15.5</td>
<td>327</td>
<td>83826.249</td>
<td>256.349</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>328</td>
<td>84976.274</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commercial Management and Quantity Surveying</td>
<td>113.1</td>
<td>18.0</td>
<td>1</td>
<td>3003.516</td>
<td>3003.516</td>
<td>11.981</td>
<td>.001</td>
</tr>
<tr>
<td>Between groups</td>
<td>120.4</td>
<td>15.1</td>
<td>327</td>
<td>81972.757</td>
<td>250.681</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>328</td>
<td>84976.274</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As was detailed above, there were significant mean differences between the CE and CMQS programmes (p=0.016<0.05, d=0.43), and between the AEDM and CMQS programmes (p=0.003<0.05, d=0.50). An analysis of the content of each individual module, mode of teaching and learning and assessment used for each module in these programmes was conducted to identify the pedagogic interventions which might
have a positive impact on EI. Further examining the programme modules between CE and CMQS revealed that 40% of the modules were similar in both programmes; of the remaining 60% of modules, five modules from the CE programme relative to two modules from the CMQS programme were indicated to develop skills that contribute to EI. In other words, there are more modules which are tended to promote EI in the CE programme than the CMQS programme. Regarding the methods of teaching and learning and assessment used, the majority of modules in both CE and CMQS programme were delivered mainly through lecturing, tutoring and laboratory classes, and adopted general assessments such as examination, oral presentation and report. However, it is worth noting that of the remaining 60% of differential modules, nearly all modules in CE programme involved group work and were based on student-centred learning (see Appendix I). The examination of both the AEDM and CMQS programmes uncovered some similar findings. Both programmes shared 40% similarity in modules. Of the remaining 60% of differential modules, it was interesting to find that three modules from the AEDM programme were intended to enhance emotional competencies, mainly design courses, while only one module from CMQS served the same purpose. In other words, there are more EI-embedded modules involved in the AEDM programme than the CMQS programme. No difference was found with regard to the teaching and learning methods and assessment used in both programmes (see Appendix J).

5.2.4 EI and gender

An exploratory analysis was conducted to determine if demographic factors, such as gender, work experience and age, were significant contributors to the difference between first and second EI test scores. Table 5.8 shows the Means, Standard Deviation and EI changes for females and males over the test-retest period. The results revealed that no significant EI change was found between female students and male students for the programmes taken in the first EI assessment. However, males generally scored significantly higher than females in the second EI assessment. It is also interesting to note that females’ EI dramatically decreased after an academic year while males’ EI remained almost the same (see Figure 5.1). The overall EI mean scores of female students between the EI test and retest were 119.7 (S.D.=12.1) and 110.4 (S.D.=20.7), respectively, or a loss of 9.3 points. This may imply that
females are more likely to experience EI reduction during the learning process in the built environment education or that current built environment education inhibits females’ EI growth. One possible reason could be due to the tendency of females to exhibit their gender in a particular way in male dominated environments, (Butler, 2004), such as acting like one of the boys, adopting an ‘anti-woman’ approach etc., in order to gain male acceptance (Powell et al., 2009); this, in turn, may adversely affect their EI growth.

Figure 5.1: EI score for females and males over the test and re-test period

Table 5.8: EI score and EI differences for males and females over the test and re-test period.

<table>
<thead>
<tr>
<th>Programmes</th>
<th>Females</th>
<th>Males</th>
<th>EI Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>Mean</td>
<td>S.D.</td>
</tr>
<tr>
<td>1st EI Test</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total EI score</td>
<td>46</td>
<td>119.7</td>
<td>12.1</td>
</tr>
<tr>
<td>2nd EI Test</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total EI score</td>
<td>34</td>
<td>110.4</td>
<td>20.7</td>
</tr>
</tbody>
</table>

5.2.5 EI and work experience

Exploring the changes in EI in relation to work experience and age uncovered some interesting potential relationships. Table 5.9 shows the Means, Standard Deviation and EI changes for students with or without work experience for the entire sample. It can be seen from Figure 5.4 that students’ EI generally declined for all programmes between the EI test and retest period (as was discussed in section 5.2.2);
however, there were different degrees of EI increase for all programmes with placement students who had work experience. A descriptive analysis of the entire sample showed an average overall EI score of 121.4 (S.D.=11.1) for students with work experience, as compared to 117.3 for students without work experience in the second EI test, or a gain of 4.1 points. The CMQS programme witnessed the biggest EI improvement in which students’ EI rose from an average score of 110.7 to 123.7, with a standard deviation of 19.5 and 10.1 respectively. This was followed by the CEM programme where students’ EI experienced a gain of 5.2 points. Both the CE and AEDM programmes did not experience any significant EI gains.

Figure 5.2: EI score of students studying on CE, CEM, AEDM and CMQS programme

Table 5.9: The Means, Standard Deviation and EI changes of students studying on different programmes

<table>
<thead>
<tr>
<th>Programme</th>
<th>1st EI Test</th>
<th>2nd EI Test</th>
<th>Placement</th>
<th>EI Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>Mean</td>
<td>S.D.</td>
<td>No</td>
</tr>
<tr>
<td>Total EI</td>
<td>198</td>
<td>119.7</td>
<td>14.9</td>
<td>131</td>
</tr>
<tr>
<td>CE</td>
<td>91</td>
<td>120.0</td>
<td>13.4</td>
<td>43</td>
</tr>
<tr>
<td>CEM</td>
<td>30</td>
<td>118.9</td>
<td>13.9</td>
<td>14</td>
</tr>
<tr>
<td>AEDM</td>
<td>39</td>
<td>123.5</td>
<td>16.9</td>
<td>37</td>
</tr>
<tr>
<td>CMQS</td>
<td>38</td>
<td>115.5</td>
<td>16.3</td>
<td>37</td>
</tr>
</tbody>
</table>
5.2.6 EI and age

With respect to age, EI was also found to be higher in older students. Table 5.10 shows the Means, Standard Deviation and EI changes of different age groups for the entire sample. It can be seen that age appeared to have a positive relationship with overall EI score, with the older students (age>22yrs) having a higher EI score than younger respondents (age<=22yrs). It was notable that students’ EI did not change massively for participants who are younger than 22 years old, it only experienced a slight EI gain of less than 1 point. However the EI score rose dramatically for students over 22 years old (see Figure 5.3). The data showed that the students experienced an EI gain of 5.0 points from an average score of 119.4 (S.D.=13.0) for 20 to 22 year olds’ group to an average score of 124.4 (S.D.=14.8) for 23 to 24 year olds’ group. This may imply that older participants are more likely to experience EI growth through their study than their younger counterparts.

Figure 5.3: EI score of different age groups

<table>
<thead>
<tr>
<th>Age Group</th>
<th>No</th>
<th>Mean</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between 18 to 20yrs old</td>
<td>288</td>
<td>118.9</td>
<td>15.7</td>
</tr>
<tr>
<td>Between 21 to 22 yrs old</td>
<td>99</td>
<td>119.4</td>
<td>13.0</td>
</tr>
<tr>
<td>Between 23 to 24 yrs old</td>
<td>26</td>
<td>124.4</td>
<td>14.8</td>
</tr>
</tbody>
</table>
5.2.7 Inferential statistics analysis

An exploratory analysis was conducted to determine if demographic factors such as gender, age and work experience were significant contributors to the mean differences for the entire sample. ANOVA tests were applied to analyse if a high confidence level could be obtained in these factors. The results are shown in Table 5.11, which indicates that no significant differences in relation to EI score were found in relation to gender (F=3.75, p=0.054), age (F=1.56, p=0.212) and work experience (F=2.26, p=0.134). Notwithstanding the limitations imposed by the small sample, this suggests that gender, age and work experience were not determining factors for EI in the built environment students sampled.

Table 5.11: ANOVA summary table comparing total EI on Gender, Age and Work Experience

<table>
<thead>
<tr>
<th>Variables</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Group</td>
<td>964.285</td>
<td>1</td>
<td>964.285</td>
<td>3.753</td>
<td>.054</td>
</tr>
<tr>
<td>Within Groups</td>
<td>84011.989</td>
<td>327</td>
<td>256.917</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>84976.274</td>
<td>328</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Group</td>
<td>703.101</td>
<td>2</td>
<td>351.551</td>
<td>1.555</td>
<td>.212</td>
</tr>
<tr>
<td>Within Groups</td>
<td>92663.775</td>
<td>410</td>
<td>226.009</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>93366.877</td>
<td>412</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work Experience</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Group</td>
<td>518.585</td>
<td>1</td>
<td>518.585</td>
<td>2.257</td>
<td>.134</td>
</tr>
<tr>
<td>Within Groups</td>
<td>96042.405</td>
<td>418</td>
<td>229.767</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>96560.990</td>
<td>419</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5.2.8 Summary

Many interesting findings emerged from the questionnaire survey. Overall, a general EI reduction occurred in all programmes taken in the built environment education over an academic year. Although the reduction was relatively modest, it has revealed that the built environment education goes against the natural EI growth rise with maturity process experience (Bar-On and Parker, 2000). Therefore, this may suggest that the current built environment education does not fully develop students’ EI or the built environment programmes in some way inhibit students’ EI growth. Exploring the relationship between EI and other demographic factors, such
as gender, work experience and age uncovered some interesting relationships. In built environment education, males were generally found to have higher EI than females. In addition, female students were more likely than their male counterparts to experience a decline of EI through the learning process. A positive relationship was revealed between EI and age. Older students (age>22yrs) tended to have a higher EI score than the younger respondents (age<=22yrs). Surprisingly, a significant EI gain of 5.0 points occurred in students who were over 22 years old. In terms of the relationship between EI and work experience, students with work experience scored higher than students without work experience. Although there were mean differences observed across the demographic factors, ANOVA tests revealed no significant EI differences in relation to EI changes and these factors. In other words, gender, age, and work experience were not determining factors for EI in the built environment students sampled. However, caution should be exercised because of the small sample in each category. The following sections present the results and findings from the interviews.

5.3 Findings from Interview Sample

As the results indicated in the section 5.2, although current built environment education did not appear to support students’ EI development, the industrial experience was found to enhance EI. Therefore, the aim of the interview was to investigate how students’ EI is shaped and developed by working in the industry and the potential issues that contribute to this achievement. A qualitative methodology utilising one-to-one, semi-structured interviews was adopted. The tape-recorded interviews were transcribed verbatim and analysed by NVivo 8.0 to reveal codes, categories and themes (see section 4.8).

5.3.1 Interview sample

The interview sample (see table 5.12) included in-depth interviews with 30 placement students (24 males and 6 females) with a mean age of 21.4 years (S.D.=1.16), range from 20 to 24 and drawn from four different programmes in built environment education. The company size they worked for ranged from 4
employees to 2,000 employees. The students were in either the second or third year of a four-year undergraduate course. All participants possessed work experience between 6 months and 48 months (see Figure 5.5), and each interview conducted lasted between 45 minutes and an hour. These included 5 BEng Civil Engineering students (CE), 13 from the BSc in Construction Engineering Management (CEM), 5 students from BSc Architectural Engineering and Design Management (AEDM) and 7 students from the BSc Commercial Management and Quantity Surveying (CMQS). Table 5.12 shows numbers of interviewed students by programme in this study. Figure 5.4 and Figure 5.5 show positions of interviewed students and duration of informants’ work experience in the placement, respectively. (A profile of respondents can be seen in Appendix H).

Table 5.12: Number of interviewed students by programme

<table>
<thead>
<tr>
<th>Module Programmes</th>
<th>Number of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civil Engineering (CE)</td>
<td>5</td>
</tr>
<tr>
<td>Construction Engineering Management (CEM)</td>
<td>13</td>
</tr>
<tr>
<td>Architectural Engineering and Design Management (AEDM)</td>
<td>5</td>
</tr>
<tr>
<td>Commercial Management and Quantity Surveying (CMQS)</td>
<td>7</td>
</tr>
</tbody>
</table>

Figure 5.4: Positions of interviewed students

The Distribution of Position

- Trainee QS: 7, 23%
- Trainee site manager: 5, 17%
- Trainee design coordinator: 6, 20%
- Trainee engineer: 3, 10%
- Trainee construction manager: 2, 7%
- Trainee project planner: 7, 23%
5.3.2 Descriptive statistics for interview sample

Table 5.13 shows the EI score of placement students in relation to the programmes taken according to gender, age and work experience. There were several interesting findings. The results revealed that CEM placement students possessed the highest EI scores with an average of 128.9 (S.D.=10.2) in comparison to the other programmes, whilst CE placement students scored the lowest on EI with an average of 110.8 (S.D.=15.0). In addition, females were shown to possess higher EI than male students, with an average overall EI score of 128.3 (S.D.=9.79), as compared to 122.3 (S.D.=13.7) for males. This finding was the opposite of the results in the sample of students without work experience group (see section 5.2.4). However, caution must be taken owing to the small sample size of each category.
Table 5.1: A Summary of Means and Standard Deviation of EI score in relation to Programmes, Gender, Age and Work Experience.

<table>
<thead>
<tr>
<th>Variables</th>
<th>No.</th>
<th>Mean</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total EI</strong></td>
<td>30</td>
<td>123.5</td>
<td>13.1</td>
</tr>
<tr>
<td><strong>Programmes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Civil Engineering (CE)</td>
<td>5</td>
<td>110.8</td>
<td>15.0</td>
</tr>
<tr>
<td>Construction Engineering Management (CEM)</td>
<td>13</td>
<td>128.9</td>
<td>10.2</td>
</tr>
<tr>
<td>Architectural Engineering and Design Management (AEDM)</td>
<td>5</td>
<td>119.0</td>
<td>14.8</td>
</tr>
<tr>
<td>Commercial Management and Quantity Surveying (CMQS)</td>
<td>7</td>
<td>125.6</td>
<td>10.2</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>6</td>
<td>128.3</td>
<td>9.79</td>
</tr>
<tr>
<td>Male</td>
<td>24</td>
<td>122.3</td>
<td>13.7</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>age &lt;=22 yrs</td>
<td>26</td>
<td>123.5</td>
<td>12.7</td>
</tr>
<tr>
<td>age &gt;22 yrs</td>
<td>4</td>
<td>123.0</td>
<td>17.5</td>
</tr>
<tr>
<td><strong>Work Experience</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W&lt;=12 months</td>
<td>16</td>
<td>124.7</td>
<td>14.5</td>
</tr>
<tr>
<td>12&lt;W&lt;=24 months</td>
<td>10</td>
<td>120.0</td>
<td>12.2</td>
</tr>
<tr>
<td>W&gt;24 months</td>
<td>4</td>
<td>127.3</td>
<td>9.54</td>
</tr>
</tbody>
</table>

Exploring the EI changes in relation to age and work experience showed some unique findings. On average, students with work experience were found to have higher EI (M=123.5; S.D.=13.1) than those without work experience (M=118.7; S.D.=16.1) (see Table 5.2). Participants with the greatest work experience (W>24 months) scored highest amongst all those in the work experience group (M=127.3, S.D.=9.54). However, the second highest EI score was shown in the students with the least job experience (W<12 months). The data showed an average overall EI score of 124.7 for people possessing less work experience (W<=12m), as compared to 120.0 for people in the group having greater work experience (12m<W<=24m), with standard deviations of 14.5 and 12.2 respectively.

### 5.3.3 Inferential statistics for interview sample

To determine whether there were statistically significant EI changes amongst educational programmes, gender, age and work experience, ANOVA tests were applied to determine if a high confidence level could be obtained in these factors (see
Table 5.14). However, no significant differences were found in relation to EI score for the CE programme (F=2.33, p=0.126), CEM programme (F=0.76, p=0.71), CMQS programmes (F=0.71, p=0.75), gender (F=0.60, p=0.83), age (F=1.89, p=0.20) and work experience (F=0.41, p=0.95). Again, due to the small sample size in each variable, the results can only be used for an exploratory purpose. Table 5.14 summarises one-way analysis of variance, comparing total EI on programmes according to gender, age and work experience.

Table 5.14: One-way analysis of variance summary table comparing total EI on programmes, by gender, age and work experience

<table>
<thead>
<tr>
<th>Variables</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>3.667</td>
<td>22</td>
<td>.167</td>
<td>2.333</td>
<td>.126</td>
</tr>
<tr>
<td>Within Groups</td>
<td>.500</td>
<td>7</td>
<td>.071</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>4.167</td>
<td>29</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CEM</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>5.200</td>
<td>22</td>
<td>.236</td>
<td>.764</td>
<td>.708</td>
</tr>
<tr>
<td>Within Groups</td>
<td>2.167</td>
<td>7</td>
<td>.310</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>7.367</td>
<td>29</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>AEDM</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>4.167</td>
<td>22</td>
<td>.189</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Within Groups</td>
<td>.000</td>
<td>7</td>
<td>.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>4.167</td>
<td>29</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CMQS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>3.700</td>
<td>22</td>
<td>.168</td>
<td>.706</td>
<td>.751</td>
</tr>
<tr>
<td>Within Groups</td>
<td>1.667</td>
<td>7</td>
<td>.238</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>5.367</td>
<td>29</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>3.133</td>
<td>22</td>
<td>.142</td>
<td>.598</td>
<td>.832</td>
</tr>
<tr>
<td>Within Groups</td>
<td>1.667</td>
<td>7</td>
<td>.238</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>4.800</td>
<td>29</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>2.967</td>
<td>22</td>
<td>.135</td>
<td>1.888</td>
<td>.197</td>
</tr>
<tr>
<td>Within Groups</td>
<td>.500</td>
<td>7</td>
<td>.071</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>3.467</td>
<td>29</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Work Experience</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>8.467</td>
<td>22</td>
<td>.385</td>
<td>.414</td>
<td>.946</td>
</tr>
<tr>
<td>Within Groups</td>
<td>6.500</td>
<td>7</td>
<td>.929</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>14.967</td>
<td>29</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5.3.4 EI changes over placement

Table 5.1 summarises the responses from informants when asked how they perceived that their EI had changed over the placement year. The research revealed that 67% informants (n=20) stated that their EI had greatly improved, whilst 33% (n=10) students believed that their EI had not changed massively or stayed almost the same. It should be noted that none of the informants claimed that industrial experience had inhibited the growth of EI. This finding was echoed by the results of the quantitative data in which students possessing work experience had higher EI score than students without work experience (section 5.2.5). This may infer that industrial experience generally has a positive effect on the development of EI.

Table 5.15: Responses of interviewed students to Questions 1

<table>
<thead>
<tr>
<th>Q1: How do you perceive your EI abilities have been changed over the placement year?</th>
<th>1=significant reduction</th>
<th>2=mild reduction</th>
<th>3=neither improved nor reduced</th>
<th>4=mild improvement</th>
<th>5=major improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-point scale</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CE</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>CEM</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>AEDM</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>CMQS</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Number in sample</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>7</td>
<td>20</td>
</tr>
</tbody>
</table>

The majority of informants believed that their emotional competencies had greatly improved through the placement. One student responded,

“I think it’s greatly improved over my placement year. When I first started my placement year, if things annoyed me and I became angry I would speak out and say something about it. Now I am a lot better in managing that. If I have a bad day at work, or some people say something in the meeting, you know something not very nice. I’d better sort of just swallow it and learn to let it wash over me.”

Male AEDM student-21yrs

Another student commented,
“I think my construction placement definitely helped to improve my emotional competences, as you are completely in a different role. You work with a lot of people you wouldn’t normally work with, and you open to so many different types of people. I sort of manage to develop my emotional skills and develop my ability to handle the way that I respond to people. I definitely think my skills have improved”

Male CEM student-20yrs

However, it was very interesting to note that of the 33% informants who did not feel that their emotional competencies had been greatly enhanced during the placement, 10% (n=3) categorised themselves as ‘older’ or ‘mature’ students (age>=24 years old) as compared to younger respondents (age <24 years old). The respondents felt that they had more experience along with the age increase; hence felt it easier to behave like an adult when dealing the people in the workplace.

“I am an older student than most of people; I am a more mature student. I am older than most of students in my course. They are maybe 21 when they are in their year out. I think they haven’t had any opportunity to work before the degree and I have. So I have found it very comfortable to read people’s emotions and talk to them, just sit down and act as adults in the industry.”

Female CMQS student-24yrs

This sentiment was well echoed by another construction professional who indicated that his experience in dealing with people increased along with age, and felt that he was better able to manage and control his emotions than his younger age (see 2.10.4). Another younger student also reflected this sentiment by indicating the difficulty he had in dealing with people in the industry when he was younger and less mature.

“I think I have become harder this year, I have become more robust. Beforehand, I was a lot more, not immature, but younger in the way I dealt with people. I don’t really understand why they think like that. I have grown a lot in that...I’m a lot more resistant to it.”

Male AEDM student-21yrs
In addition, it is notable that within the 33% participants (n=10), the majority of students (n=8) had already gained substantial amounts of work experience prior to the placement. Hence, they considered themselves as experienced students in comparison to novice students who just entered their first placement. They believed they had learnt and developed many emotional competencies from the work done in the past, such as how to control their own emotions, cope with conflicts and act appropriately to others’ emotional reactions.

“I have been in a tricky situation before, because I used to teach as well. I was like a classroom assistant. The nature of classes I was in was more often where the students had always been expelled from other schools. Basically it was the low ability class with bad attitudes, so I developed a lot of mediation skills. I think I was able to perceive others’ emotions, kind of to allow them to talk about their emotions without actually building up conflicts. So I feel like I could do that before the placement and after, so I don’t necessarily feel like my time in industry has developed them a lot.”

Male CEM student-24 yrs

Also:

“I have worked full time; I’ve worked with adults before, so I feel I can handle peoples’ emotions a lot better than the younger people in my course.”

Female CMQS student-24yrs

The above two quotes support the work conducted by Bar-On (2002) and Goleman (2000) who indicated that the past life experience and work experience will enhance people’s EI. This is also in correspondence with the results presented in section 5.3.2 where students with greater work experience tended to score high in EI (M=127.3, S.D.=9.54) as compared to those with less work experience (M=124.7; S.D.=14.5).

The other reason stated by two female respondents who did not perceive that their EI had changed massively was that their exclusion from the male society in the construction industry had resulted in their unwillingness to perceive and to understand their male colleagues, which in turn hindered the development of their
emotional competencies. This could be used to explain why male students scored higher on EI than females as shown in section 5.2.4.

“On the male perspective, you can never guess what they’re feeling. During the work placement, apart from friends, social kind of friends, personally I never dwelled into too much about what other people would feel or how they would feel at work. Because I was working with lots of guys and they are so closed off anyway… I don’t really think it has been developed since I have been at work.”

Female CMQS student-22yrs

5.3.5 Students’ perspectives of Built Environment Education on their EI development

This section addresses the first part of objective five which was to explore the perspectives of built environment students on their EI development, and the second part (how these could be enhanced in the future?) is addressed in Chapter Six. When students were asked to compare how well university and placement had prepared their emotional competencies for the construction industry, the majority of students (62%, n=19) considered that industry was more helpful than university in developing the emotional competencies for the future work, whilst 14% (n=4) students held an opposite view. The remaining 24% of students (n=7) believed both experiences had the same effect on the EI development. Table 5.16 summarises the responses of informants.

Table 5.16: Responses of interviewed students to Questions 2.

<table>
<thead>
<tr>
<th>Q2: How do you perceive your industrial experience developed your emotional competencies in comparison with your learning experience in the University?</th>
<th>Industrial experience &lt; University experience</th>
<th>Industrial experience = University experience</th>
<th>Industrial experience &gt; University experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE</td>
<td>0</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>CEM</td>
<td>1</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>AEDM</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>CMQS</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Number in sample</td>
<td>4</td>
<td>7</td>
<td>19</td>
</tr>
</tbody>
</table>
Experience of Industrial Placement

It was interesting to note that industry placement was described by many informants as a ‘protective bubble’ (n=5) where students were supervised and watched over by industrial mentors. They indicated that such a risk-free environment gave students a sense of security as they knew they could always get support from mentors, hence learning more effectively without taking too many responsibilities.

“When you have a year out, you kind of walk through everything. You always have someone there holding your hand pretty much throughout the whole year. They let you know everything is ok. I think they build up your confidence in which you know when you come out to university, you know there is really nothing to fear...You are in a protective bubble and you know that nothing can really go wrong.”

Female CMQS student-24yrs

This sentiment was echoed by another informant who stated that he tended to perform better when he had people to rely on and undertook less responsibility.

“At the start I was quite busy, but I got friends to depend on in the company and I got told what to do really so I had less responsibility. I really enjoyed that because it made me work better.”

Male CEM student-20yrs

In addition, industrial placement was cited by the majority of informants (n=19) as a ‘real world’ where students were given opportunities to develop a broad range of emotional competencies in a professional environment by putting what they had learnt from the university into practice. One student stated,

“Industries give you chance to put what you are learning into practice, sometimes you realise that what you’ve learnt, what you do between students doesn't always work in the industry, but it allows you not to make such big mistakes that might affect you later on. Certainly in the university, work in coursework groups is very important. But it’s a real life and real world when
you are in the construction; also there are problems you meet in construction you won’t meet in the university."

Male CEM student-22yrs

Another student expressed,

“Industry is real, and you also did something more...if you get to start to develop relationships with people and you’ve got to talk to people and communicate. You do pick up the ability to understand and how to work with people better. As you work in a team, you have to work with people, relate to them and understand how they work, and try to fit how you are working with them.”

Female CMQS student-21yrs

Many respondents believed that both university and industry had built up their confidence, but in different areas. They believed that university was particularly good at developing confidence in dealing with the courses and examinations, while industry tended to develop students’ confidence in dealing with interpersonal relationships and work.

“The university experience gives me confidence in my course, so I have better understanding of how to handle the course, you know just the modules....For my placement, I think it really improves my confidence working in industry in which I feel more confident as a graduate when I go out there. You know taking control of whatever they give me rather than taking a back seat without the experiences and thinking I don’t know what I’m doing because I know some people go through that.”

Female CMQS student-24yrs

The industrial placement was also found to help informants to gain a more realistic view of their work capability, a better understanding of their strengths and weaknesses as well as remedial areas which needed to be improved. Many informants indicated that they had misunderstood or overestimated their emotional competencies before entering the placement.
“If you ask me that question before my placement, I would say I am pretty good, say just general conversation. But that’s similar situation to just socialising and anyone can do that. You have years’ experiences to do that. But when you are in the working environment where you are actually put in contention with people based on your companies, policies, your different objectives for you know saving money on both sides. It’s bound to come to contention. It’s a new experience which I haven’t done it before. As a result, now I would say I was pretty poor. I am still pretty poor compared to some people but I am learning. I am much better than I was.”

Male CEM student-21yrs

**Experience of University Learning**

When asked how well university had developed the informants’ emotional competencies, some informants expressed the view that they did not learn as much in the university as they did in the industry. They considered that university was a fairly controlled environment where students could easily understand each other due to similar age and background.

“The university, you are very much still inside the bubble, it’s a fairly controlled environment. Although from different diversity backgrounds, students tend to understand their mind set and they tend to be the similar age; they all tend to be between 18 to 25 years old. In some way, the way of dealing with those people is quite similar, and also people tend to have the same issues. Being a student, you can relate to because you can share with their backgrounds.”

Male AEDM student-21yrs

Also see

“In the university, it is more or less controlled environment. You still have group meetings, you do have to be tolerant and argue with people about the work and stuff, but it is not as taxing as being at work. You got everyone pretty much on the same level as far as experience goes. Within your class, there are not that many or a broad range of people. When you work, you
work with the people from all countries, different work lives, and different ages. Just bring more people to your door, so you have to use different techniques and try to work it out.”

Male CEM student-21ys

Accordingly, It was indicated that the simple and fairly controlled environment of university had resulted in a tendency for students to focus on their own ‘little world’ which concerns mainly finishing coursework, passing examinations and gaining a good grade.

“At university all you are responsible for is your own grade. You revise to pass the exam, you don’t do it because you want to learn about stuff, you just do it to pass the exam, you only feel you need to do that as far as you need to get a 2:1. You can get quite narrowly focused on yourself and your own ‘little world’.”

Male CE student-21yrs

Although many built environment courses containing group work were appreciated as helpful in developing the communication, interpersonal relationships and teamwork capability, many informants indicated that the extent to which university developed these emotional competencies had failed to reach the standard required by industry. The reasons were explained in that industry requires a higher standard of professionalism in interpersonal relationships and skills. Besides, industry is a real and more rigorous environment where informants need to be responsible not only for themselves, but also other people such as colleagues, leaders and teammates etc. Therefore, when dealing with the problems in the industry, any errors they make in the performance are subject to higher risk than those in the university. Hence, the realisation of being professional has led to a motivation for informants to self-learning and to improve their work capability, and as a result enhance their work performance.

“When you are in the industry, you are forced to relate to so many people. You got managers, you got your friends, and you got people on site who are telling you what to do. You got responsibilities and expectations to meet. It’s
like if I made a mistake in my exam then my grade would go down; but if I make a mistake on site, I could cost my company hundreds thousands of pounds, you learn a lot more because the stake is higher.”

Male CE student-21yrs

Another student stated,

“In the university, you expose yourself to different things, but not to the standard when you actually work in the industry.”

Male CE student-23yrs

Nearly 25% of students believed that both industry and university were important for developing students’ EI. They described the relationship between industry and university as interrelated in which university builds up the foundation of EI theory whilst industrial placement offers students a place to practise. There was a general recognition that the most effective way of learning was through practising.

“I think they (EI competencies) can be taught to a degree, but you’ve got to experience them. I don’t think you can build emotion competencies yourself once you understand what truth an emotion is until you feel it. So I think the placement is the best way of learning these skills...I think one thing you can do in university is you can be taught things, and you can relate back to things that you have done. You can learn the principle of maybe how to communicate with people, but it’s not until you’re put in the situation where you actually have to do it, it’s the best way to come out.”

Male CEM student-20yrs

5.3.6 Work characteristics and skills

Most interviewees described the particular characteristics and skills required to work better and be successful in their jobs. Interestingly, most of these skills can be attributed to EI. Effective communication was mentioned most frequently as an essential skill in the industry. It was indicated that this would help to improve the
work efficiency by accurately conveying the information amongst people with whom you work. The following quotations make the point.

“The most important one would be able to communicate with people, because without communication you can’t get any job done. I think my job is pretty much communicating information across to people. Making sure everyone is involved in the whole process, and you don’t miss out people or links or certain criteria that need to be covered. I think that’s almost the most important skill….You also need to have a close relationship between associates, but also thinking on and reflecting on how you perceive others and how your emotions would affect them.”

Male CEM student-20yrs

Others felt that personal skills were crucial since everyone in the industry has to work in a team, and personal skills help to establish a good interpersonal relationship that contributes to effective team performance.

“I think it’s people skills. You’ve got to be able to talk to people. You’ve got to use people skills for everything, to talk one and one, to talk in a team. If you don’t have that, it doesn’t matter how intelligent you are. I think in my job, it’s all based on teamwork, it’s not an individual job you do, everyone has some sort of roles in which all comes together…So I think if you have people skills, you know how to manage people, get on with people well, if you have that, it’s very important… It’s not just about being book smart, it’s about being people smart, and it really helps out.”

Female CEM student-24yrs

In addition, it is interesting to note that respondents working in different roles emphasised different emotional competencies for a better performance in their work area. Most CMQS students highlighted the importance of being assertive in dealing with the relationship of subcontractors. This was quite reasonable, as most CMQS students worked as trainee quantity surveyors in their placement, mainly responsible for financial and measurement, costing control, evaluation etc; the nature of their
work required them to make sure all price quoted items were clearly presented and firmed in order to make sure subcontractors were not over claiming money.

“You need to be good at communicating and you need to be quite assertive as well. When I was dealing with subcontractors and suppliers’ things, I was managing finance, making sure they are not over spending money, and making sure they are not overcharged money as well. You need to be fairly assertive, without being aggressive, just being assertive.”

Male CMQS student-22yrs

Another CMQS student commented,

“When I was doing the final account for lots of jobs, subcontractors will sending their final invoice saying what they think they should be paid. I have a look at it, I don’t think they should be paid that much for whatever reasons, like they haven’t done the work or haven’t done their job properly. I would go back to them, I rang them up and said ‘look, I don't think it’s correct, this is why’, then I went for it...If you’re correct and assertive, you can go back to what you said, often you can achieve what you want.”

Male CMQS student-22yrs

The CEM students pointed out that emotional understanding and emotional awareness were important in the project management.

“You need to be attentive to other people’s emotions and understand other people’s situations. Being empathetic and being able to put yourself in their shoes. You’ve got to be understanding when you do my job, you have to realise what you can’t expect from people. They are not going to be perfect and also I might not be able to be perfect in all the situations”

Male CEM student-24yrs

This perspective was echoed by another AEDM student who worked as a project planner and he believed that people with the ability to accurately perceive and assess others’ emotions were able to use this intelligence to distinguish the true emotions
and ‘real feeling’ from massive concealed or false emotions of others, hence gaining the right information that contributed to decision making and work effectiveness.

“\textit{You have to judge people’s emotions. If you are a planner, you need to make sure you get the best information out of people. I guess you have to judge that particular emotion at that point. It might be change the information they are telling you, like do they try to hide something, or are they in a bad mood so they just snap out things and give you the wrong information or are they really thinking about what they are telling you.}”

\textit{Male AEDM student-22yrs}

Also a good sense of humour and resilience would make students easier to fix into a new environment.

“\textit{You need to have a sense of humour both to motivate yourself and other people. I often made a joke in the placement when there were pressures.}”

\textit{Male CE student-21yrs}

The above comments suggest that there was a discrepancy amongst informants with regards to the emotional competencies required by different jobs. Although informants mentioned that generic skills, such as experience, knowledge and technical skills were essential as well, many indicated that emotional competencies outweigh technical skills and academic knowledge for a better performance in the industry. One student stated,

“\textit{One of those things I’ve found in the placement was not so much like technical, architecture things, its more sort of dealing with people…it’s very intensive to deal with other people and yourself, 95% every day.}”

\textit{Male AEDM student-22yrs}

Also:

“\textit{I think I would handle it a little bit differently if I’d done it again. It wasn’t about the problem of the job; it’s about how carefully you approach the people.}”
Male CE student-23yrs

This sentiment was echoed by another respondent who felt that the knowledge and academic skills he had acquired from the university was rarely being used in the placement, indicating that students were not sufficiently prepared to enter the construction industries in terms of emotional skills.

“I did two years of university learning, like degree level maths, but I could go on site and do everything I’ve done without that...You don't need a lot of academic skills, it’s mostly about being able to pick up things quickly, being a quick leaner. Because most of the things you learn are new, you have to learn from staff anyway...I think it would be different if you went to a design office, but on site, what I was doing last year, I used fairly little academic knowledge, the most useful things I did was the field course we did which was only for a week.”

Male CE student-21yrs

5.3.7 The role of EI in construction industry

When students were asked how important EI was in managing people in the construction industry, all informants believed that EI played a very important role in construction industry, especially for how to manage people’s emotions and being able to use it to regulate their behaviours in order to get the best work performance.

“It’s very important, obviously, you are going to meet and talk to people. The process of managing people is to try to get them to do something for you, try to get something out of them for you, so you get the benefits. So if you know how to adapt to different people, tell what different people are feeling, understand what different people are feeling, obviously you have the advantages. If you use the one method or one thinking all the time for everybody, it is not going to work.”

Male CMQS student-21yrs

Another student commented,
“Very important, people won’t communicate a lot inside. Sometimes people won’t communicate by speaking out, they communicate through facial expressions. I think the important thing is to look at their facial expression and interpret what they are thinking from that and you can experience the differences.”

Male CEM student-21yrs

Others felt that EI was particularly important for certain roles, like project manager, or HR manager, because more often people in these positions need to manage and deal with people very frequently.

“Because of my experience in London and the way that I was dealt with, I think EI is important for particular roles, mainly HR people. I think it’s significantly important. They need to have the ability not only to read people’s emotions but also to portray a sense that they are comfortable with listening to people’s emotions and accepting what people might say because of their emotions.”

Female CMQS student-22yrs

However, it was notable that only a few students went to the placement with a clear idea of developing their emotional skills.

“The reason I went to work placement was to improve my sort of ability to manage peoples’ emotions, interpret what people are feeling and leadership quality, I think I have learnt a lot more.”

Male CE student-21yrs

The majority of the students stated that they had not been well prepared in terms of EI competencies and failed to recognise its role in the workplace before entering the placement. This may indicate that current built environment education fails to raise students’ awareness of EI learning and development.
“Before I went to the placement, I never really think about emotional skills...I can’t really tell people what they would feel and myself as well. I didn’t really know, as I didn’t think about things like that.”

**Male CEM student-22yrs**

In addition, it is interesting to find that some informants stated that in the university they tended to avoid working with peers without work experience as they would see them as less professional.

“I was very careful in my final year to pick the good people that I work with. Everyone in the team is just different. In one of my team of four, three of them have done the placement year, one of them hasn’t. He is a lot less professional than the rest of us, so you can tell the difference. He doesn’t do his work for meeting sometimes which is annoying. It’s ok in the university, but these sort of things are unacceptable in industry, three of us know that, I think we just focus a bit more, and we know more about industry and building in general.”

**Male AEDM student-21yrs**

Others indicated they were likely to work with their friends in the group coursework as they got on very well with each other and felt comfortable to work together.

“In the group work, I tend to work with my friends on my course. Because we always do well together, we work and we put the same effort in the group and we are quite comfortable with each other. Sometimes you get forced into a group and you can’t choose your own group.”

**Male CMQS student-22yrs**

5.4 How EI Affects Students’ Performance

The next two sections (Section 5.4 and 5.5) aim to fulfil objective four, to investigate if and how industrial placements enhance students’ EI, by investigating the effect of industry on students’ EI, and the potential factors that contribute to EI development
in the industry placement. As with the pilot study during the interviews, the student informants were asked to describe real incidents in the workplace in which they regulated their emotions (a positive critical accident) or fail to regulate their emotions (a negative critical accident). Participants were not limited in their responses; they could recall both positive and negative incidents as many times as they desired. The interviewer limited her questioning to probing questions about the incidents, such as “what led up to the event?”, “what happened later”, “how did you feel and what did you actually do”. By doing this, it was possible to find out the effect of emotions on informants’ thought and behaviours that would eventually lead to different work performance.

5.4.1 Emotions influence behaviours

The Source of Negative Emotions

It was universally believed that working in the industry was very challenging, which had led to informants experiencing a series of negative emotions. These included frustration, nervousness, worry, self-doubting and anger etc. Most of these negative emotions generated were related to being new to the environment, lack of support from the workplace, pressure from existing team members, the deficiency of professionalism, and unfair treatments, etc. One student commented that,

“I felt the pressure by most of the existing team. They’ve been doing it longer than me. They have sort of 20 years plus experience, and me being my first year, so I found it more stressful for me.”

Male A EDM student-21yrs

Another student expressed,

“I was very tired myself; the fact that I was very tired, and was new to the dynamic of the working relationship in the company, also probably I was new to the whole working environment.”

Male CEM student-24yrs
In addition, four students reported confronting unfair and biased treatment, and their work ability was underestimated by leaders or their companies because of their undergraduate status.

“The commercial manager was expecting a graduate, so when he found I was an undergraduate, I don’t think he was very impressed. So he try to put me out the job as he felt I was being overpaid... I wasn’t given any responsibility even though I was not sure if I should have any. I was undermined quite a lot by certain members who were on the team as well. The whole spirit was a very negative one.”

Female CMQS student-22yrs

Also:

“I think when you are a trainee on site, you are not respected in the same way as you are as a graduate. I think people don't respect you as you don’t have enough knowledge.”

Male CEM student-20yrs

**Emotions and Behaviours**

As with the finding in the pilot study where emotions were found to influence one’s thinking and behaviours and contribute to effective decision making (section 2.10.2), many students stated that their behaviours and work efficiency were directly affected by their emotional states. The positive emotions were found to facilitate students’ creativity and productivity, and therefore promote their performance.

“I’ve found that when I’m happy I am a lot more productive and generate more ideas and I work better.”

Male CMQS student-22yrs

In contrast, unregulated negative emotions were found to become barriers to effective reasoning and problem solving. For example, in one case, the feared thought resulted in the informant being distracted from work and tending to focus on his passive emotions rather than taking action to resolve problem.
“I felt demolished. Ah! I just can’t do this (job). My boss isn’t helping me to do this, so I can’t do it. Probably I need to chat with someone, but I can’t do anything because I was stuck at that moment.”

Male CEM student-20yrs

In one extreme case, the negative emotions resulted in a student having to quit her job in order to escape from the unpleasant work environment and stress.

“I was working with the team of people who really didn’t have the space for me to be working on that job. In hindsight they put me into the wrong job, especially the commercial team were actually not very nice people. Many things built up, I got upset, I was frustrated, I was pissed off, it was just everything and I just had enough, I just wanted to quit. ...It got to the point, I can’t work on this job anymore, I told the other girls on site and said ‘I’m just going to end up not being a QS if I have to stay here’. So I decided to leave.”

Female CMQS student-22yrs

Accordingly, there was a consensus by most informants that it was very important to understand not only their own emotions but also the emotional state of others, and to use this intelligence to regulate their behaviours and others’ behaviours to solve the problems in the workplace.

“It’s very important to read people’s emotions and control your emotions. When we work in the professional environment, you sometimes have to control your emotions. Like if something goes your way, you sometimes can’t show you are happy with it, because that might work against you... Sometimes you have to control your emotions when you are happy or when you get angry. Because you got to keep clear-headed, it makes it easier for you and the person sat on the table, and you might get them losing their temper, when they can’t think of it clearly and if you can manage to stay calm, you can think clearly.”

Male CMQS student-21yrs
5.4.2 Emotional regulation brings success

It was interesting to find that emotional regulation was found to help informants to overcome the negative emotions stemming from the workplace and to redirect these negative emotions, which may cause irrational or destructive behaviours, into a constructive behaviour. For example, in one of the cases, emotional regulation enabled the informant to manage her negative emotions and to use such pressure as a motivation to facilitate self-learning and hard working, which in turn improved her work performance.

“To start with it made me really nervous. I could deal with the email as it’s not personal. But when you’re on the phone, they ask you here and there. To start with, I didn’t necessarily have all the answers and I didn’t have confidence. I got nervous and anxious. In relation to this, it made me do the job in more depth, made me want to know them more, have them ready for all the phone calls I got.”

Female CMQS student-22yrs

Also:

“I got frustrated, as it was such simple things to get resolved and I put a lot of effort to get them all to be prepared. But I couldn’t get it resolved without particular subcontractors’ agreement...then I went back and did more work to resolve it, so I could make sure everything was firm and everything was backed up. Then I just basically calculated them and said ‘This is what we believe the price is, if you think there is any difference, prove it to me.’”

Male CMQS student-21yrs

In addition, emotional regulation was found to help informants to proactively manage upcoming negative emotions and prevent the irrational or disturbed behaviours which could lead to poor performance. For example, they might avoid making any unreasonable decision when they are angry.

“I got angry; because we (me and my boss) had signed it and we both knew that we were right...But as soon as I got angry I realised that I have to
control and I couldn’t let that show. Otherwise, that would make me unprofessional...I didn’t speak for a while and kept my mouth shut for a bit. Let myself calm down, allowed me to think the fact of the argument, allowed me to put one across to them in the way they couldn’t really answer.”

**Male CMQS student-21yrs**

In one of these cases, once the informants realised that the negative emotions might undermine their work performance and effectiveness, they were better able to focus on the problem itself rather than being influenced by the passive emotions.

“We (the line manager and me) were very angry, because it’s not our faults... We basically have to realise there is no point in arguing about it, because there is the date we have to work to. There is nothing going to change, there is no way of improving it. We both decided to stick with those dates, go and have a word with them (subcontractors) to meet the data and to change everything to those dates.”

**Male AEDM student-22yrs**

In contrast, a lack of emotional control was found to prevent informants’ rational thoughts which may lead to impulsive and irrational behaviours.

“When I first started on site, there was a really sex-resistant construction manager. My friend told me that in the one of the meetings, he won’t let me run the site on my own on the Saturday, because he didn’t want to leave women in charge on site. I don’t think I was ever so angry on site as when I found out like that. I was absolutely steaming. I was really annoyed. I have got to go and talk to him and I don’t care whether I leave my job or not, I just got to go and want to say ‘who do you think you are’... I went to his office to talk to him about it, but he wasn’t in there.”

**Female CEM student-21yrs**

Furthermore, it was found that emotional awareness and understanding enabled informants to easily discern the factual information from inappropriate or inaccurate
emotional expressions, therefore they could stay calm when encountering the aggressive emotional response of others.

“They (customers) shouted at me, but I knew it’s not directed to me, as they were angry people and they shouted at everyone when they were angry. You just have to sort of listen to more of the factual things they are trying to say, rather than the emotion. This is what you have to separate, try to block out separately.”

Male AEDM student-21yrs

5.4.3 Effective communication and empathy resolve conflicts

As was discussed in the section 5.3.6, effective communication was described by the majority of informants as the most important emotional competence that could lead to a better work performance. In contrast, ineffective and inappropriate communication was deemed to strongly hinder the work effectiveness and result in misunderstanding and the occurrence of conflicts. One student mentioned that

“We were frustrated really. Mainly because the fact was that if we had communicated a bit better a few days ago, we could have saved a lot of time. But now we have to go and do it again…We’ve done correctly at the end, but it took another week to finish which was late for the schedule.”

Male AEDM student-22yrs

In another case, one student mentioned that inappropriate communication without being fully understood and well answered by his company had led to the informant having a low work commitment and negative work attitude in response.

“I have some issues with my company where essentially I felt I wasn't being treated fairly. I wasn’t being listened to with regards to my basic pay. I felt everything was not explained to me…I spoke to my site manager and I spoke to the payroll department in the company, I sent several emails to people in the company, just to question. But they didn't respond very well at all…I got a
Chapter Five: Results and Findings

lot of negative emotions to the company. I didn't want to work for this company and I didn't feel valued and why should I commit myself”

Male CEM student-24yrs

However, through effective communicating, one respondent reported that he was able to manage and control his teammates’ emotions and bring them back to rational thinking.

“On an individual basis, I asked them (team members) what happened, and then asked why they sort of took the action they did, and I explained to them the objectives and views, what I thought about the situation. It was necessary that you have to make people see the logic. You know when people’s emotions run high, their sense seems not to be logical, it’s not complex to resolve...At the end, they were pretty much willing to shake hands.”

Male CE student-21yrs

In addition, empathy and emotional understanding were found to be essential in resolving the conflicts in the workplace. One informant reported that being respected and emotionally understood by his manager had changed his negative work attitude toward the company, in which students now felt they were valued and instilled with a sense of trust in their leader. This in turn motivated them to perform at their optimum level for the leader and organisation.

“In some way, because he (my manager) actually named the issue for what it was, I felt I have some kind of understanding from someone. He encouraged me that if he was in charge, he would pay me more, it kind of helps me for valued. From that point onwards, it was a turning point really, my attitude towards the company. I was able to say ‘if my site manager was in charge, he will pay me more, so I am going to work for him.”

Male CEM student-24yrs

In another case, the informant reported that by displaying emotional understanding and empathy with the subcontractors, he was able to release the tension between two
companies and soothe subcontractors’ anger and establish a good relationship with them.

“They (subcontractor) felt sad. I can understand why they were frustrated, because more often my line manager has been awkward to them. I actually feel quite sorry for them which was why I went to them to apologise, not to meet them with the same anger… I said to them ‘I apologise on behalf my company’, because there was tension generally between us and the contractors. I said ‘I will sort it out’. He apologised to me for venting his anger, he said ‘no, this is not your fault, I’ve just taken my frustration out on you.’... For that point onwards, they (subcontractors) would come to see me about any questions they had.’”

Male CEM student-24yrs

Furthermore, by showing emotional understanding and small daily encouragements to the subordinates, a student site manager was able to establish a good interpersonal relationship with his subordinates and uplift their spirit which contributed to better performance.

“There were couples of brick layers I was looking after, I was managing many of them on site... Basically if they were doing a good job and I told them when they were doing a good job. When they were doing a bad job, I was still positive about them...Generally on site, have a chat with them, see how they are doing, if they had a bad day, I said ‘why don't you go home early and come back in the next day’, and they come back in much better.”

Male CEM student-24yrs

5.5 How Students’ EI is Shaped by Working in the Industry

5.5.1 A good mentor

All informants reported being supervised by an industrial mentor in developing their
knowledge, skills and experience in the industry. Nearly all students (n=28) alluded to the fact that a good industrial mentor was of paramount importance and perhaps the most important factor influencing their learning process in the placement. They implied that a good mentor knew how to build up students’ EI competencies by skilfully guiding students to solve problems through daily work and enabled students to use their potential to the full.

“I wasn’t very experienced in my people skills. My boss taught me a lot. Sometimes he would come to see me. Because he was a lot older than me, he was 50. He has a lot of experience in dealing with people and knows how to work with them. If I got any situation that I found it difficult, he could tell me how to get on, or if I really don’t know what I’m doing, then he stepped in, took over a bit and then he stepped back and let me carry on. And I really enjoyed my time working with him.”

Male CMQS student-21yrs

Some informants reported a high level of respect and admiration for mentors who had good personality and professional work capacity, and they tended to have a much more favourable opinion of this kind of mentor.

“My line manager on that project was particularly good...First of all; I got on with him on the personal level. I respected him in his professional capacity. He is quite young himself, about 36-37, but very well up in the company. It’s obvious he is good at his job. There was a lot for me to learn from him and I got on with him as well, he was appointed to put in this project because he was seen as the remedy if anybody couldn't do it but he could.”

Male CEM student-22yrs

Favouritism was also shown to mentors who were adept at shortening the distance with students. Through proactively approaching students, mentors developed a good relationship with them, which added to the sense of students feeling approved and instilled in them a sense of commitment to the mentors. This close mentoring relationship also magnified students’ job satisfaction in the placement.
“Because of that placement I was working with him (my manager), I enjoyed it, so I am going back to work for him when I’ve graduated. I get texts from my manager occasionally and he rings me and asks me how I’m getting on and is there anything he could do to help me out, so I get on with him well.”

Male CMQS student-20yrs

As a result of the favouritism towards mentors, informants reported to be motivated to work harder for the sake of mentors. This in turn enabled them to perform at their optimum level for the mentors and the organisation.

“My line manager on that project was particularly good, and I got on with him very well. I wanted to get it right for his sake, because the project was behind programme, people had been brought from another project, he wasn’t enjoying. He tried to turn it around, as it’s going to be delivered late anyway and he tried to get it as good as possible.”

Male CEM student-22yrs

In addition, mentors were found to strongly influence students’ emotions that related to their work attitude and commitment. Mentors who were lacking professional work capability and expertise were perceived as a barrier to students’ effective learning and better performance. When mentors did not display the behaviour expected by informants, or when they failed to display expertise on the job, informants reported that they experienced negative emotional responses such as disappointment and frustration, and expressed that this kind of mentor had slowed down their learning.

“I was working with this commercial manager, I felt he wasn’t organised, very forgetful, and I felt there was a slowing down in my learning, and he frustrated me because you expect someone at that level to be highly trained and know what they are talking about, but he just wasn’t like that.”

Male CEM student-21yrs

In one extreme case, the informant reported that she and her colleagues both lost respect for their mentor and they did not think their mentor had adequate professional
capacity required for work in their work area. It was indicated that this kind of mentor had resulted in the informant’s work environment deteriorating and their learning process being undermined.

“The way we were handling the project was a new way, it was a contract, not a lot of people knew about it, so everyone was learning, on top of me. He (my boss) didn’t want to change the way he has done things in the past...He really just rejected the whole way of doing it, he really held not just me back but the whole team back, and the client was getting frustrated and didn’t want to deal with him personally...I lost a lot respect for him... I just thought I don’t think I am going to learn the right stuff from him....It’s after he left and it’s down to me and my colleagues. Gradually we run the job and everything got better. I started to see more opportunities were rolling up for me and I was able to progress quicker, and I felt he held me back. It’s a bit annoying.”

Female CMQS student-24yrs

Further, when experiencing problems or difficulties in the industry, informants expressed the view that mentors who were able to display emotional understanding and empathy would give them a sense of support which helped them to easily overcome the negative emotions.

“In some way, because he (my manager) actually named the issue for what it was, I felt that I have some kind of understanding from someone. He encouraged me that if he was in charge, he will pay me more, it kind of helps me for valued. From that point onwards, it was a turning point really, my attitude towards the company. I was able to say ‘if my site manager was in charge, he will pay me more, so I am going to work for him.’”

Male CEM student-24yrs

In contrast, when mentors were unable to display emotional understanding and empathic behaviours, or even blamed informants because of their mistakes, this could lead to informants having a negative work attitude and low work commitment in response.
“He (manager) gave me a bit of a dressing down. He basically said you shouldn’t walk around here. But he didn’t do it in a very good position. To be perfectly honest, from that point onwards, I didn’t do anything for him. ...I probably let him affect me too much. I thought he handled it wrong, which made me handle it wrong...It really frustrated me because he didn't understand how I felt.”

Male CMQS student-22yrs

In addition, when mentors acted as the ‘role model’ and led as an example, informants reported that their emotional competencies were improved by observing and imitating mentors’ behaviours in the daily work.

“Based on my past experience, it's (EI) got to be one of the top priorities for you, even simple things. I know myself, three line managers I have worked for were pretty good. One thing I always noticed about is 4:30 or 5 clock when you are leaving, they always say thank you, thank you for your day’s work, just small things like that they really help.”

Male CEM student-22yrs

5.5.2 Support in the workplace

Another theme generated from the data that influenced on students’ EI development in the placement was the support in the workplace. As was discussed in section 5.3.5, although industrial placement provided students a ‘protective’ environment to learn, many indicated that it was crucial to have support from the workplace. A lack of support in the workplace was revealed to be associated with various negative emotions such as frustration, disappointment, de-motivation etc. These negative emotions, as discussed in section 5.4.1, were shown to undermine students’ learning process in the placement. One informant expressed,

“We had a training course, producing what you did, that was frustrating me because there was a lack of help. Everyone on the course was frustrated. We had the meeting with the supervisor, but he used to cancel the meeting, so we didn’t know what to do...Because of the lack of support from the system
really, everyone got de-motivated...Eventually we did the best as we could, but I didn’t feel I was learning.”

Male AEDM student-22yrs

In another case, the informant reported that his learning process stopped when his mentor left and his company did not install a new mentor to support him in the placement.

“On my first year placement, suddenly my site manager got moved to another site, but he left and no person replaced him straight away, so I was left on my own. And then someone started to visit me one day a week, so I didn’t have any contact. ... It’s quite difficult and I became quite frustrated without his support...I was on my own, I wasn’t learning, I wasn’t being taught, I wasn’t progressing. It wasn’t enjoyable for me. I want someone there with me.”

Male CMQS student-22yrs

Furthermore, one informant reported being misunderstood by subcontractors and receiving little support from teammates which had resulted in him having a negative and demotivated work attitude.

“We had a procurement meeting and the subcontractors were sort of angry with me. I don’t know why me, and my site team didn’t stand up for me very much which made me a bit angry... That was bad really, I felt a bit abandoned, got de-motivated because that’s my first year in the industry. I was working for a very big company which I thought their support had faded away.”

Male AEDM student-21yrs

5.5.3 Industry experience

As was discussed in 5.3.5, the industrial placement was cited as a ‘protective bubble’ where students were given many opportunities to develop and learn a broad range of emotional competencies in a real work setting. Most importantly, it was evident that most students had come to a clear picture of what the real industry might look
like and gained an orientation towards the jobs they might undertake in the future. One informant expressed,

“Before you go into industry, you don’t realise how much conflict there is, even slight minor things, people can get very annoyed. Things like between different contracts and different things, or think about where the cost is going to get passed on to whom. ... I think you realise you understand industry more and if you want to become like a project manager, quite a big part of your job is going to be to solve conflicts, take control of situations that sort of thing.”

Male AEDM student-22yrs

As a result of the better understanding of industry, the majority of students indicated that their abilities to perceive and understand their own emotions, as well as those of others, were enhanced and they were more emotionally competent than before they went to placement.

“Before I wasn't good, I was un-empathetic, I can’t really tell what people would feel and myself as well. I didn't know, as I didn't think about things like that. I then definitely matured a lot in my placement, now I’m definitely better in reading other people’s feeling.”

Male CE student-23yrs

Also:

“Before I went on placement, I think I was a lot worse in understanding people’s emotions. I think I have learnt a lot more since I have been on site. Now I am a lot more aware of why people get annoyed and why they did.”

Female CEM student-21yrs

In addition, most informants indicated that the characteristics of construction industry, such as the complex environment, dynamism and diversity group of people, had created a challenging environment for them to work. Being in this challenging environment, informants were forced to work with people from different backgrounds and with different experiences, they needed to be aware of the
differences between people and try to understand them if they wanted to work effectively. This in turn developed their emotional awareness and emotional understanding; as Bar-On and Parker (2000) argued, EI will be raised when individuals experience challenges during the course of their life time.

“In the working environment, you deal with a lot of different peoples, people with different experiences, and people of different ages, therefore you have to think about things more. You have to think about what you say to whom? and who you can show your emotions to, who you can’t, etc.”

_Male CMQS student-21yrs_

Also:

“In work placement, you got people from a wide variety of ages, some people are older like your dad’s age or your granddad’s even. A wide variety of backgrounds, completely different issues, they got work issues, they got different family issues, you got to think about and you got to take all these into account, you don’t realise the amount of things people have to deal with...So when you are actually in the work placement, you can’t be dealing with everyone, you have to learn to adapt the management stuff to deal with them.”

_Male AEDM student-21yrs_

The industry experience was also found to raise informants’ awareness of other peoples’ opinions that would affect their work performance. Many informants realised that having a good interpersonal relationship with colleagues and peers would help them to work in the industry easily. This realisation had also led to informants making efforts to establish or maintain a good relationship with others, which in turn enhanced their emotional competencies in this respect.

“As you do see people don’t get along with others, they get excluded from little things that might help them out, because people don’t want to tell them. This kind of thing I don’t like him; I don't want to help him out. So it’s very important to have a good relationship with your colleagues.”
Female CMQS student-24yrs

As a result of realising the importance of interpersonal relationship, informants recognised that first impression was very important when attempting to establish a good impression in the industry. This sentiment resonated with the following discussion as a good impression enabled informants to more easily establish a good interpersonal relationship with others.

“The first impression and the first few weeks you meet people and work with them I think probably is the most vital, I think because it’s like sort of the first box that you form.”

Male AEDM student-21yrs

Another student expressed,

“I was new to the job and I didn't want to give the wrong impression. So I approached the stock manager, I asked him very politely where the site manager was, and why the guys wouldn’t do the job which being asked by my boss.”

Male CEM student-24yrs

Accordingly, there was a propensity for many novice placement students to hide their negative emotions when encountering problems or unfair treatments in the workplace in order to leave a good impression.

“Maybe on the site work where I was left on my own, I should go straight away and say ‘this is not fair’, but I didn't want people to look at me and say ‘he is moaning about it’. To be honest, I didn't want to stand up and I didn't really want to kick up a fuss on my first placement year. I wasn't staying there for long, so I just stuck it out really.

Male CMQS student-22yrs

Also:
“Everyone can understand my situation that I had problem with this manager, but I did kind of hint it at the end. Because I was very new, I didn’t want to get off on the wrong foot.”

Female CMQS student-21yrs

In contrast, experienced students were found to be brave enough to speak out and took initiative to sort out the problems instead of taking a step back.

“I have some issues with my company where essentially I felt I wasn't being treated fairly...I wasn't being paid regardless of how well I did because I was categorised as an undergraduate student. I spoke to my site manager and I spoke to the payroll department in the company. I sent several emails to people in the company, just to question.”

Male CEM student-24yrs

5.6 EI Competencies being Developed through Placement

5.6.1 EI competencies

As mentioned in Chapter Four, the current study used Goleman’ EI structure and definition to identify the EI competencies exhibited by informants (see Appendix G). Regarding the EI competencies being developed through the work placement, interview data revealed 9 core competencies that were experienced by students in a high frequency through the placement. The following quotations support these.

a) Emptathy: People with this ability are able to demonstrate understanding and consideration for the opinions, feelings, and needs of others. Treats others with courtesy and respect. Modify behaviour as appropriate to facilitate effective relations with persons of different backgrounds and work styles.

“They (subcontractors) felt sad. I can understand why they were frustrated, because more often than not my line manager has been awkward with them. I actually feel quite sorry for them which was why I went to them to apologise,
not to meet them with the same anger, but approach them in the other way and say ‘I’m sorry’ and pave the way.”

Male CEM student-24yrs

b) **Self-control:** People with this ability are able to control emotional cravings and desires even in the face of temptations. Able to control being overly dominant, forceful and assertive when faced with interpersonal challenge/threat. Demonstrate the ability to control strong emotions such as frustration, impatience, and anger in interpersonal situations.

“I got angry, but you have to realise that you have to control. So as soon as I got angry I realised that I couldn’t let that show...I didn’t speak for a while and kept my mouth shut for a bit, let myself calm down, allowed me to think the facts of the argument, allowed me to put one across to them in the way they couldn’t really answer.”

Male CMQS student-21yrs

c) **Communication:** People with this competence are able to speak and convey written and verbal thoughts and ideas in a clear and concise manner. Express ideas effectively and persuasively in individual and group situations. Demonstrate attention to and conveys understanding of others through active listening. Communicate information clearly and in a timely manner in all written memos, email, reports, and documentation.

“I got frustrated but I was able to persuade the project manager to let me to do it. Just sitting down with project manager and going through what I have planned, explained to him the situation, and said ‘this is what we’ve got and this is what we could do, what we could achieve and the natural fact is it is going to cost less time to do it’ and just talking through them.”

Male CEM student-21yrs

d) **Conflict management:** People with this competence are able to demonstrate the ability to effectively resolve interpersonal differences and manage conflict with
others. Bring interpersonal conflicts into the open and attempt to resolve them collaboratively. Seek "win-win" solutions for all individuals.

“I resolved a conflict between two different people whilst I was a third party…I deal with each person (team members) on an individual basis. First of all, to get their side of the story, then I brought them both together. This wasn’t immediately, this was a day or later after I’ve got both sides’ stories. I asked them what happen, and then asked why they sort of took the action they did. And I explained to them the objects and views, what I thought about the situation…You have to make people to see the logic, you know when people’s emotions run high, their sense seems not to be logical… At the end, they were pretty much willing to shake hands.”

Male CE student-21yrs

e) Self-confidence: People with this competency are able to present themselves with self-assurance; have “presence”; Can voice views that are unpopular and go out on a limb for what is right; Are decisive, able to make sound decisions despite uncertainties and pressures.

“You get more confident as you grow into the industry and you know about it, you’ll be more confident and you can communicate with people more effectively.”

Male CEM student-22yrs

Also:

“Overall, it really improves my confidence working in industry in which I feel more confidence as a graduate when I go out there. You know taking control of whatever they give me rather than taking a back seat without the experiences and thinking ‘I don’t know what I’m doing’, because some people go through that.”

Female CMQS student-24yrs
Chapter Five: Results and Findings

f) **Emotional awareness**: People with this competence know which emotions they are feeling and why; they realise the link between their feelings and what they think and say; recognise how their feelings affect their performance, have a guiding awareness of their values and goals.

“Before I wasn't good, I was un-empathetic, I can't really tell people what they would feel and myself as well. I didn't know, as I didn't think about things like that. I then definitely matured a lot in my placement, now I'm definitely better in reading what other people’s feeling.”

*Female CEM student-21yrs*

g) **Understanding others**: People with this competency are attentive to emotional cues and listen well; show sensitivity and understand others’ perspectives; help out based on understanding other people’s needs and feelings.

“Now I have been on site, I am a lot more aware of why people get annoyed and why they did... Now you have been on site so you see people deal thing in a more fair manner, you can see why.”

*Female CEM student-21yrs*

h) **Teamwork**: People with this ability are able to demonstrate the ability to adjust and modify interpersonal behaviour to effectively work with others in a cooperative and effective manner. Demonstrate consideration for the feelings and needs of others. Demonstrate the ability to work in a collaborative manner with others in the organization.

“When you work in a team, you have to work with people, relate to them and understand how they work and try to fit how you are working with them that sort of thing...if you want the cooperation, you know you need them in order to get whatever you try to do. You need to be able to compromise yourself, you got to be on their level.”

*Female CMQS student-24yrs*
i) **Initiative:** People with this ability are able to demonstrate the ability to assert ideas and opinions in the face of opposition. Step forward to address difficult issues. Stand firms and takes responsibility to deal with important problems. Take action to achieve goals beyond what is required without direction from others.

“My line manager initially said ‘no, we don’t have to pay them (subcontractors), because they didn’t do their job.’ but when I actually researched it, it was really our fault... I did a bit of investigation, I spoke to the lads on site, and asked them what happened? I got the picture, so I could resolve the problem.”

*Male CMQS student-22yrs*

### 5.6.2 Summary

The previous sections (from section 5.3 to 5.6) presented the findings of interviews carried out with 30 placement students. Overall, there was a consensus by the majority of informants that their EI competences had greatly improved in the industry placement. This was consistent with the result discovered in the questionnaire survey in which EI was found to be increased in students with work experience. Of the remainder who did not perceive experiencing great emotional growth in the placement, some informants categorised them as mature students (age >=24yrs); others explained that they had gained substantial work experience prior to the placement. It was commonly believed that industrial placement outweighed university for developing students’ emotional competences due to its dynamism, diversity and complex environment. In addition, informants have described the essential skills and characteristics that are needed to work better and be successful in their job. In particular, communication, people skills and empathy were cited in the highest frequency in this respect. There was also a discrepancy between informants in terms of the particular emotional competencies required for different positions. For example, CMQS informants emphasised the importance of being assertive, while CEM informants tended to put interpersonal relationships in the first place. Generally, there was a belief that EI was paramount in managing people in the industry and that helped informants to better fit in the industry.
With regards to the question of how EI has affected students’ performance, most informants expressed that their thinking and behaviours were directly influenced by their emotional state. The negative emotions, such as anger, frustration etc., were found to cause informants impulsive and irrational behaviours. However, informants who could effectively understand and control their negative emotions were able to use this intelligence to regulate their behaviours, hence improve their work effectiveness and performance. In addition, EI competencies, namely effective communication, emotional understanding and empathy, were described as essential skills for resolving conflicts in the workplace.

In terms of the question of how students’ EI was shaped by working in the industry, a good mentor, support in the workplace and industry experience were all found to be beneficial in this respect. Section 5.6 has detailed the emotional competencies of informants that have been developed through the industrial placement: these are empathy, self-control, communication, initiative, emotional awareness, understanding others, self-confidence, teamwork and conflict management.

### 5.7 Chapter Summary

This chapter presents the findings and results from three research phases of the current study, including questionnaire survey of more than 400 undergraduates, an examination of built environment education and interviews with 30 placement students. The data collected from the questionnaire survey were analysed by SPSS 16.0 in terms of descriptive statistics and inferential statistics, while the interview transcripts were analysed by NVivo 8.0, a systematic codification and representational tool which allowed the themes to be generated in a rigorous and precise way. This section summarises the main findings.

Despite the fact that EI has been addressed as being very important in the construction industry (section 2.10), current built environment education failed to support students’ EI development during the examined period. In general, students’ EI was found to decline within an academic year; however, there were moderate EI increases exhibited in the students who had participated in the placement. Students
with work experience were found to score higher on EI than those without work experience. In order to investigate how students’ EI was developed and shaped by working in the industry, 30 placement students were interviewed. The findings uncovered some interesting facts. When dealing with conflicts or problems in the industrial placement, EI was found to free informants from the detachment of negative emotions and enable them to focus better on the problem per se. In addition, emotional regulation was found to help students to regulate their behaviours when frustrated or angry, and thus to facilitate the thought that contribute to effective decision making. Overall, there was a consensus by informants that EI was critically important in managing people in the construction industry. Besides, the results revealed that a good mentor, support in the workplace and industry experience were all found to be beneficial in developing students’ EI through the placement. The next chapter presents a critical discussion of the results and findings of the research in relation to the literature.
CHAPTER SIX: DISCUSSION

6.1 Introduction

The first three chapters of the thesis identified the need for the current work; presented the research questions, aim and objectives (Chapter one); and set out the theoretical background for the investigation (Chapter Two and Three). Chapter Four outlined the methodology adopted to achieve the objectives together with a proposition which justified the investigation. Chapter Five reported the findings and results of the research in relation to the propositions. This chapter discusses the findings and results in the context of extant literature, and addresses objective six, to propose recommendations to enhance students’ EI through built environment education.

6.2 Discussion of Results and Findings

6.2.1 EI and construction professionals

This section addresses objective one of the research which was to explore the potential role and importance of EI in the context of construction industry. Previous research in other fields and sectors has shown that individuals with high EI scores perform better than those with low EI scores (Bachman et al., 2000; Fox and Spector, 2000; Jordan, et. al., 2002; Wong and Law, 2002). The current study confirmed this notion by revealing that EI competencies had a positive effect on construction professionals’ daily work performance (section 2.10), in support of proposition one. Emotional regulation was found to enable informants to be free from the detachment of negative emotions, and avoid its adverse influence on their ability to analyse problems, therefore allowing them to focus better on the problem per se, think logically and thus contribute to effective decision making (section 2.10.2). This finding was consistent with research conducted by George (2000) who proposed that emotions are indisputably influencing the judgements that people make, and different emotions (positive and negative) impact differently on one’s
reasoning, hence the use of emotional intelligence can enhance individuals’ cognitive processes and decision making (Loewenstein, et al., 2001).

Effective communication and emotional awareness were found to help informants to resolve conflicts by clearing confusion and eliminating misunderstanding amongst people (section 2.10.3). In contrast, failing to recognise or give importance to others’ emotions can evoke peoples’ opposite emotions along with negative behaviours that could lead to conflicts and poor performance (section 2.10.2). The finding is partially supported by Wong and Law (2002) and Pescosolido (2002) who indicated that leaders who are more sensitive to feelings and emotions of themselves and their followers can influence their followers’ job satisfaction and enhance their performance. It is worthy of note that one informant mentioned about a phenomenon in the construction industry where managers were overly stressed during the process of project management and highlighted the importance of recovering from such emotional stress in order to maintain general well-being (section 2.10.4). This may indicate a requirement for high levels of EI for each construction professional, because an integral part of EI is stress management which enables people to withstand adverse events and stressful situations without “falling apart” by actively and positively coping with stress. Further, Lopes et al., (2006) suggested that stress management may buffer employees against emotional burnout and enable them to remain productive and motivated during stressful periods of project management.

All informants believed that EI was important in the construction industry. In particular, it was suggested that the key to effective people management is mainly dependent on how emotionally intelligent an individual is in approach and response to others. Informants commonly believed that different ways to interact with people could result in different responses and effects. As such, construction professionals, especially managers are encouraged to learn and display behaviours associated with EI. Furthermore, EI was referred to as a new criterion for assessing one’s ability to work and has been taken into account in the process of recruitment, especially for management positions, in the construction industry. Thus, based on the findings of pilot study, the role of EI was revealed to be very important to the construction industry.
6.2.2 EI and built environment education

This section addresses objective two which was to examine the extent to which current built environment education develops students’ EI. The current research revealed that a general EI decline occurred in all programmes taken in the built environment education during the examined period (section 5.2.2). The mean overall EI test and retest scores for students were 119.7 and 117.3 respectively, or a loss of 2.4 points. Although the reductions were not statistically significant at a high confidence level (Table 5.2), they did represent a moderate decline in the raw data set. The previous study conducted by Bar-On and Parker (2000) stated that EI will be raised when individuals experience challenges during the course of their lifetime. When it comes to the challenges, university life without question poses many challenges for students to experience in relation to their lifetime. For example, most students are away from home for the first time and sharing a house with other students. Therefore they need to take care of themselves and establish a good relationship with other housemates. Also students need to learn to be an adult and to make many decisions, such as the need to think about their future careers, or they may face difficulties to find a placement, etc. All these experiences will inevitably catalyse students’ natural maturity process both emotionally and psychologically, and ultimately lead to the development of EI. Therefore, it was reasonable to expect at least a minimum of EI growth to be shown in each programme during the examined period. Contrary to expectation, the declining trend of EI within an academic year may suggest that the built environment education does not sufficiently enhance students’ EI or in some way inhibits the natural growth of EI. This result was consistent with previous research conducted by the authors examining the impact of various modules of MSc Construction Management programme on the EI development of postgraduates within the period of a semester, and the results indicated that the existing construction management curricula do not support postgraduate students’ EI development (see Mo and Dainty, 2007).
6.2.3 EI and programmes

The current section addresses objective three which was to examine whether different programmes of built environment education have a differential effect on students’ EI. Although no statistically significant test and retest mean differences were found for all four programmes (section 5.2.2), students’ EI differed statistically significant according to the type of programme taken (section 5.2.3). The results revealed that AEDM students scored highest on EI (M=122.1) whilst CMQS students displayed the lowest EI score (M=113.2) (Table 5.7). The results also indicated a statistically significant mean difference between the CE and CMQS programme (p=0.016<0.05, d=0.43) in which students studying on the CE programme tended to have a statistically higher EI score than students studying on the CMQS programme; and between the AEDM and CMQS programme (p=0.003<0.05, d=0.50) in which students studying on the AEDM programme were more likely to score significantly higher than CMQS students. Consequently, the results suggested that different built environment programmes have a differential effect on students’ EI, in support of objective three. This finding could be supported by a previous study conducted by the authors in investigating the EI levels of postgraduate students in the MSc programme of Construction Management, and the results indicated that managerial related modules are more likely to enhance students’ EI than technological modules and law-relevant modules (see Mo and Dainty, 2007).

Further examining the modular content between the CE and CMQS programme revealed that the number of modules which were indicated to develop skills attributable to EI were greater in the CE programme than the CMQS programme (section 5.2.3). Hence, it could be tentatively inferred that the quantity of modules tending to promote EI result in the statistical difference between CE and CMQS students. In addition, amongst the 60% different modules, nearly all those modules in the CE programme involved group work and were based on student-centred learning. This could be another reason why CE students scored statistically higher on EI than CMQS students. This speculation was echoed by the qualitative phase of research where all interviewed students expressed the view that group work was good for enhancing emotional intelligence. This is discussed later in section 6.3.2.
Similarly, examining the modular content of both AEDM and CMQS programmes revealed that three modules from the AEDM programme which tended to enhance emotional competencies were mainly design courses, while there was only one module from CMQS serving the same purpose. Hence, it could be speculated that the more EI-embedded modules were contained in the programme, the higher the EI scores displayed by students. The other reason may have been because the AEDM programme contains more artistic factors such as those designing and drawing modules; according to Mayer and Cobb (2000), such art-related subjects use and foster emotional perception and understanding, therefore may well develop emotional intelligence. Moreover, Freshwater and Stickley (2004) added that a curriculum with the element of opportunities for working creatively with the arts may well develop peoples’ emotional intelligence.

6.2.4 EI and gender

Prior research on gender difference in EI has remained inconclusive. Some research has shown that in terms of total EI males and females do not seem to differ (Bar-On, 2000; Saklofske et al., 2003); however, females and males may differ on specific competencies. Other research has suggested that females are more emotionally competent than males (Ciarrochi et al., 2000; Wertlieb et al., 1987; Wierzbicki, 1989). The current research revealed that in terms of total EI males and females did not seem to differ significantly in the initial EI assessment, which accords with previous research conducted by Bar-on (2000) suggesting no significant gender differences in the overall EI score. However, females’ EI dramatically decreased in the second EI test while males’ EI remained the same (section 5.2.4). In other words, males’ EI scored higher than females’ EI after an academic year. This went against the findings of some previous research where women repeatedly had higher scores than men on tests of EI (Day and Carroll, 2004; Mayer et al., 1999; Schutte et al., 1998). This was an interesting finding with many possible speculations. It can be speculated that women tend to experience greater EI reduction than men during the learning process of built environment education. One possible reason for this phenomenon may have been that the number of the males in the sample was three times greater than the number of females, and this may have skewed the results. Another possible reason may have been due to the
male-dominated environment and disparity in gender resulting in women in built environment education not receiving enough attention and finding it difficult to get into male society. The evidence could be seen in section 5.3.4 where two female informants reported implicitly about being excluded from male society in the construction industry, leading to a reluctance to perceive and to understand their male colleagues. This, in turn, may hinder the development of females’ emotional competences. The other reason may be due to females tending to display their gender role in a particular way in a male dominated environment, such as by acting like one of the boys, adopting an ‘anti-woman’ approach, and accepting gender discrimination etc., in order to gain male acceptance (Butler, 2004; Powell, 2009). This, in turn, may adversely influence their EI growth.

6.2.5 EI and work experience and age

The next two sections address objective four which was to investigate if and how industrial placements enhance students’ EI. The current research revealed that students who had worked in the placements possessed higher EI scores than students without work experience (section 5.2.5), in support of proposition four which was industry sandwich placement experience has a positive effect on students’ EI development. This corresponded with prior research which has shown that people with greater work experience scored higher on EI than those with less work experience (Goleman, 1998; 2002; Mo and Dainty, 2007). This was a very important finding as if university learning interventions have been shown to inhibit the EI growth of students, which is the case in the current study, then this has significant implications for educators and policy makers to think about how to maximise the impact of industrial placements on students’ EI. It may also indicate that current built environment curricula may have to be redesigned to encourage EI development.

In addition, EI was found to be higher in relation to age in which older students have higher EI scores than younger students (section 5.2.6). This was consistent with several empirical studies indicating that emotional and social intelligence increases with age (Bar-On, 2000; Derksen, et al., 2002; Guastello and Guastello, 2003; Mayer et al., 1999). Moreover, the age effect suggests that the levels of EI can increase at
least up until the fifth decade of life; similar findings have been reported by others (Denney and Palmer, 1981; Derksen, et al, 2002; Goleman, 1998). These findings are interesting when one takes into account that cognitive (or academic) intelligence (IQ) increases significantly up until about seventeen years of age and then begins to mildly decrease between the second and the third decade of life (Wechsler, 1958). In other words, EI appears to have a greater potential to be developed than cognitive intelligence. Therefore, EI should be considered as equally important as IQ to the learning standard and given full attention for enhancement in order to achieve students’ full potential.

6.2.6 How students’ EI is enhanced in industry

This section discusses how students’ EI is enhanced by working in the industry. The results indicated that a good mentor; support in the workplace; and industry experience were all found to be beneficial in this respect.

A good mentor

The current study revealed that a mentor is probably the most important factor that influences students’ learning process in the placement. This is supported by Beaty (2005) who indicated that a good relationship between the university tutors and managers in the workplace is essential to ensure that the placement offers the right degree of challenge and support to the students. Good mentors were shown to build up students’ emotional competencies by skilfully guiding students to resolve problems in the daily work, and enabling students to use their potential to the full. This echoes with Yukl (2002) who proposed that effective leaders can inspire and encourage their employees to be creative, pushing them beyond their comfort zones to solve problems; therefore, enabling their employees to use their skills and abilities to their full potential (Amabile et al., 2004). In addition, mentors who were able to establish a close relationship with students could magnify their job satisfaction as the relationship added to the sense of the students feeling approved and instilled a sense of committed to the leader (section 5.5.1). The finding resonates with the recommendation proposed in section 6.3.4, suggesting that lecturers need to be more proactive to shorten the distance with students in order to enhance their willingness to learn. This is discussed later in section 6.3.4.
Mentors were also found to strongly influence students’ emotions that related to their work attitude and commitment. Mentors who were lacking professional work capability and expertise were perceived as a barrier to students’ effective learning and better performance. Informants indicated that this kind of mentor had slowed down their learning process and resulted in negative work attitude and low work commitment. In contrast, students reported a high level of respect and admiration for mentors who have a good personality and strong work capacity. As a result of the favouritism for this kind of mentor, students were motivated to work harder and perform at their optimal level that would lead to better work performance. This is reflected by Goleman (2000) who suggested that the relationship between trainer and learner is critically important in social and emotional learning situations.

Students’ EI development was also found to be influenced by the support from the workplace. A lack of support from colleagues and peers resulted in various negative emotions being generated (as was discussed in section 5.4.1) that could undermine students’ learning process in the placement (section 5.5.2). This is supported by Beaty (2005) who indicated that the balance of helpfulness and constructive criticism from colleagues in the workplace will support students’ learning.

**Industry experience**

Another factor revealed from the data which tended to influence students’ EI was the experience of work in the industry. It was believed that a placement offers students many opportunities to learn a broad of emotional competencies by working in a real world setting. In particular, it offers students a better understanding of industry and their future professional career. This also helps students to gain a more realistic view about their work capability, strength, and weakness, as well as the remedial areas which need to improve. In addition, the construction industry was viewed as a complex and challenging environment for students to work in (section 5.3.5); when students engaged in the actual activities in the work placement, they were required to work and relate to a wide range of people in different positions and with various backgrounds. This in turn helped to develop their emotional awareness and emotional understanding, and subsequently EI. As Bar-On and Parker (2000) argued, EI will be raised when individuals experience challenges during the course of
their lifetime. In addition, the literature suggests that people with greatest work experience are more likely to have higher EI scores than those with less working experience, indicating a positive association between work experience and EI (see Goleman, 1998; Mo and Dainty, 2007).

6.2.7 Students’ perspectives of Built environment education on their EI development

This section addresses objective five, which was to explore the perspectives of built environment students on their EI development. Nearly all students believed that their EI had improved in the placement to some degree and the majority of informants (n=20) considered that the levels of such an improvement were great (section 5.3.4); this was supported by the quantitative phase of the research where students’ EI was found to increase in the placement (section 5.2.5). The remaining students (33%) who did not perceive that their EI had changed massively, revealed the following reasons: 1) informants categorised them as older or ‘mature’ students (age>=24 years old); 2) informants had already gained substantial amounts of work experience prior to the placement; 3) informants had developed emotional competencies from past life experience. This is supported by the work conducted by Bar-On (2002) and Goleman (2000) who indicated that past life experiences and work experience enhance one’s EI.

In comparing how well university and industrial placement have developed students’ emotional competencies, most informants believed that industrial placement was more beneficial than university in developing their emotional competencies for their future jobs (section 5.3.5). They perceived industrial placement as a ‘protective bubble’ where students were given opportunities to put theory into practice while being supervised and taken care of by industrial mentors. Such a risk-free environment develops students’ sense of security and enables them to learn more effectively. In addition, it was indicated that working in the industry was far more complex and challenging than studying in the university. Although in the university, students are also required to work with others to deal with problems, the environment for work in the university was considered to be fairly simple and controlled. In the university, students work with people of similar age and
background, hence they can easily relate to and understand each other as they tend to have the same mind set. However, being on the placement, students needed to work with a broad of people with different age and from different backgrounds. Such an environment required students with a high level of professionalism in interpersonal relationships and skills because any errors they made would carry higher risks than they did in the university. The realisation of being professional has also led to a motivation for informants to self-learn and to improve their work capability and therefore enhance their work performance (section 5.3.5).

Many informants suggested that built environment education had not sufficiently prepared them to enter the future professions in terms of emotional and personal skills. They implicitly rather than explicitly indicated a shortage of skills to work in terms of dealing with people or controlling their emotions, amongst other factors (section 5.3.5). In particular, one informant revealed that the knowledge and academic skills he had acquired from university was seldom being used on his placement (section 5.3.6). The results are well supported by the extant literature indicating that built environment students continue to graduate with strong technical skills, but are lacking emotional competencies, such as interpersonal skills; communication skills and project management and planning etc., (Bakos, 1997; Davies, 1998; Jagger and Connor, 1998; NSF, 1995). The findings may also indicate a mismatch between the skills level required for professional performance in the construction industry and the skills level acquired in built environment education.

6.2.8 Work characteristics and skills

The literature has shown that EI, like technical skills, can be developed through a systematic and consistent period to build competence in personal and social awareness, self-management, and social skills (Goleman, 1995; Jaeger, 2003, Lopes et al., 2006; Mayer and Caruso, 1999). This is supported by the current research where all informants believed that their emotional competencies had been enhanced to varying degrees through the placement; these included empathy, self-control, communication, conflict management, emotional awareness, team work etc., (section 5.6). Amongst these competencies, effective communication, personal skills, and emotional understanding were mentioned in the highest frequency as essential skills
for working better and being successful in the job (section 5.3.6). The results are well correlated with prior studies examining the most wanted skills being sought by construction employers, and revealed that most of the skills fall into the dimension of emotional competencies; these include communication, teamwork and interpersonal skills (Jagger and Connor, 1998; Shivpuri and Kim, 2004). A similar survey carried out by Fowler and Tietze (1996), who asked employers to rate the skills they required from students on placement, found that the most important skill being required from students on placement is the ability to relate to and interact effectively with individuals. In other words, these include communication and interpersonal skills as well as the ability to work effectively in a team. In addition, it is worth noting that although generic skills, such as experiences, knowledge and technical skills are essential, many informants indicated that emotional competencies outweighed both technical skills and academic knowledge in achieving a better performance in the industry (section 5.3.6). Taken together, the findings confirmed again the importance of EI in construction industry and identified a need for the existing educational system to pay more attention to developing students’ emotional competencies.

The results also revealed a discrepancy in emotional competencies which were required for better performance amongst different work positions. For example, CMQS students advocated being assertive as essential in their work whereas CEM students put personal skills as the first priority. One possible reason may have been because most of the CMQS students interviewed worked as trainee quantity surveyors on the placement, mainly responsible for financial measurement, costing control and evaluation etc. The nature of their work required them to check out and make sure that all price quoted items were clearly presented and firmed in order to ensure that subcontractors were not over claiming the money. Therefore, they needed to be assertive and confident when talking to clients. The finding may also suggest that emotional competencies, similar to the technical skills, are required differently in relation to different jobs and positions. As such built environment educators should have a better understanding of what specific emotional competencies should be taught in relation to students’ future jobs. This would help students to specialise in their future professions and to succeed in attaining the job.
6.2.9 The role of EI

The current study confirmed again the important role that EI plays in the construction industry by manifesting its effect on students’ performance during the placement (section 5.3.7 and 5.4). This is consistent with a large body of research which reveals that EI is associated with various positive outcomes likely to contribute to work performance, such as effective leadership, team effectiveness, project management etc., (Bar-On et al., 2006; Butler and Chinowsky, 2006; Fox and Spector, 2000; Jordan, et. al., 2002; Wong and Law, 2002). Some informants noted that EI was particularly important for certain roles, for example managers, as people in these positions are often needed to deal with people in a high frequency. This finding can be well reflected by extant literature as detailed in section 2.8.1, suggesting that managers with higher EI can improve the performance of their employees by managing employees’ emotions that foster creativity, resilience and confidence (Fredrickson, 2003).

Section 5.4.1 revealed that peoples’ thinking and behaviours were directly affected by their emotional state. Positive emotions were found to enhance students’ creativity and productivity, and therefore enhance their performance; whereas unregulated negative emotions resulted in students being distracted from work and concentrating on the negative emotions instead of solving the problem, hence preventing effective reasoning and problem solving (section 5.4.1). The findings are well supported by the extant literature suggesting that emotions play an important role in guiding one’s thinking and decision making (Loewenstein, et al., 2001; George, 2000). For example, positive emotions can facilitate creativities and integrative thinking whereas negative emotions can facilitate attention to detail and detection of errors and problems (Isen et al., 1987; Palfai and Salovey, 1993). In particular, emotional intelligence was found to have a direct effect on students’ work performance. Emotional regulation was found to help informants by proactively controlling their negative emotions or redirecting the irrational or destructive behaviours stemming from negative emotions into a constructive behaviour (section 5.4.2). In contrast, a lack of emotional control prevented informants’ rational thoughts and caused impulsive and irrational behaviours which could impair work performance (section 5.4.2).
It is also important to note that the majority students reported that they only started to realise the importance of EI after they had been on the placement (section 5.3.7). Given that industry placement was shown to develop students’ EI and their professionalism (section 6.2.6), many informants stated that they tended to work with peers who had been on industrial placement as they viewed such students as more emotionally intelligent and professional than none-working experience students (section 5.3.7). This was an interesting finding with many implications. One may imply that current built environment education does not give importance to developing students’ EI, or fails to prepare students with enough emotional competencies that are required from industries. Given that EI plays an important role in the construction industry as discussed earlier, built environment education needs to fully support the development of students’ emotional competencies before they enter the construction industry.

6.2.10 Summary

The discussion so far has addressed objectives one to five of the research. The chapter has discussed the role and importance of EI in the construction industry, and the extent to which current built environment education develops students’ EI. The impact of different programmes on EI has been discussed in relation to the modular content of programme, teaching and learning activities and assessment used. By doing this, it discerned the pedagogic interventions which appeared to have a positive effect on students’ EI. In addition, this chapter has discussed the impact of industrial placement on students’ EI and investigated the potential factors that contribute to EI enhancement. Students’ perspectives of the effect that built environment education has on their EI were discussed in relation to the extant literature. The next section addresses objective six, through discussing the impact of different teaching and learning experiences with fifteen students, and relating this to the literature on EI development; several recommendations are provided of how to influence EI in a positive way.
6.3. Recommendations for Enhancing Students’ Emotional Intelligence

The final objective of research was “to propose recommendations to enhance students’ EI through built environment education”. As discussed earlier, the research has suggested that the existing built environment education does not sufficiently support the development of students’ emotional intelligence (section 6.2.2). Given that the important role of EI has been revealed in the construction industry (section 2.10 and section 6.2.9) and the EI shortage demonstrated by built environment students (section 6.2.2), a need was identified to establish strategies to enhance students’ EI through built environment education. Most previous research on linking the concept of EI into educational context has been mainly 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 fifteen students (12 males and 3 females) were asked about what teaching and learning experiences appeared to have a positive effect on their EI, and how current programmes could be enhanced based on their own understanding. All recorded interviews lasted around 20 minutes, and were transcribed verbatim and analysed with NVivo 8.0. The recommendations below comprise a selection of informants’ suggestions, together with other initiatives and issues drawn from the extant literature.

6.3.1 Introducing the concept of EI into modular content

Many students suggested that the concept of EI should be integrated into the modular content where relevant. They indicated that some managerial modules which addressed the emotional and social competencies of managers, emphasising aspects such as communication skills, effective interaction and the leadership, could deepen their understanding of EI. One student expressed that,

“I think it would be good if emotional competencies can be linked to modular content. Like ‘Management Principles and Practice’ module, I’ve learnt people skills, communication, and how your emotions would affect other people...I think from that module, I start to realise how you perceive yourself...”
to be is exactly how people perceive you to be...It’s quite helpful because when I went for placement, I found the problems I’d faced could be linked back to what I’ve learnt from class.”

Male CEM student-22yrs

See also,

“I like “Teamwork and Leadership” module, it helps me a lot in understanding not only how to become a good leader, but also how you can use your abilities to manage people more effectively.”

Male CEM student-21yrs

This opinion echoes with the extant literature indicating that EI can be taught in a traditional classroom through an appropriate way and the knowledge of EI can be increased through this method as well (Jaeger, 2003). Besides, the literature suggests that the optimal and practical way to teach EI is not to create a special course for teaching emotional skills, but rather to blend the concept of EI into the normal academic programmes (Mayer et al., 1999). Accordingly, built environment education could increase students’ EI knowledge by integrating the theory of EI into the modular content where relevant. For example, tutors could infuse the concept of EI into managerial modules in which the role of EI could be manifested in different dimensions of management practice, e.g. how to negotiate with clients and establish good relationships with others, etc. By doing this, students could learn about emotional competencies through daily teaching and learning activities that are embedded in the classes, and also have a better understanding of how EI is relevant to and applied in their future jobs. In addition, it would help to raise students’ awareness of the importance of EI, and therefore take actions to develop it.

6.3.2 Creating opportunities for group work

The second suggestion obtained from students was made for lecturers to create more opportunities for students to work together. Students reflected that group work allows them to frequently communicate and interact with others; and to effectively work in the group requires students many skills, such as effective communication,
personal skills, problem solving and leadership, that collectively attribute to EI. This in turn gives them opportunities to develop the emotional competencies in this respect. One student expressed that,

“I think everything you do in groups are good to develop emotional intelligence. If you want to do well, you have to force yourself to work in a team. You need to be quite sensitive to other peoples’ emotions and the words used... At the end, you will learn from each other.”

Male CMQS student-22yrs

This is supported by the literature suggesting that the teamwork or group exercises help people to effectively interact and communicate with others and enhance both personal and professional skills of students, thereby enhancing emotional intelligence (McAlister and Alexander, 2005; Nestel and Tierney, 2007). In this regard, lecturers and tutors should consider how to appropriately integrate group exercises into a module when designing the mode of teaching and learning. Furthermore, when implementing the group activities in the class, tutors need to be made aware of group composition and the different impact that they could have on EI. Because one problem that may exist is that students tend to choose their friends as group-mates because they get on very well with each other and feel comfortable working together (see section 5.3.7). Despite the fact that a good interpersonal relationship between team members indeed leads to a better team performance (Luca and Tarricone, 2001), this might reduce the chance of students experiencing the challenges and difficulties of work in an unfamiliar group; such challenges are deemed to be helpful in developing students’ ability to understand and manage the emotions of themselves as well as others, thereby enhancing EI development (Bar-On and Parker, 2000). This was reflected by the quotation below indicating that when an informant worked in an unfamiliar group, he was prone to be more aware of other peoples’ emotions and put in effort to maintain a good interpersonal relationship.

“Sometimes, we are forced into different groups. When you work with other students you are not familiar with, you become more aware of other people’ emotions, like you won’t say many de-motivated words as you know that it
might affect other people…it’s a bit difficult, but I like the fact that, at the end you are making more friends.”

Male CEM student-21yrs

6.3.3 Supporting self-directed learning

The third recommendation was derived from the question when students were asked about the best teaching and learning experience that they had which appeared to enhance their EI. Many students reported that a self-directed learning, with good support from tutors and relevant materials, was found to be particularly useful to enhance their learning process. One student stated,

“I’ve learnt the most, surprisingly and almost is self-learning coursework. It’s well supported by lecturers. For example, we had the module called ‘Construction Technology and Management’ which was a big design project. We also had ‘Plant Management’, it’s a big earthwork moving package, they were both pretty well supported throughout a wide variety of resources…I’ve learnt a lot during that, when the lecturers become irrelevant almost. In effect I have to bury my head in this project for so long and eventually we (classmates) both felt ready.”

Male CE student-21yrs

Another student implicitly reflected that,

“The best way I’ve learnt is to draw the lessons from what I’ve gone through… Learning from my past experience really.”

Female CEM student-22yrs

This opinion is well supported by the literature where student-centred learning has been shown to promote students’ initiative and motivation (Giaconia and Hedges, 1982). In addition, in such a learning environment, students’ role is shifted from a passive receiver of information to an active participant, and this has proven to enhance student’s academic achievement and emotional development. The evidence can be seen in many empirical studies (Brophy and Good, 1986; Weinert et
indicating that direct, teacher-centred instruction hindered students’ emotional and motivational aspects of learning. In contrast, student-centred or open instruction enabled students to learn autonomously which is beneficial for class climate (Giaconia and Hedges, 1982). In this regard, current built environment education should encourage tutors to facilitate students’ self-directed learning when designing the curriculum.

### 6.3.4 Input from lecturers to build up a close relationship with students

Most of the students believed that lecturers were the major influence in their motivation to learn, and that a strong interpersonal relationship between the tutor and his/her students was the key to enabling a positive and pleasant learning experience to occur. Therefore, informants suggested that lecturers and tutors need to be more proactive in shortening the distance between them and students in order to promote students’ learning. This suggestion is consistent with the findings from the qualitative phase of research (section 5.5.1) which indicated that a mentor was the key to influencing students’ learning process in the placement. The close mentoring relationship also enables students to engage in the course easily and boosts their interest to learn. One student recommended that,

“We might need a little bit more input from our tutors, I think some of my lecturers are quite distant, some people are less distant than others. .... Most of our lecturers don't know our names, but there are only 30 of us. Sometimes my tutor forgets my name, so I think that (input from tutors) would make a big difference...All the lecturers I think we’ve got are perfectly capable. When you do talk to them, they are happy to help you, but it’s like if you don’t go and see them, they will never take initiative to help you.

*Male CEM student-21yrs*

Another student added,

“If the tutors can establish a close relationship with students that would really help. When you go into a class, you like to be there, because you know
that your tutor is your friend, you can relate more to them. That relationship really helps us to learn more effectively. Like my tutor, he not only knows my name, and he understands me, and the things about me. We are like good friends.”

Male CEM student-22yrs

This opinion is supported by Goleman (2001) and Cherniss and Goleman (2001) who suggested that the relationship between the trainer and learner is critically important in social and emotional learning situations. Besides, Holt and Jones (2005) indicated that teachers are a powerful force in modelling motivation, conflict resolution, and other EI skills. Therefore, lecturers should not be only lecturing knowledge to students, but also be sensitive to the underlying emotional needs of students. Besides, they also need to have high level of emotional intelligence and adequate knowledge about emotional intelligence as teachers cannot teach what they themselves never learned until teachers themselves are “emotionally intelligent”.

6.3.5 Simulating the real world through role-play

Another suggestion generated was to use role-play activities to simulate ‘real-world’ scenarios. It was suggested that this would provide opportunities for students to put theoretical knowledge into practice and would be very useful for developing students’ capacity to handle different unexpected problems as well as better preparing students for their future careers. One student illustrated this by giving an example that,

“The module (Project and Teamwork) was based on a role-play exercise. We were split into small groups and each one played a different role, such as an architect, contractor or quantity surveyor. We worked together to solve problems and conflicts during the process of project management… We had a mock site meeting and our lecturer acted as a receptionist and she came in with some emergent information, and we needed to deal with it… It was good and very interesting. I’ve found myself learning a lot through that module, like communication, teamwork, negotiation… we all love it.”
Male CMQS student-21yrs

This is consistent with Morgan et al. (2004) who found that role-play exercise can deepen the understanding of a subject, and help to develop individuals’ emotional competencies such as negotiation, communication and problem solving skills. Furthermore, the role-play exercise has proven to develop students’ emotional intelligence (Reilly, 2005). As such, role-play simulations are suggested to be well employed as a the mode of teaching and learning for built environment education.

6.3.6 Personal charisma improvement

Although the literature consistently highlights the way in which modules are delivered as the key to influencing students’ learning outcomes, and different modes of teaching have varying impacts in this respect; many students revealed that the personal charisma of tutors had more impact on students’ learning outcome than the way the module was delivered. They pointed out that even if the module was delivered mainly through the traditional lecturing method, which according to the literature is less appealing to students (Chambliss, 1996), the charismatic tutors could also impact hugely on students’ attitude and interest to learn. Students reflected that such charismatic tutors were passionate about the course and knowledgeable in their main area of subject. They knew how to arouse students’ interest to learn and fostered a positive learning atmosphere where students could be facilitated to absorb more knowledge during the learning process. One student commented that,

“the course (Management Theory) was delivered mainly through lecturing, but it was the content itself and the lecturer’s experience, knowledge and passion of the course, which made me learn more effectively.”

Male CEM student-21yrs

Another student expressed,

“the course was not directly about developing students’ EI, but the lecturer was very passionate about the course. He works in the industry for many years and has written many books and he knows how to bring us into the module. Through these, I found I’ve learnt a lot more.”
Male CE student-20yrs

This is partially contrary to the literature indicating that students appear to prefer teaching and learning activities that target the development of individual student’s knowledge by tapping their social learning experiences, and they found more traditional lecture methods less appealing (Chambliss, 1996). This finding may also imply that the influence of lecturers should be considered as equally important as the mode of teaching when enhancing students’ EI. As such, lecturers should be encouraged to improve their expertise and experience in the area of teaching in order to facilitate students’ learning process.

Clearly, these suggestions only offer a limited range of ideas for enhancing EI in the built environment education and are without empirical foundation in terms of their effect on student’s EI learning. Due to the limited size of the interview sample, they should serve an exploratory purpose and only provide evidences in support of more detailed future research. Nevertheless, they may offer a starting point for developing existing modules without the need to overhaul the technical content of existing programmes.

6.4 Chapter Summary

This chapter has discussed the results aligned with objectives one to six in relation to the extant literature. The investigation from objective one to objective six has been fully addressed and achieved in the current study. The potential role and importance of EI in the construction industry has been investigated and confirmed. Construction professionals’ performance was revealed to be affected by their emotional competencies. For example, emotional regulation enabled informants to be free from the detachment of negative emotions and avoid its adverse influence on effective problem solving, therefore allowing them to focus better on the problem per se and think logically in order to contribute to effective decision making.

Built environment education was revealed to fail to support students’ EI development. However, students’ EI differed according to the types of programmes taken. There was a statistically significant mean difference between programme CE
and CMQS, as well as between programme AEDM and CMQS. A further examination of the modular content, teaching and learning activities and assessment used in these programmes revealed that the amount of the modules which were indicated to develop skills attributable to EI in both the CE and AEDM programme were greater than the CMQS programme. In addition, a positive association was found between industrial placement and students’ EI. This was well supported by the qualitative phase of the research indicating that the majority of informants agreed that their EI had been greatly enhanced through industrial placement. The investigation of how industrial placement enhances students’ EI revealed that a good mentor, support in the workplace and industry experience were all found to be beneficial in this respect.

Six suggestions were proposed by students as guidance for future educators and practitioners to take in helping students to develop their EI. These included introducing EI concepts into modular content where relevant, so that students could increase their EI knowledge and learn emotional competencies through daily teaching and learning activities. Besides, lecturers and tutors were required to create more opportunities for students to work in groups. This was revealed to be very helpful in developing various competencies, such as communication, negotiation, teamwork, and leadership that collectively contribute to emotional intelligence, through working in a team-based setting. In addition, more input was required from tutors to reduce the distance from students by proactively talking to and approaching them. This would help to enhance students’ willingness to learn. Adopting role-play simulations in a real-world scenario was recommended as it would help to enhance students’ experience to deal with unexpected problems and their professionalism. In addition, it was suggested that lecturers needed to improve their personal charisma in order to facilitate the learning process of students.
CHAPTER SEVEN: CONCLUSIONS, RECOMMENDATIONS AND FUTURE RESEARCH

7.1 Introduction

This chapter presents the conclusion of measuring and enhancing the emotional intelligence of built environment students. It assesses the extent to which each objective and proposition of the research has been met and states the contribution to knowledge. This is followed by a summary of recommendations for enhancing EI in built environment education. It finally discusses the limitations of the study, and offers guidance as to the direction that future research should take in order to develop the area further.

7.2 Achievement of the Research Objectives and Propositions

The aim of the research was to measure and enhance the emotional intelligence of built environment students. In pursuit of this aim, six objectives were developed, which were addressed through the propositions which acted as a focus for data collection and analysis. Objective one represented an exploratory pilot study through in-depth interviews with construction professionals. From objective one, the potentially important role of EI was identified in the context of the construction industry and this directed the investigation of the main phase of study. Given that the importance of EI was shown in the construction industry, accordingly, the further five objectives of the research, focusing on examining how well current built environment education has developed students’ EI, were established. The fulfilment of each of these objectives and propositions is now addressed in turn. Table 7.1 shows the relationship between the research objectives and propositions.
Table 7.1: Research objectives and propositions

<table>
<thead>
<tr>
<th>Research Objectives</th>
<th>Propositions</th>
</tr>
</thead>
<tbody>
<tr>
<td>O1: To explore the potential role and importance of EI in the context of the construction industry.</td>
<td>P1: Emotional intelligence competencies are likely to have a positive impact on construction professionals’ performance.</td>
</tr>
<tr>
<td>O2: To examine the extent to which current built environment education develops students’ EI.</td>
<td>P2: Built environment education does not sufficiently develop students’ EI.</td>
</tr>
<tr>
<td>O3: To examine whether different programmes of built environment education have a differential effect on students’ EI.</td>
<td>P3: Programmes with EI relevant content and simulation activities are more beneficial to develop students’ EI than other pedagogic interventions.</td>
</tr>
<tr>
<td>O4: To investigate if and how industrial placements enhance students’ EI.</td>
<td>P4: Industry sandwich placement experience has a positive effect on students’ EI development.</td>
</tr>
<tr>
<td>O5: To explore the perspectives of built environment students on their EI development, and how these could be enhanced in the future.</td>
<td></td>
</tr>
<tr>
<td>O6: To propose recommendations to enhance students’ EI through built environment education.</td>
<td></td>
</tr>
</tbody>
</table>

7.2.1 Objective one and proposition one

The first objective was to explore the potential role and importance of EI in the context of the construction industry. The investigation of this objective revealed that EI indeed positively related to construction professionals’ daily work performance. In particular, EI was shown to influence one’s ability to make an effective decision. Emotional regulation was found to help construction professionals to make a sound decision by managing the impulsive and destructive behaviours stemming from negative emotions into a constructive outcome. In contrast, failing to regulate other peoples’ emotions evoked their resistant behaviours which led to poor work commitment and undermined informants’ work effectiveness. Emotional understanding and empathy were both found to play an important role in resolving conflicts in the construction industry. Construction professionals who were aware of other peoples’ emotions could mitigate unnecessary misunderstanding amongst their team members. In addition, construction managers and leaders who were able to show emotional understanding and empathy to their followers could help to develop a sense of trust in them as leader, which in turn
increased the organisational commitment of their followers, and that led to better work performance. All informants believed that EI was of paramount importance in the construction industry. In particular, they pointed out that the key to effectively managing people mainly depended on how emotionally intelligent an individual was in approach and response to others. Therefore, the first proposition of the research which predicted that “Emotional intelligence competencies are likely to have a positive impact on construction professionals’ performance” was supported in the current study.

7.2.2 Objective two and proposition two

The second objective was to examine the extent to which current built environment education develops students’ EI. The investigation of this objective revealed that built environment education did not develop students’ emotional intelligence or in some ways hindered students’ EI growth. There was a general EI decline occurring in all programmes taken in the built environment education during an academic year. On average, students’ overall EI score went down by 2.4 points. The biggest EI reduction was evident for CMQS students where students’ EI decreased by 4.8 points. This was followed by programme AEDM (a decrease of 2.8 points), CEM (a decrease of 1.1 points) and CE (a decrease of 0.1 points). Although these reductions were not statistically significant at a high confidence level, given that a minimum of EI growth was legitimately being expected due to the natural maturity process experienced during the examined period (see Section 6.2.2), such a moderate decline of EI may suggest that built environment education has an adverse impact on students’ EI growth. Therefore, the second proposition which predicted that “Built environment education does not sufficiently develop students’ EI.” was supported.

7.2.3 Objective three and proposition three

The third objective was to examine whether different programmes of built environment education have a differential effect on students’ EI. The investigation of this objective revealed that students’ EI differed statistically according to the type of programme taken. There was a statistically significant EI difference between CE students and CMQS students, as well as between AEDM students and CMQS
students. This could suggest that students studying on the CE and AEDM programmes tended to have a statistically higher EI score than students studying on the CMQS programme. Further examination of the modular content of the programme, teaching and learning activities, and assessment used revealed that the significant EI differences between CE and CMQS programme and between AEDM and CMQS programme could be because there were more modules which were indicated to develop skills contributing to EI in both CE and AEDM programmes than the CMQS programme. In addition to this, amongst the remaining 60% differential modules between CE and CMQS programme and between AEDM and CMQS programme, nearly all modules in both CE and AEDM programmes involved group work and were based on student-centred learning. This resonates with the literature in which student-centred learning and group activities are indicated to have a propensity to enhance students’ EI (Giaconia and Hedges, 1982; McAlister and Alexander, 2005). Therefore, the third proposition which was “Programmes with EI relevant content and simulation activities are more beneficial to develop students’ EI than other pedagogic interventions.” was supported.

7.2.4 Objective four and proposition four

The fourth objective was to investigate if and how industrial sandwich placements enhance students’ EI. The investigation of this objective revealed that industrial sandwich placements indeed have a positive effect on students’ EI development. Although undergraduates’ EI generally declined within an academic year, EI was shown to increase after students have been on their placements. On average, placement students’ EI received a gain of 4.1 points. CMQS placement students witnessed the biggest EI improvement in which students’ EI rose by 13.0 points. This was followed by CEM students, AEDM students and CE students. The investigation of how industrial sandwich placements enhanced students’ EI uncovered that a good mentor was an important factor that influenced students’ learning process. A good mentor could nurture a pleasant and positive environment for students to learn and magnify their job satisfaction. In particular, good mentors knew how to build up emotional competencies by skilfully guiding students to resolve problems in the daily work whilst enabling students to use their potential to the full. They also took the initiative to establish a close interpersonal relationship
with students by proactively talking to and approaching them. Such good mentoring relationships also helped to remove students’ nervousness from being in a new environment and instilled a sense of trust and loyalty toward mentors, which in turn promoted students’ organisational behaviours that contributed to better performance.

In addition, support in the workplace was another critical issue reported to have influenced students’ EI learning. A lack of support in the work environment was found to yield various negative emotions which have shown to de-motivate students’ interest to learn and impair their work performance. Furthermore, the industrial placement experience itself was revealed to be beneficial to students’ EI enhancement. Being in the placement, students were challenged to work and deal with people from different ages and backgrounds, thus their abilities to understand and be aware of others’ emotions were improved. Such challenges have also led to the professionalism of interpersonal skills, communication and cooperation, and subsequently EI. Therefore, the proposition four which predicted that “Industry sandwich placement experience has a positive effect on students’ EI development.” was supported.

7.2.5 Objective five

The fifth objective was to explore the perspectives of built environment students on their EI development, and how these could be enhanced in the future. The investigation of this objective revealed that industrial sandwich placement was generally reported to be more helpful than university in developing students’ EI. Nearly all students expressed the view that their EI had developed through placement, and the majority students (67%) considered that the level of such improvement was great. It was believed that the characteristics of the construction industry, such as complexity, dynamism and multidisciplinary, had created a difficult and challenging environment. Such an environment required students to have high levels of professionalism in interpersonal relationships and people skills because any errors they made would carry higher risk than they did in the university. This raised students’ awareness of the importance of EI and presented opportunities for them to develop relevant emotional competencies such as emotional awareness, emotional
understanding, and ultimately promotes emotional intelligence. Conversely, university was recognised as a simple and controlled environment where students tended to work with people of similar age and background, and so they could easily relate to and understand each other. In addition, it was believed that students in the university mainly confronted problems related to study, which has led to a tendency for students to focus on their ‘little world’ which is all about examinations, grades, and coursework. Therefore, university has less scope for students to develop their EI. These results were also reflected by the quantitative survey (phase two) in which industrial placement students’ EI were found to be higher than university students.

7.2.6 Objective six

The sixth objective was to propose recommendations to enhance students’ EI through built environment education. This objective has been met through the investigation of students’ opinions of how current educational programmes could be enhanced to develop EI. Several recommendations were proposed as guidance that future educators and practitioners can take in helping students to develop their EI. The concept of EI needs to be explicitly introduced into the modular content where relevant. For example in the management related modules, tutors could emphasise the emotional abilities of managers such as communication, empathy and leadership as important for their performance. This would help to deepen the understanding of EI of students and increase their knowledge of EI through daily teaching and learning activities. Besides, recommendations were made for lecturers and tutors to create more opportunities for students to work in the group and to support student-centred learning. This was revealed to help develop students’ various competencies, such as communication, cooperation, teamwork and leadership that collectively contribute to emotional intelligence. In addition, there was a belief that a close interpersonal relationship between students and lecturers was the key to enabling a positive and pleasant learning experience to occur. Therefore, tutors and lecturers should put more effort to get closer to students by proactively talking to and approaching them. A recommendation was also provided for the modes of teaching and learning, namely using role-play activities to simulate the real-world scenarios. This was reported to help develop students’ capacity to handle different unexpected problems.
in a risk-free environment, as well as better preparing students for their future careers. It was also interesting to find that the personal charisma of tutors was influential effect to students’ learning outcomes. A charismatic lecturer could boost students’ attitude and interest to learn. Finally, it was believed that taking part in the industrial sandwich placement was the best opportunity to enhance EI. This would offer students opportunities to put what they have learnt from the university into practice and help to enhance students’ experiences and professionalism. As such, the university should establish good partnerships with industries and encourage students to take part in the placements.

7.3 Some Practical Recommendations for Enhancing EI in Built Environment Education

Some practical recommendations for enhancing EI in built environment education are presented below. These are based upon participants’ suggestions, together with other recommendations and EI practices drawn from the extant literature.

- The concept of EI should be explicitly introduced into the modular content where relevant. For example, in the management related modules, lecturers can teach the theory of EI, EI’s application to construction management and emphasise the value of EI to students’ further careers. This can be further enhanced by asking students to discuss the component of EI as a crucial factor for successful managers or successful group experience, etc. For technical or engineering courses, EI can be implicitly applied into daily teaching by adopting small group discussions in the class, and using group work and presentations to further enhance social interactions amongst students.

- Role-plays and simulation exercises should be integrated into teaching activities. This can be achieved by making up a situation in the workplace that could actually happen, such as two colleagues arguing over a work issue; asking students to discuss the thinking of each person, identify their emotions and reasons; instilling students with a sense of emotional understanding and
empathy; and brainstorming positive ways to solve the conflict and find the best solution.

- Group work and peer assessment should be applied to modules. Group work encourages cooperation, and peer assessment allows students to observe and critically assess how other people perform. They both provide excellent opportunities for students to develop and practise their emotional competencies such as interpersonal skills, communication, and teamwork etc. Group composition should be changed often since there is a tendency for students to work with their friends, which will reduce opportunities to experience the challenges that could contribute to EI growth.

- Lecturers should spend time (10 minutes) after lectures or tutorials to build a close relationship with students. This would help to enhance students’ learning outcome.

- The use of an innovative teaching method, by combining videos, role-plays, small group discussions, and presentations together, is encouraged for developing students’ EI.

- In designing an EI-embedded curriculum, some elements should be involved such as reflective learning experiences; supportive supervision and mentorship; opportunities for working together; and constructive feedback.

- Asking students to read relevant EI materials and books. Giving students’ a self-measurement of EI, such as the Emotional Quotient Inventory (Bar-On, 1997) or the SSRI (Schutte, 1998), to identify their EI strengths and weakness. A pamphlet of tips on improving EI would be a good way for students to practise their emotional competencies.

- An EI workshop run by a department or university can offer students additional support in developing their EI. Also, an EI workshop, emphasising aspects such as how to use teachers’ emotions to positively influence learners’ emotions to enhance their ability to learn, should be provided for any staff involved in the teaching.
Chapter Seven: Conclusions and Future Research

7.4 Contributions of the Research

In addressing the need for an empirical study to measure and enhance the EI levels of students through built environment education, this research has made several contributions in terms of theoretical development and practical applications.

- This research has demonstrated a positive impact of EI on construction professionals’ performance in which EI influences people’s thinking and behaviours and thus contributes to effective decision making and the elimination of conflicts. In addition, EI was uncovered as the key to effectively managing people in the construction industry.

- This research has examined the EI level of built environment students and revealed that current built environment education inhibits the EI growth of students. In addition, different built environment programmes have a differential effect on students’ EI. Students studying on the CE and AEDM programme tended to have higher EI scores than students studying on the CMQS programme.

- The research has identified several teaching and learning interventions which appear to influence EI in a positive way. The results revealed that arts-related modular content; student-centred learning and group work in particular were found to be beneficial in this respect.

- This research has explored the relationship between EI and other demographic factors such age, gender and work experience. There was no gender difference being found in terms of overall EI score in the research. However, females were more likely to experience EI decline than males during the learning process of built environment education. EI was also found to be higher in relation to age and work experience.

- This research has indicated that industrial sandwich placements have a positive effect on students’ EI development, and identified the potential factors that contributed to the EI development during the placement. These included a good mentor; support in the workplace as well as industry experience.
The research has compared the effectiveness of the learning experience of university with industry on EI development, and revealed that industrial sandwich placement was considered to be more beneficial than university in developing students’ EI.

This research has investigated the perception of students regarding how current built environment education could be enhanced to develop EI based on their own experience and understanding. Recommendations are made for the built environment education to introduce the concept of EI into current modular content where relevant, and support student-centred learning. In addition, the application of group work and role-play simulations are to be encouraged within the daily teaching and learning activities. Recommendations are made to the lecturers and educators to be more proactive in taking the initiative to approach students, and improving personal charisma to boost students’ ability to learn.

Another recommendation is that built environment education might consider implementing policies and procedures that recognise EI as a key component in students’ success, e.g. raising the awareness of both lecturers and students about the importance of EI skills in attaining a job and succeeding in today’s workplace. The construction industry might consider conducting EI training to construction professionals to increase their EI levels, thereby enhancing their team performance.

The major theoretical contribution of this study has been the linking of the theory of EI and general education, and the application of the two theories to the context of the built environment education. The findings provide in-depth knowledge on the impacts of different learning experiences of the education process (e.g. the industrial placement period) on EI, and valuable information for educators who are seeking to enhance EI of their students through their teaching and learning strategies.
7.5 Limitations of the Study

Although EI has been abundantly explored in other areas and domains, the research of emotional intelligence within the context of built environment education is quite new. As such, there are many areas for improvement and for further research. In particular, the author recognises that this study is subject to some limitations. These include informant bias and interview techniques, and limited sample size.

7.5.1 Informant bias and interview techniques

The questionnaire (SSRI) used for EI measurement is a self-report instrument, therefore, the research can be subject to informant bias. As detailed in Chapter Two, the potential problem of using a self-report approach is that if a person’s self-concept is accurate, then these sorts of measures can often serve as an accurate measure of the actual ability or trait. However, if the person’s self-concept is inaccurate, then self-reported measures might yield information concerning only the person’s self-concept, rather than the actual ability or trait (Mayer et al., 2000). Therefore, informants might have had a propensity to overestimate or underestimate their actual ability or trait during the surveying. In addition, discussions of informants’ experiences of industry were all retrospective. Participants’ memory of this experience may have been subject to recall bias. Furthermore, the recommendations proposed by students were limited in not only students’ personal experience, but also in theoretical knowledge. Their views on enhancing EI through built environment education may have been influenced by a lack of teaching and learning experience and a deficient understanding of the educational setting.

7.5.2 Limitation in sample size

The findings and recommendations of this study were limited by the sample size of study (420 for the questionnaire survey, 45 interviews for placement students and other graduates, and 6 interviews for construction professionals), particularly in reference to the pilot study of construction professionals. There are questions over the trustworthiness and generalisation of the data to a broader context of construction professions. Limitation also concerned the differences between two cohorts of
students in the questionnaire survey. The surveyed students in the EI test and re-test were not completely the same, which may have skewed the results. Examining EI for same cohort of student may have revealed more reliable results. However, more than 50% were the same students in both EI assessments. Nevertheless, this study used mixed methods of data collection, by combining both quantitative and qualitative approaches together, to enhance the trustworthiness of the findings and results. Another limitation concerned the nature of the institution from which the sample was drawn; Loughborough University students may come from similar socioeconomic backgrounds, which may have skewed the results. Exploring EI in students from the other institutions may have revealed different results. However, as has been shown in Chapter Six, the findings presented here are supported by the extant literature, therefore suggesting that the findings can be generalised more widely. A final consideration is that the number of the males in the sample was almost three times greater than the number of females. The disparity between males and females might be subject to the effect of statistic error, but this does reflect the gender imbalance on such programmes.

7.6 Recommendations

It is important to continue research on EI in the context of built environment education so that students can be better prepared to enter their future professions and be successful in attaining a job. This research has identified some recommendations which require further investigation:

- The current study examined the overall EI score of built environment students- a study focused on examining different dimensions of EI by using other alternative EI instruments, such as Bar-On EQ-i instrument, would help to understand students’ EI from different aspects. In addition, the EI instrument (SSRI) used in this study was based on a mixed-model and a self-report measure, further research could utilise the other predominant EI model, such as the ability model and ability performance measure (e.g. MSCEIT) to assess informants’ EI.
● The pilot study with construction professionals was based on a small convenient sample. A further study should enlarge the sample size to provide a richer understanding of the impact that EI has on construction professionals’ performance. Besides, the pilot study used a qualitative approach to investigate the relationship between EI and construction professionals’ performance. A quantitative approach to analyse construction professionals’ EI score with their performance is needed. This would help to identify if EI is a predictor to differentiate super managers from average performers.

● The current study was limited to the nature of the institution from which the sample was drawn; all surveyed students came from Loughborough University and they may have come from similar socioeconomic backgrounds. Exploring EI in other institutions or different disciplines may help to strengthen findings and provide interesting findings as compared to the results presented in this study.

● This study examined and re-examined students’ EI based on two different cohorts of students (Note: more than 50% were still the same students). A study on the same cohort of students adopting similar research methods to the current study is recommended, and would enhance the credibility of the research.

● The current research indicated that females were more likely to experience EI decline through learning interventions in built environment education. The reasons underlying this phenomenon are unclear and would require further exploration of the gender issues within built environment education in a more extensive study. Such as whether the male dominated environment or the masculine culture of built environment education would have an adverse effect on females’ EI growth? Furthermore, the literature indicated that females tend to display their gender role in a particular way in order to gain male acceptance (Butler, 2004); it would be interesting to investigate if this would have any implications here.

● There is ample scope for more empirical studies to explore the issues and factors that influence students’ EI through different learning interventions of built
environment education. Other potentially influencing factors might include the EI levels of lecturers, personal characteristics and interests of students, parents’ influence, or other social interactions beyond built environment education.

7.7 Further Research

To continue EI research in the built environment domain, this research has identified some areas which require further research.

- The current study focused on students’ EI changes within an academic year. Future studies should enlarge the sample size to students from different disciplines and in different grades of built environment education. A longitudinal study on students’ EI from year one to year four would help to better understand the general trend of EI growth of built environment students.

- A further research should explore the EI levels of lecturers and its relationship with their teaching effectiveness. For example, examining the relationship between lecturers’ EI and their teaching assessment, and finding out if lecturers with higher EI were better able to enhance students’ learning outcome.

- An empirical study to examine and compare different cohorts of students who take on an EI-embedded module (which uses the recommendations presented in this study) with control group students who take on a typical module would provide valuable information in designing an effective EI-embedded module. Thus, it is important that research be continued in the area.

- A longitudinal study of the EI of construction professionals within different positions, and with different levels of work experience (e.g. 5yrs, 10yrs and 15yrs) would help to understand the development of EI along with increasing age and work experience.

- The recommendations proposed to enhance students’ EI through built environment education were merely based on the experience and knowledge of students. A study exploring academics’ good teaching and learning practice is...
needed, and would richly contribute to the body of knowledge in this area. Besides, a further empirical study would help to verify these recommendations.

- An ethnographic study to observe how EI plays a part in managing site activities and daily tasks of construction professionals would provide a different view of understanding the role of EI in the construction industry.

Overall, linking the concept of EI to the educational context poses a considerable challenge to all educationalists. This study has produced some important results that have implications for both research and practice. It is recognised that these conclusive findings may not be generalised to the whole built environment education in the UK, but it is possible that it can provide insights that might be applicable to other similar contexts. It is hoped that this may lead to further exploration of how emotional intelligence can be serve as a significant tool for facilitating students’ intelligence development.

7.8 Publications


REFERENCES


References


References


Cain, P.J. (2003) A first step toward introducing emotional intelligence into the law school curriculum: the “emotional intelligence and the clinic students” class. URL:


References


References


References


APPENDICES

Appendix A Research Questions

Research questions

*To investigate if and how current built environment education develops students’ EI, how built environment education could be enhanced to develop students’ EI more effectively in the future?*

The research objectives are established align with the research questions, and can be achieved through a series of sub-questions.

<table>
<thead>
<tr>
<th>Research Objectives</th>
<th>Sub-questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>O1: To explore the potential role and importance of EI in the context of the</td>
<td>• How EI influences construction professionals’ work performance?</td>
</tr>
<tr>
<td>construction industry.</td>
<td>• If the emotional competencies being performed or not being performed by construction professionals result in any differences of the work outcome?</td>
</tr>
<tr>
<td>O2: To examine the extent to which current built environment education develops</td>
<td>• Is there a difference between the first EI test and second EI test of the levels of emotional intelligence?</td>
</tr>
<tr>
<td>students’ EI.</td>
<td>• How does EI change over the period of an academic year?</td>
</tr>
<tr>
<td>O3: To examine whether different programmes of built environment education have a</td>
<td>• Is the difference or change related to the type of programmes?</td>
</tr>
<tr>
<td>differential effect on students’ EI.</td>
<td>• What kinds of pedagogic interventions appear to have a positive impact on EI?</td>
</tr>
<tr>
<td>O4: To investigate if and how industrial placements enhance students’ EI.</td>
<td>• If industrial placement develops students’ emotional competencies and what are they?</td>
</tr>
<tr>
<td>O5: To explore the perspectives of built environment students on their EI development, and how these could be enhanced in the future.</td>
<td>• How students’ EI are shaped by working in the construction industry?</td>
</tr>
<tr>
<td>O6: To propose recommendations to enhance students’ EI through built environment</td>
<td>• How students perceive their EI has developed in the built environment education?</td>
</tr>
<tr>
<td>education.</td>
<td>• Which learning experience (industrial experience vs. university experience) is good at developing students’ emotional competencies?</td>
</tr>
<tr>
<td></td>
<td>• What are students’ opinions to enhance current built environment education for their EI development?</td>
</tr>
</tbody>
</table>
## Appendix B ECI Measurement

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Personal Competency</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Self-Awareness</strong></td>
<td><strong>Accurate self-assessment</strong></td>
<td>Knowing own strengths and weaknesses</td>
</tr>
<tr>
<td></td>
<td><strong>Emotional awareness</strong></td>
<td>Recognising one’s emotions and their effects</td>
</tr>
<tr>
<td></td>
<td><strong>Self-confidence</strong></td>
<td>Sureness about ones’ self-worth and capabilities</td>
</tr>
<tr>
<td><strong>Self-Management</strong></td>
<td><strong>Achievement orientation</strong></td>
<td>Seeks ways to improve performances</td>
</tr>
<tr>
<td></td>
<td><strong>Adaptability</strong></td>
<td>Flexibility in handling change</td>
</tr>
<tr>
<td></td>
<td><strong>Emotional self-control</strong></td>
<td>Managing disruptive emotions and impulses</td>
</tr>
<tr>
<td></td>
<td><strong>Initiative</strong></td>
<td>Readiness to act on opportunities</td>
</tr>
<tr>
<td></td>
<td><strong>Commitment</strong></td>
<td>Aligning with the goals of the group or organisation</td>
</tr>
<tr>
<td></td>
<td><strong>Optimism</strong></td>
<td>Persistence in pursuing goals despite obstacles and setbacks</td>
</tr>
<tr>
<td></td>
<td><strong>Transparency</strong></td>
<td>Acts on own values even when there is a personal cost</td>
</tr>
<tr>
<td><strong>Social Awareness</strong></td>
<td><strong>Empathy</strong></td>
<td>Sensing other’s feelings and perspective, and taking an active interest in their concerns</td>
</tr>
<tr>
<td></td>
<td><strong>Developing others</strong></td>
<td>Sensing what others need in order to develop, and bolstering their abilities</td>
</tr>
<tr>
<td></td>
<td><strong>Organisational awareness</strong></td>
<td>Understands the organisation’s unspoken rules</td>
</tr>
<tr>
<td></td>
<td><strong>Service orientation</strong></td>
<td>Anticipating, recognising and meeting customers’ needs</td>
</tr>
<tr>
<td><strong>Social Skills</strong></td>
<td><strong>Change catalyst</strong></td>
<td>Initiating or managing change</td>
</tr>
<tr>
<td></td>
<td><strong>Conflict management</strong></td>
<td>Negotiating and resolving disagreement</td>
</tr>
<tr>
<td></td>
<td><strong>Influence</strong></td>
<td>Wielding effective tactics for persuasion</td>
</tr>
<tr>
<td></td>
<td><strong>Building bonds leadership</strong></td>
<td>Nurturing instrumental relationships</td>
</tr>
<tr>
<td></td>
<td><strong>Team work and collaboration</strong></td>
<td>Inspiring and guiding groups and people</td>
</tr>
<tr>
<td></td>
<td><strong>Communication</strong></td>
<td>Working with others toward shared goals</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sending clear and convincing messages</td>
</tr>
</tbody>
</table>
## Appendix C Bar-On EQ-i Measurement

<table>
<thead>
<tr>
<th>Area</th>
<th>Component Measured by EQ-i Subscales</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interpersonal Skills</td>
<td>Self-Regard</td>
<td>The ability to respect and accept oneself as basically good.</td>
</tr>
<tr>
<td></td>
<td>Emotional Self-Awareness</td>
<td>The ability to recognise one’s feelings.</td>
</tr>
<tr>
<td></td>
<td>Assertiveness</td>
<td>The ability to express feelings, beliefs and thoughts and defend one’s rights in a non-destructive manner.</td>
</tr>
<tr>
<td></td>
<td>Independence</td>
<td>The ability to be self-directed and self-controlled in one’s thinking and actions and to be free of emotional dependency.</td>
</tr>
<tr>
<td></td>
<td>Self-Actualization</td>
<td>The ability to realize one’s potential capacities.</td>
</tr>
<tr>
<td>Intrapersonal Skills</td>
<td>Empathy</td>
<td>The ability to be aware of, to understand and to appreciate the feelings of others.</td>
</tr>
<tr>
<td></td>
<td>Social Responsibility</td>
<td>The ability to demonstrate oneself as a cooperative, contributing and constructive member of one’s social group.</td>
</tr>
<tr>
<td></td>
<td>Interpersonal Relationship</td>
<td>The ability to establish and maintain mutually satisfying relationships that are characterized by intimacy and by giving and receiving affection.</td>
</tr>
<tr>
<td>Adaptability</td>
<td>Reality Testing</td>
<td>The ability to assess the correspondence between what is experienced and what objectively exists.</td>
</tr>
<tr>
<td></td>
<td>Flexibility</td>
<td>The ability to adjust one’s emotions, thoughts and behaviour to changing situations and conditions.</td>
</tr>
<tr>
<td></td>
<td>Problem Solving</td>
<td>The ability to identify and define problems as well as to generate and implement potentially effective solutions.</td>
</tr>
<tr>
<td>Stress Management</td>
<td>Stress Tolerance</td>
<td>The ability to withstand adverse events and stressful situations without “falling apart” by actively and positively coping with stress.</td>
</tr>
<tr>
<td></td>
<td>Impulse Control</td>
<td>The ability to resist or delay an impulse, drive or temptation to act.</td>
</tr>
<tr>
<td>General Moods</td>
<td>Optimism</td>
<td>The ability to look at the brighter side of life and to maintain a positive attitude, even in the face of adversity.</td>
</tr>
<tr>
<td></td>
<td>Happiness</td>
<td>The ability to feel satisfied with one’s life, to enjoy oneself and others and to have fun.</td>
</tr>
</tbody>
</table>
Appendix D SSRI Questionnaire

**Emotional Intelligence Questionnaire**

You are being invited to participate in a study examining the importance of emotional intelligence for construction professionals. Emotional Intelligence (EI) is defined as the capacity to recognise our own feelings and those of others or motivating ourselves, and for managing emotions effectively in ourselves and others. Participation in this study is completely voluntary, but if you agree to participate then your response will be completely confidential. If you would like a copy of the results of this survey, please write your email address at the top of this page. For questions regarding this study, please contact Yiyi Mo at Y.Y.Mo @lboro.ac.uk.

**Background Information** Please complete the following items that most closely correspond to your background.

<table>
<thead>
<tr>
<th>Age:</th>
<th>Position:</th>
<th>Position level:</th>
</tr>
</thead>
</table>

**How many employees in your company (e.g. around 500 people)?**

**What is your educational background (e.g. BSc Construction Engineering Management)? Please state**

**Assessing Emotions** This section is designed to ask you about your emotions or reactions associated with emotions. There are no right or wrong answers, hence, there is no need to spend too long on each question, just go with your first impulse. Please CIRCLE the value that best describes the extent of your agreement or disagreement.

<table>
<thead>
<tr>
<th>I know when to speak about my personal problems to others.</th>
<th>Strongly disagree</th>
<th>Somewhat disagree</th>
<th>Neither agree nor disagree</th>
<th>Somewhat agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>When I am faced with obstacles, I remember times I faced similar obstacles and overcame them.</th>
<th>Strongly disagree</th>
<th>Somewhat disagree</th>
<th>Neither agree nor disagree</th>
<th>Somewhat agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>I expect that I will do well on most things I try.</th>
<th>Strongly disagree</th>
<th>Somewhat disagree</th>
<th>Neither agree nor disagree</th>
<th>Somewhat agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other people find it easy to confide in me.</th>
<th>Strongly disagree</th>
<th>Somewhat disagree</th>
<th>Neither agree nor disagree</th>
<th>Somewhat agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>I find it hard to understand the non-verbal messages of other people.</th>
<th>Strongly disagree</th>
<th>Somewhat disagree</th>
<th>Neither agree nor disagree</th>
<th>Somewhat agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Statement</td>
<td>Strongly disagree</td>
<td>Somewhat disagree</td>
<td>Neither agree nor disagree</td>
<td>Somewhat agree</td>
<td>Strongly agree</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>-------------------</td>
<td>-------------------</td>
<td>----------------------------</td>
<td>----------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Some of the major events of my life have led me to re-evaluate what is</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>important and not important.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When my mood changes, I see new possibilities.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Emotions are one of the things that make my life worth living.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I am aware of my emotions as I experience them.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I expect good things to happen.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I like to share my emotions with others.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>When I experience a positive emotion, I know how to make it last.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I arrange events others enjoy.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I seek out activities that make me happy.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I am aware of the non-verbal messages I send to others.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I present myself in a way that makes a good impression on others.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>When I am in a positive mood, solving problems is easy for me</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>By looking at their facial expressions, I recognise the emotions people</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>are experiencing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I know why my emotions change.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>When I am in a positive mood, I am able to come up with new ideas</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I have control over my emotions</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I easily recognise my emotions as I experience them.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I motivate myself by imagining a good outcome to tasks I take on.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
#Appendices

##Continued

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly disagree</th>
<th>Somewhat disagree</th>
<th>Neither agree nor disagree</th>
<th>Somewhat agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I compliment others when they have done something well.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I am aware of the non-verbal messages other people send.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>When another person tells me about an important event in his or her life, I almost feel as though I experienced this event myself.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>When I feel a change in emotions, I tend to come up with new ideas.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>When I am faced with a challenge, I give up because I believe I will fail.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I know what other people are feeling just by looking at them.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I help other people feel better when they are down.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I use good moods to help myself keep trying in the face of obstacles.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I can tell how people are feeling by listening to the tone of their voice.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>It is difficult for me to understand why people feel the way they do.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Thank You for Your Participation
Appendix E Interview Schedule for Construction Professionals

Demography Information:

<table>
<thead>
<tr>
<th>Gender:</th>
<th>Whom do you report to? (Job title)</th>
<th>Who reports to you?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job title:</td>
<td>Type of organisation:</td>
<td>Year of Work:</td>
</tr>
</tbody>
</table>

What are your main responsibilities: (what do you do everyday)

Main questions

1. Can you give me an example of a time where even though it was difficult, you were able to control and filter your emotions, such as anxiety or other negative emotions, in a constructive way.

2. Can you give me an example of a time when you mishandle a situation, because you failed to observe other people’s feelings or concerns, or you observed it but did not give importance to it?

3. How would you rate your ability in accurately perceiving, understanding, managing your own emotions and those of others when you first enter the construction industry and now?

4. How has your EI changed over your career?

5. How do you perceive the role of emotional intelligence in managing people in the industry?

6. What characteristics, abilities or skills do you think are needed to do your job?
Appendix F Interview Schedule for Placement Students

Demography Information:

<table>
<thead>
<tr>
<th>Gender:</th>
<th>Age:</th>
<th>Education background:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of organisation:</td>
<td>Job title/position:</td>
<td>Main responsibilities:</td>
</tr>
<tr>
<td>Year of Work:</td>
<td>Whom do you report to? (Job title)</td>
<td>Who reports to you?</td>
</tr>
</tbody>
</table>

Main questions

1. Can you give me an example of a time where even though it was difficult, you were able to control and filter your emotions, such as anxiety or other negative emotions, in a constructive way.

2. Can you give me an example of a time when you mishandle a situation, because you failed to observe other people’s feelings or concerns, or you observed it but did not give importance to it?

3. How would you rate your ability in accurately perceiving, understanding, managing your own emotions and those of others before and after the placement?

4. How do you perceive your industrial experience developed your emotional competencies in comparison with your learning experience in the University?

5. How do you perceive the role of emotional intelligence in managing people in the industry?

6. What characteristics, abilities or skills do you think are needed to do your job?
## Appendix G NVivo Index System Node Description

The table shows the generic node names within the index system, together with a description of each emotional competence. The description of the emotional competence is borrowed from the Emotional Intelligence (EI) Competency Based Structured Behavioural Interview Guide (Goleman’s ECI model) which identifies 14 separate competencies clustered in two areas: 1) Social Awareness/Relationship Skills and 2) Self-Awareness/Self-Management skills based on the most widely accepted EI framework.

<table>
<thead>
<tr>
<th>Social Awareness/Relationship Skills</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SENSITIVITY/EMPATHY</strong></td>
<td>Demonstrates understanding and consideration for the opinions, feelings, and needs of others. Treats others with courtesy and respect. Modifies behaviour as appropriate to facilitate effective relations with persons of different backgrounds and work styles.</td>
</tr>
<tr>
<td><strong>CUSTOMER SERVICE ORIENTATION</strong></td>
<td>Demonstrates the willingness to seek feedback, listen and understand internal and external customer's needs, problems and complaints; anticipates customer needs; gives high priority to customer satisfaction.</td>
</tr>
<tr>
<td><strong>CONFLICT MANAGEMENT</strong></td>
<td>Demonstrates the ability to effectively resolve interpersonal differences and manage conflict with others. Brings interpersonal conflicts into the open and attempts to resolve them collaboratively. Seeks &quot;win-win&quot; solutions for all individuals.</td>
</tr>
<tr>
<td><strong>LEADERSHIP/INFLUENCE</strong></td>
<td>Demonstrates the ability to assert own ideas, persuade, and effectively influence others. Gains support and commitment to new ideas, suggestions, methods, and approaches to accomplishing work. Inspires, motivates, and mobilises others to take actions to complete tasks and assignments.</td>
</tr>
<tr>
<td><strong>COACHING/DEVELOPMENT</strong></td>
<td>Ensures employees' receive/attend outside training courses. Gives timely, specific, and helpful coaching and on-the-job training to each employee. Enhances employee's skills and knowledge by planning and implementing effective developmental activities. Accurately assesses employee's strengths and development needs.</td>
</tr>
<tr>
<td><strong>TEAMWORK/COLLABORATION</strong></td>
<td>Demonstrates the ability to adjust and modify interpersonal behaviour to effectively work with others in a cooperative and effective manner. Demonstrates consideration for the feelings and needs of others. Demonstrates the ability to work in a collaborative manner with others in the organisation.</td>
</tr>
<tr>
<td><strong>CHANGE MANAGEMENT</strong></td>
<td>Identifies new opportunities and champions new initiatives; Takes unpopular stands when necessary to pursue progressive changes; Pursues progressive changes; Demonstrates the ability to mange change; Adapts personal strategies/methods for different situations to achieve change; Adapts readily with versatility and balance.</td>
</tr>
<tr>
<td><strong>COMMUNICATION</strong></td>
<td>Speaks and conveys written and verbal thoughts and ideas in a clear and concise manner. Expresses ideas effectively and persuasively in individual and group situations. Demonstrates attention to and conveys understanding of others through active listening. Communicates information clearly and in a timely manner in all written memos, email, reports, and documentation.</td>
</tr>
<tr>
<td>Self-Awareness/Self-Management Skills</td>
<td>Trustworthiness</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td><strong>Trustworthiness</strong></td>
<td>Acts and believes as if others are basically honest and trustworthy; Communicates in a direct, frank and ingenuous manner; Behaves in a genuine manner without pretence or deception around others; Maintains confidences and does not reveal private information to others; Demonstrates the ability to adhere to ethical principles and fulfil moral obligations.</td>
</tr>
</tbody>
</table>
## Appendix H Placement Interviewed Students' Demography

<table>
<thead>
<tr>
<th>Name</th>
<th>Age</th>
<th>Gender</th>
<th>Position</th>
<th>Work Experience (months)</th>
<th>EI score</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE1</td>
<td>23</td>
<td>M</td>
<td>Trainee engineer</td>
<td>14</td>
<td>101</td>
</tr>
<tr>
<td>CE2</td>
<td>21</td>
<td>M</td>
<td>Trainee engineer</td>
<td>12</td>
<td>100</td>
</tr>
<tr>
<td>CE3</td>
<td>21</td>
<td>M</td>
<td>Trainee engineer</td>
<td>8</td>
<td>130</td>
</tr>
<tr>
<td>CE4</td>
<td>20</td>
<td>M</td>
<td>Trainee engineer</td>
<td>12</td>
<td>124</td>
</tr>
<tr>
<td>CE5</td>
<td>21</td>
<td>M</td>
<td>Trainee engineer</td>
<td>14</td>
<td>101</td>
</tr>
<tr>
<td>CEM1</td>
<td>20</td>
<td>M</td>
<td>Trainee project manager</td>
<td>6</td>
<td>152</td>
</tr>
<tr>
<td>CEM2</td>
<td>24</td>
<td>M</td>
<td>Trainee project manager</td>
<td>8</td>
<td>136</td>
</tr>
<tr>
<td>CEM3</td>
<td>20</td>
<td>M</td>
<td>Trainee engineer</td>
<td>12</td>
<td>140</td>
</tr>
<tr>
<td>CEM4</td>
<td>21</td>
<td>F</td>
<td>Trainee site manager</td>
<td>8</td>
<td>127</td>
</tr>
<tr>
<td>CEM5</td>
<td>20</td>
<td>M</td>
<td>Trainee site manager</td>
<td>30</td>
<td>125</td>
</tr>
<tr>
<td>CEM6</td>
<td>21</td>
<td>M</td>
<td>Trainee project manager</td>
<td>48</td>
<td>127</td>
</tr>
<tr>
<td>CEM7</td>
<td>22</td>
<td>M</td>
<td>Trainee site manager</td>
<td>24</td>
<td>124</td>
</tr>
<tr>
<td>CEM8</td>
<td>24</td>
<td>M</td>
<td>Trainee project manager</td>
<td>36</td>
<td>117</td>
</tr>
<tr>
<td>CEM9</td>
<td>20</td>
<td>M</td>
<td>Trainee project manager</td>
<td>8</td>
<td>132</td>
</tr>
<tr>
<td>CEM10</td>
<td>22</td>
<td>M</td>
<td>Trainee project manager</td>
<td>12</td>
<td>111</td>
</tr>
<tr>
<td>CEM11</td>
<td>21</td>
<td>M</td>
<td>Trainee site manager</td>
<td>15</td>
<td>121</td>
</tr>
<tr>
<td>CEM12</td>
<td>21</td>
<td>M</td>
<td>Trainee site manager</td>
<td>8</td>
<td>129</td>
</tr>
<tr>
<td>CEM13</td>
<td>22</td>
<td>M</td>
<td>Trainee project manager</td>
<td>8</td>
<td>121</td>
</tr>
<tr>
<td>CMQS1</td>
<td>21</td>
<td>F</td>
<td>Trainee quantity surveyor</td>
<td>36</td>
<td>140</td>
</tr>
<tr>
<td>CMQS2</td>
<td>22</td>
<td>F</td>
<td>Trainee quantity surveyor</td>
<td>18</td>
<td>127</td>
</tr>
<tr>
<td>CMQS3</td>
<td>24</td>
<td>F</td>
<td>Trainee quantity surveyor</td>
<td>14</td>
<td>138</td>
</tr>
<tr>
<td>CMQS4</td>
<td>21</td>
<td>M</td>
<td>Trainee quantity surveyor</td>
<td>18</td>
<td>117</td>
</tr>
<tr>
<td>CMQS5</td>
<td>22</td>
<td>M</td>
<td>Trainee quantity surveyor</td>
<td>15</td>
<td>123</td>
</tr>
<tr>
<td>CMQS6</td>
<td>20</td>
<td>F</td>
<td>Trainee quantity surveyor</td>
<td>12</td>
<td>113</td>
</tr>
<tr>
<td>CMQS7</td>
<td>22</td>
<td>M</td>
<td>Trainee quantity surveyor</td>
<td>15</td>
<td>121</td>
</tr>
<tr>
<td>AEDM1</td>
<td>22</td>
<td>M</td>
<td>Trainee design coordinator</td>
<td>12</td>
<td>98</td>
</tr>
<tr>
<td>AEDM2</td>
<td>21</td>
<td>M</td>
<td>Trainee project planner</td>
<td>12</td>
<td>133</td>
</tr>
<tr>
<td>AEDM3</td>
<td>22</td>
<td>M</td>
<td>Trainee design coordinator</td>
<td>12</td>
<td>112</td>
</tr>
<tr>
<td>AEDM4</td>
<td>21</td>
<td>M</td>
<td>Trainee design coordinator</td>
<td>12</td>
<td>133</td>
</tr>
<tr>
<td>AEDM5</td>
<td>21</td>
<td>M</td>
<td>Trainee project planner</td>
<td>15</td>
<td>119</td>
</tr>
</tbody>
</table>
## Appendix I CE and CMQS Module Assessment

<table>
<thead>
<tr>
<th>Module</th>
<th>Intended EI learning outcome</th>
<th>Module Aim and Content</th>
<th>Mode of Teaching and Learning</th>
<th>Assessment used</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVA002 (Fluid mechanics)</td>
<td>teamwork ability</td>
<td>To introduce and describe the static and dynamic behaviour of ideal and real fluids.</td>
<td>20 one-hour lectures (two per week), 10 one-hour tutorials (one per week), 2 timetabled laboratory classes (each of approximately 2 hours duration) student centred learning</td>
<td>80% examination and 20% coursework including two lab reports (each 10%) which will be partially peer-assessed.</td>
</tr>
<tr>
<td>CVA005 (Analysis and Mechanics 1&amp;2)</td>
<td>teamwork ability</td>
<td>To develop the students’ analytical skills and understanding of qualitative and quantitative behaviour of structures</td>
<td>Lecture (2hrs) and examples class/tutorial (1hr) per week plus laboratory class (3hrs)</td>
<td>30% coursework including lab report and poster and 70% examination</td>
</tr>
<tr>
<td>CVA007 (Engineering Design)</td>
<td>teamwork ability and design presentation skill</td>
<td>To develop an appreciation of the design process and of team working</td>
<td>Lectures (8 hrs) and tutorials/seminars/group meetings (25 hrs), student centred learning</td>
<td>100% coursework: consisting group, individual and peer assessment report, presentation</td>
</tr>
<tr>
<td>CVA009 (Surveying)</td>
<td>teamwork ability</td>
<td>to acquire the theoretical and practical skills necessary for employment as a Junior Land Surveyor and Setting Out Engineer</td>
<td>A combination of 11 one-hour lectures and 9 two-hour practical sessions in which students work in small units (3 or 4 students per group), student centred learning</td>
<td>50% coursework including one group fieldwork report and examination (50%).</td>
</tr>
<tr>
<td>CVA010 (Engineering Materials)</td>
<td>teamwork ability</td>
<td>To extent the student’s understanding of properties of engineering materials and to show how this knowledge is applied to the design of structures</td>
<td>Tutorial (20 hrs), examples classes (4hrs), lab class (2hrs)</td>
<td>50% coursework and 50% examination</td>
</tr>
<tr>
<td>Module</td>
<td>Intended EI learning outcome</td>
<td>Module Aim and Content</td>
<td>Mode of Teaching and Learning</td>
<td>Assessment used</td>
</tr>
<tr>
<td>------------------------</td>
<td>------------------------------</td>
<td>----------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------</td>
</tr>
<tr>
<td>CMQS (commercial Management and Qualities Survey)</td>
<td>teamwork ability</td>
<td>to provide the student with a basic knowledge of land surveying techniques applicable to building and civil engineering works</td>
<td>10 one-hour lectures including in-class examples (nominally one per week), 2 one and a half hour practical sessions and a one week residential field course. Remaining time for student centred learning</td>
<td>examination (50%) and coursework (50%): a fieldwork report</td>
</tr>
<tr>
<td>CVA021 (Site surveying)</td>
<td>teamwork ability</td>
<td>To illustrate how the various parties to construction project work together to manage the design and construction process, to deliver a successful project to their client</td>
<td>Tutorials (4 hrs per week) and student centred learning</td>
<td>100% coursework: including presentation, meeting simulation and report writing</td>
</tr>
<tr>
<td>CVA025 (Project and Teamwork)</td>
<td>teamwork ability, effective communication, problem solving though negotiation and compromise, presentation skill</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Appendix J AEDM and CMQS Module Assessment

<table>
<thead>
<tr>
<th>Module</th>
<th>Intended EI learning outcome</th>
<th>Module Aim and Content</th>
<th>Mode of Teaching and Learning</th>
<th>Assessment used</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVA003 (Introduction to Structural Design)</td>
<td>Work in a group</td>
<td>To understand the principle of structural design and to appreciate how this is related to architectural form.</td>
<td>Lecture (2hrs) and seminar/tutorial/coursework clinic (1hr) per week</td>
<td>40% coursework including presentation and poster and 60% examination</td>
</tr>
<tr>
<td>CVA007 (Engineering Design)</td>
<td>Working as a team and presentation skill</td>
<td>To develop an appreciation of the design process and of team working</td>
<td>Lectures (8hrs) and tutorials/seminars/group meetings (25hrs), student centred learning</td>
<td>100% coursework: consisting group, individual and peer assessment report, presentation</td>
</tr>
<tr>
<td>CVA026 (Building Production)</td>
<td>Developing group working capability</td>
<td>To understand the building production process for unframed buildings and to introduce the student to professional development and lifelong learning</td>
<td>Tutorial, seminar, workshop and a simulation exercise of building process (3hrs per week)</td>
<td>50% coursework and 50% examination</td>
</tr>
<tr>
<td>CVA025 (Project and Teamwork)</td>
<td>Team working, effective communication, problem solving though negotiation and compromise, presentation skill</td>
<td>To illustrate how the various parties to construction project work together to manage the design and construction process, to deliver a successful project to their client</td>
<td>Tutorials (4hrs per week) and simulation exercise, student centred learning</td>
<td>100% coursework: including presentation, meeting simulation and report writing</td>
</tr>
</tbody>
</table>
## Appendix K Curriculum Maps

### Curriculum map for BEng Programme in Civil Engineering (1101)

<table>
<thead>
<tr>
<th>Knowledge and understanding of</th>
<th>Module</th>
<th>Evidence of achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Mathematics, science and engineering principles in the field of structures, geotechnics, water engineering and surveying</td>
<td>A002(EX); A005(EX); A007(GR); A009(EX/FR); MAA100(EX/CW); MAA102(EX/CW); MAA2102(EX/CW); B001(EX); B002(EX/MQ); B003(EX); B004(EX/AP); B006(EX/CW); B010(FR); B011(EX/LR); MAB102(EX/CW); MAB202(EX/CW); C001(CW/EX); C004(EX/CW); C005(CR); C006(PR); C007(EX/CW); C009(CW/EX); C011(EX/CW); C013(EX/CW); C014(EX); C018(CW/EX); C020(CW/AP); C021(CW/EX)</td>
<td>Examination</td>
</tr>
<tr>
<td>2 Properties, behaviour, fabrication and use of relevant materials</td>
<td>A002(EX); A007(GR); A014(PR/MQ); A015(EX/CW); B001(EX/CW); B002(EX/MQ); B026(EX/PR); C006(PR); C007(EX/CW); C009(CW/EX); C015(EX/MQ); C018(CW/EX); C033(EX/PR)</td>
<td>Coursework – individual + group</td>
</tr>
<tr>
<td>3 Construction technology and civil engineering practice</td>
<td>A014(PR/MQ); B026(EX/PR); C004(CW); C006(PR); C007(EX); C009(EX/CW); C014(EX/CR); C015(EX/MQ); C021(CW/EX); C025(CW/EX); C033(EX/PR)</td>
<td>Lab work/report</td>
</tr>
<tr>
<td>4 Construction management and contract procedure</td>
<td>B005(EX/MQ); B006(EX/PR); C006(PR); C009(CW); C013(EX); C022(CC); C023(EX); C025(EX); C044(CW)</td>
<td>Multiple choice questions</td>
</tr>
<tr>
<td>5 Principles of design specific to civil engineering</td>
<td>A007(GR); B001(EX); B003(LR); B008(EX/CW); B011(CW); C001(EX/CW); C004(CW); C005(CR); C006(PR); C007(CW/EX); C009(CW/EX); C014(EX); C015(EX); C021(CW/EX)</td>
<td>Assessed presentations</td>
</tr>
<tr>
<td>6 The role of codes of practice and the regulatory framework in design and practice</td>
<td>A002(CW); A007(GR); B001(EX/CW); B011(EX); B026(EX/PR); C005(CR); C006(PR); C007(CW/EX); C009(EX/CW); C014(EX); C015(EX/MQ); C018(CW/EX); C021(CW/EX); C033(PR)</td>
<td>Fieldwork + report</td>
</tr>
<tr>
<td>7 Principles of relevant information technology</td>
<td>A002(CW); A007(GR); A009(EX/FR); A014(PR/MQ); B005(MQ); C006(PR); C009(EX); C044(CW/EX)</td>
<td></td>
</tr>
<tr>
<td>8 The role of the professional engineer in society, including health, safety and environmental issues</td>
<td>A014(MQ); B010(FR); B011(EX); C005(CR); C009(CW); C011(FR); C023(CW); C025(CW); C033(PR/EX)</td>
<td></td>
</tr>
</tbody>
</table>

### The thinking skills to:

<table>
<thead>
<tr>
<th>The thinking skills to:</th>
<th>Module</th>
<th>Evidence of achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 Demonstrate competence in identifying, defining and solving engineering problems</td>
<td>A002(EX/CW); A009(EX/FR); MAA100(EX/CW); MAA102(EX/CW); MAA202(CW); B002(EX/PR); B003(EX/LR); B008(EX/CW); MAB102(CW); MAB202(CW); C001(CW); C004(EX/CW); C006(PR); C007(EX/CW); C009(CW); C015(EX); C018(CW/EX); C021(CW); C023(CW); C025(CW)</td>
<td></td>
</tr>
<tr>
<td>10 Apply appropriate mathematical and computer-based methods for modelling and analysing engineering problems</td>
<td>A002(EX/CW); A005(EX/CR); A009(EX/FR); MAA100(EX/CW); MAA102(EX/CW); MAA202(CW/EX/PR); B002(EX); B003(CW); B008(EX/CW); MAB102(EX/CW); MAB202(EX/CW); C001(EX/CW); C004(CW); C006(PR); C013(EX); C018(CW/EX); C021(CW/EX); C022(CC)</td>
<td></td>
</tr>
<tr>
<td>11 Apply appropriate knowledge of techniques and codes of practice to the design of components and systems</td>
<td>A007(GR); A014(PR); B001(EX/CW); B002(PR); B003(EX); B008(EX/CW); B011(LR); B026(PR); C001(EX/CW); C006(PR); C007(CW/EX); C009(CW/EX); C013(EX); C014(EX); C018(CW); C021(CW); C033(PR)</td>
<td></td>
</tr>
<tr>
<td>12 Demonstrate proficiency in the evaluation and integration of information and processes in project work</td>
<td>A001(AP/CR); A002(CW); A007(GR); A009(FR); A014(PR); B006(PR); B010(FR); B026(PR); C005(CW); C007(CW/EX); C009(CW); C011(CW); C022(CC); C023(CW); C025(CW); C033(PR); C044(CW/EX)</td>
<td></td>
</tr>
<tr>
<td>13 Display the necessary skills to define, plan, conduct and report on an original research project</td>
<td>C006(PR)</td>
<td></td>
</tr>
</tbody>
</table>
### The practical skills to:

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>Use laboratory and field equipment competently and safely</td>
<td>A002(CW); A005(LR); A009(EX/FR); A101(CW); B001(CW); B002(LR); B003(CW); B010(FR); B011(LR); C006(PR); C011(LR); C020(CR)</td>
</tr>
<tr>
<td>15</td>
<td>Observe, record, process and analyse data in the laboratory and in the field</td>
<td>A002(CW); A005(LR); A009(FR); A101(CW); B001(CW); B002(LR); B003(CW); B010(FR); B011(LR); C006(PR); C011(LR); C020(CR); C021(CW)</td>
</tr>
<tr>
<td>16</td>
<td>Use computational tools and packages</td>
<td>A001(CW); A005(LR); B010(FR); C001(CW); C006(PR); C018(CW); C020(CR); C022(CC)</td>
</tr>
<tr>
<td>17</td>
<td>Prepare technical reports and give technical presentations</td>
<td>A001(AP/CR); A002(CW); A005(LR); A007(GR); A009(FR); B003(LR); B004(AP); B006(PR); C005(CR); C006(PR/AP); C014(AP/CR); C020(CR); C021(CW); C022(CW); C025(CW)</td>
</tr>
<tr>
<td>18</td>
<td>Prepare technical drawings both manually and using CAD</td>
<td>A007(GR); A009(FR); A014(PR); A027(CC); B026(PR); C005(CR); C007(CW); C020(CC); C022(CC); C033(PR)</td>
</tr>
<tr>
<td>19</td>
<td>Apply knowledge and skills in a professional environment through a twelve month period of work experience (DIS programme only)</td>
<td>I001(CR)</td>
</tr>
</tbody>
</table>

### The key skills to:

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>Communicate effectively using written, oral, and graphical skills</td>
<td>A001(CR); A002(CW); A005(AP); A007(GR); A009(EX); A010(LR); A014(PR); A015(LR); A027(CC); MAA102(EX/CW); MAA202(EX/CW); B001(CW); B002(PR); B003; B004(AP); B006(PR); B101(FR); B010(FR); B026(PR); MAB102(EX/CW); MAB202(EX/CW); C004(LR); C005(AP); C006(AP); C007(CW/EX); C009(CW/EX); C014(EX/AP/CR); C015(EX); C018(CW); C020(CR); C021(CW); C023(CW/EX); C025(CW/EX); C033(PR)</td>
</tr>
<tr>
<td>21</td>
<td>Use IT effectively (WP, spreadsheets, databases, presentations, CAD, email, WWW and specialist software)</td>
<td>A001(CR); A002(CW); A005(LR); A007(GR); A009(FR); A010(LR); A014(PR); A027(CC); B002(MQ); B004(AP); B010(FR); B011(CW); B026(PR); C005(CR); C006(PR); C007(CW); C018(CC); C020(CR); C021(CW); C022(CW); C033(PR)</td>
</tr>
<tr>
<td>22</td>
<td>Use mathematical skills appropriate to an engineer</td>
<td>A002(EX); A005(EX); A009(EX/FR); A101(LR); MAA100(EX/CW); MAA102(EX/CW); MAA202(EX/MQ/CW); B001(EX/CW); B002(EX); B003(EX); B004(EX); B101(EX); B101(CW); MAB202(EX/CW); C001(CW); C004(CW/EX); C006(PR); C007(EX/CW); C009(CW); C018(CW); C020(CR); C021(CW)</td>
</tr>
<tr>
<td>23</td>
<td>Work independently</td>
<td>A001(CR); A002(EX); A005(LR); A007(GR); A009(GR); A101(CW); MAA100(CW); MAA102(CW); MAA202(CW); B003(LR); B003(LR); MAB102(EX); MAB202(EX); C004(CW); C006(PR); C007(EX); C009(CW); C013(CW/EX); C014(CR); C020(CR); C021(CW); C022(CC); C023(CW/EX); C033(PR)</td>
</tr>
<tr>
<td>24</td>
<td>Work in a team environment</td>
<td>A005(AP); A007(GR); A009(PR); A101(PR); A101(CW); B001(CW); B003(CW); B004(CW); B101(FR); B026(PR); C005(CR); C006(PR); C007(CW); C009(CW); C018(CC); C020(CR); C021(CW); C022(CC); C023(CW/EX); C033(PR)</td>
</tr>
<tr>
<td>25</td>
<td>Manage workloads and time effectively</td>
<td>A007(GR); A009(FR); A010(CW); A027(CW); MAA100(CW); MAA102(CW); MAB102(CW); B001(CW); B004(CW); B101(FR); MAB102(CW); MAB202(CW); C005(CR); C006(PR); C007(CW); C009(CW); C020(CW/CC); C033(PR)</td>
</tr>
<tr>
<td>26</td>
<td>Work with limited or contradictory information</td>
<td>A010(LR); A014(PR); MAA102(CW); B026(PR); C005(CW); C006(PR); C007(EX/CW); C009(CW); C033(PR)</td>
</tr>
</tbody>
</table>

### Legend

<table>
<thead>
<tr>
<th>EX</th>
<th>Examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR</td>
<td>Field Course Report</td>
</tr>
<tr>
<td>MQ</td>
<td>Multiple Choice Tests/Questions</td>
</tr>
<tr>
<td>AP</td>
<td>Assessed Presentation</td>
</tr>
<tr>
<td>CW</td>
<td>Coursework</td>
</tr>
<tr>
<td>PR</td>
<td>Project Report</td>
</tr>
<tr>
<td>GR</td>
<td>Group Report</td>
</tr>
<tr>
<td>LR</td>
<td>Laboratory Report</td>
</tr>
<tr>
<td>CC</td>
<td>CAD Coursework</td>
</tr>
</tbody>
</table>
## Curriculum map for BSc Commercial Management & Quantity Surveying (1118)

<table>
<thead>
<tr>
<th>Part</th>
<th>Code</th>
<th>Module Name</th>
<th>al</th>
<th>aii</th>
<th>aiii</th>
<th>aiv</th>
<th>av</th>
<th>bi</th>
<th>bii</th>
<th>biii</th>
<th>biv</th>
<th>bv</th>
<th>bvi</th>
<th>bvii</th>
<th>ci</th>
<th>cii</th>
<th>ciii</th>
<th>civ</th>
<th>cv</th>
<th>cvi</th>
<th>cvii</th>
<th>cviii</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>CV</td>
<td>A001 Communications</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>A</td>
<td>CV</td>
<td>A014 Constr Tech &amp; Man</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>A</td>
<td>CV</td>
<td>A015 Constr Materials</td>
<td>x</td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>A</td>
<td>CV</td>
<td>A018 Principals of Law</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>A</td>
<td>CV</td>
<td>A028 Constr &amp; Comm Man</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>A</td>
<td>CV</td>
<td>A022 Building Services 1</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>A</td>
<td>CV</td>
<td>A021 Site Surveying</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>A</td>
<td>CV</td>
<td>A025 Project &amp; Team 1</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>A</td>
<td>CV</td>
<td>A027 Graphical Comm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>A</td>
<td>CV</td>
<td>A030 Meth of Measuremnt</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>A</td>
<td>MA</td>
<td>A211 Mangmnt Statistics</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>B</td>
<td>CV</td>
<td>B043 Econ for Const</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>B</td>
<td>CV</td>
<td>B022 Civ Eng Measuremnt</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>B</td>
<td>CV</td>
<td>B027 Bldg Services QS's</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>B</td>
<td>CV</td>
<td>B030 Constr Org &amp; Man</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>B</td>
<td>CV</td>
<td>B023 Land &amp; Building Law</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>B</td>
<td>CV</td>
<td>B024 Contractors Est</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>B</td>
<td>CV</td>
<td>B020 Contract admin</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>B</td>
<td>CV</td>
<td>B065 Dev Economics</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>B</td>
<td>CV</td>
<td>B029 Prin of Man</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>B</td>
<td>CV</td>
<td>B031 Project &amp; Team 2</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>B</td>
<td>CV</td>
<td>B038 e.Constr</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>C</td>
<td>CV</td>
<td>C015 Civ Eng Tech</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>C</td>
<td>CV</td>
<td>C032 Research Project</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>C</td>
<td>CV</td>
<td>C033 Maint, Repair Refurb</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>C</td>
<td>CV</td>
<td>B025 Pre-Con IT</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>C</td>
<td>CV</td>
<td>C035 Mangmnt Finance</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>C</td>
<td>CV</td>
<td>C028 Const Econ</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>C</td>
<td>CV</td>
<td>C031 Const Law</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>C</td>
<td>CV</td>
<td>C062 Geotech Eng</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>C</td>
<td>CV</td>
<td>C034 Adv Econ Analysis</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>C</td>
<td>CV</td>
<td>C036 Teamwork 3</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>C</td>
<td>CV</td>
<td>C051 Civ &amp; Bldg Eng Cont</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>
Key to ILOs

a Subject-specific cognitive skills
i Analyse and solve construction management problems, applying professional judgment to balance risks, costs, time, quality and safety
ii Integrate & evaluate information and data from a variety of sources, including drawings, specs, codes of practices, BoQ and legal forms of contract
iii Plan, conduct and report on a programme of original research.
iv Analyse and solve technical construction problems
v Take a holistic approach to planning and execution of construction projects through the implementation of information technology systems

b Subject-specific practical skills
i Quantify and measure construction projects
ii Use survey equipment to survey and produce drawings and reports
iii Prepare technical and financial reports and presentations
iv Design, plan for and implement solutions to technical problems
v Use commercial and technical and managerial literature effectively
vi Take notes effectively.

vii Use computational tools and packages.

b Key/transferable skills:
i Communicate effectively (in written and verbal)
ii Work as a member of an interdisciplinary team
iii Manage resources of time and money
iv Use information and communication technology
v Apply mathematical skills (statistics).
vi Learn independently in familiar and unfamiliar situations
vii Learn effectively for continuing professional development within the context of professional membership of an authoritative institution
viii Balance risks and make decisions
## Curriculum map for BEng Programme in Construction Engineering Management (1119)

<table>
<thead>
<tr>
<th>Part</th>
<th>CV</th>
<th>A003</th>
<th>Intro Structures</th>
<th>X</th>
<th>X</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CV</td>
<td>A014</td>
<td>Constn Tech &amp; Man</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>A017</td>
<td>Constn Materials</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>CV</td>
<td>A018</td>
<td>Principles of Law</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>CV</td>
<td>A001</td>
<td>Communication</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>A028</td>
<td>Constn &amp; Comm Man</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>A022</td>
<td>Building Services 1</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>A021</td>
<td>Site Surveying</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>A026</td>
<td>Building Production</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>A027</td>
<td>Graphical Comm</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>A030</td>
<td>Meth of Measurement</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>MA</td>
<td>A211</td>
<td>Mangmnt Statistics</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>B1</td>
<td>CV</td>
<td>B026</td>
<td>Constn T&amp;M2</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>CV</td>
<td>B026</td>
<td>Building Services 2</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>CV</td>
<td>B021</td>
<td>Man Principles &amp; Prac</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>B1</td>
<td>CV</td>
<td>B020</td>
<td>Constn Org &amp; Man</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>B1</td>
<td>CV</td>
<td>B032</td>
<td>Plant &amp; Equipmnt</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>B1</td>
<td>BS</td>
<td>B086</td>
<td>Employment Relns</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>BS</td>
<td>DIS</td>
<td>Ind Placement</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B2</td>
<td>CV</td>
<td>B023</td>
<td>Land &amp; Building Law</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>B2</td>
<td>CV</td>
<td>B033</td>
<td>Health &amp; Safety</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>B2</td>
<td>CV</td>
<td>B034</td>
<td>Man Human Resources</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>B2</td>
<td>CV</td>
<td>C030</td>
<td>Building Services 3</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>B2</td>
<td>CV</td>
<td>B024</td>
<td>Contractors Estim</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>B2</td>
<td>CV</td>
<td>C015</td>
<td>Civ Eng Tech</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>B2</td>
<td>CV</td>
<td>B043</td>
<td>Econ for Constn</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>B2</td>
<td>CV</td>
<td>C082</td>
<td>Geotechnical Eng</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>B2</td>
<td>Language</td>
<td>Ind Placement</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B2</td>
<td>DIS</td>
<td>Ind Placement</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>CV</td>
<td>B020</td>
<td>Contract admin</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>CV</td>
<td>C038</td>
<td>Building Design Pjt</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>CV</td>
<td>C061</td>
<td>Research Dissert</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>CV</td>
<td>B022</td>
<td>Civ Eng measurmnt</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>CV</td>
<td>B025</td>
<td>Pre-Con IT</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>CV</td>
<td>B065</td>
<td>Devlmt Economics</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>Language</td>
<td>Devlmt Economics</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>CV</td>
<td>C022</td>
<td>3D CAD</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>CV</td>
<td>C033</td>
<td>Maint, Repair Refurb</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>CV</td>
<td>C035</td>
<td>Mangmnt Finance</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>CV</td>
<td>C040</td>
<td>Advanced Constn</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>CV</td>
<td>C080</td>
<td>Value Eng</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>CV</td>
<td>B036</td>
<td>E Constn</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>CV</td>
<td>C044</td>
<td>Man Info Systems</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>Language</td>
<td>Man Info Systems</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
Key to ILOs

**Subject-specific cognitive skills**

a. Analyse and solve construction management problems, applying professional judgment to balance risks, costs, time, quality and safety

b. Integrate & evaluate information and data from a variety of sources, including drawings, specs, codes of practices, BoQ and legal forms of contract

c. Plan, conduct and report on a programme of original research.

d. Analyse and solve technical construction problems

e. Take a holistic approach to planning and execution of construction projects through the implementation of information technology systems

**Subject-specific practical skills**

i. Quantify and measure construction projects

ii. Use survey equipment to survey and produce drawings and reports

iii. Prepare technical and financial reports and presentations

iv. Design, plan for and implement solutions to technical problems

v. Use commercial and technical and managerial literature effectively

vi. Take notes effectively.

vii. Use computational tools and packages.

**Key/transferable skills:**

i. Communicate effectively (in written and verbal)

ii. Work as a member of an interdisciplinary team

iii. Manage resources of time and money

iv. Use information and communication technology

v. Apply mathematical skills (statistics).

vi. Learn independently in familiar and unfamiliar situations

vii. Learn effectively for continuing professional development within the context of professional membership of an authoritative institution

viii. Balance risks and make decisions
### Curriculum Map for BSc Architectural Engineering & Design Management (1120)

<table>
<thead>
<tr>
<th>Part</th>
<th>Curriculum</th>
<th>al</th>
<th>all</th>
<th>alll</th>
<th>allv</th>
<th>av</th>
<th>bi</th>
<th>biii</th>
<th>biv</th>
<th>bv</th>
<th>bvi</th>
<th>bvii</th>
<th>bivi</th>
<th>bix</th>
<th>c</th>
<th>cli</th>
<th>clii</th>
<th>cliii</th>
<th>civ</th>
<th>cv</th>
<th>cvi</th>
<th>cvii</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Communication</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Intro to Structural Des</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Engineering Design</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Surveying 1</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Constr Tech &amp; Man</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Constr Materials</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Principals of Law</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Constr &amp; Comm Man</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Building Services 1</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Building Production</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Architectural Dawing and Representation</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Introduction to Architectural Design</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Health &amp; Safety</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Low Energy Architectural Design</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Contract Administration</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>3D CAD modelling</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>DevImpt Economics</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Land and Buid. Law</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Constr T&amp;M2</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Building Services 2</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Principles of Management</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Constr Org &amp; Man</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Architecture and the Environment</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>E Constr</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Building Services 3</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Value Man &amp; Eng</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Building Design Proj</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Research Dissertin</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Geotechnical Eng</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Pre-Con IT</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Construction Economics</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Construction Law</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Maint, Repair Refurb</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Mangmnt Finance</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Advanced Constrn</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Project Management</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Man Inf Systems</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Contr Management</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendices

Key to ILOs

a  Subject-specific cognitive skills
i  Analyse and solve building design problems, applying professional judgement to balance risks, costs, time and quality.
ii  Coordination and monitoring of the production of information and data from a variety of sources: drawings, specifications, codes of practices etc.
iii  Plan, conduct and report on a programme of original research.
iv  Analyse and solve technical design problems
v  Take a holistic approach to planning and execution of construction projects through the implementation of information technology systems

b  Subject-specific practical skills
i  Produce integrated design solutions to meet a client brief
ii  Use CAD to produce technical drawings
iii  Use survey equipment to survey and produce drawings and reports
iv  Prepare drawings, technical and financial reports, and presentations
v  Design, plan for, and implement solutions to technical problems
vi  Use commercial and technical and managerial literature effectively
vii  Take notes effectively.
ix  Use computational tools and packages.

ix  Participate in teams

c  Key/transferable skills:
ii  Communicate effectively (written and verbal and graphical)
iii  Manage resources of time and money
iv  Use information and communication technology
v  Learn independently in familiar and unfamiliar situations
vi  Learn effectively for continuing professional development within the context of professional membership of an authoritative institution
vii  Balance risks and make decisions