

# **The Bartlett School of Construction and Project Management**

## **MSc Construction Economics and Management**

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### **A review of students' views on postgraduate construction management courses in the UK**

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### **Declaration of originality**

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I declare that all material presented in the accompanying work is entirely my own work except where explicitly and individually indicated and that all sources used in its preparation and all quotations are clearly cited.

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## **Abstract**

In response to the author's interest in the quality of construction management education in the UK, this dissertation evaluates the perceived value to students of postgraduate construction management courses in a number of UK universities. A review of the literature is structured in two sections: (1) The perceived value to students and (2) course content. Value factors (personal value, research skills, hard and soft skills and knowledge acquired) and course success factors (course challenges, teaching methods, assessment methods and feedback on student work) were derived from the literature review and were assessed by a questionnaire sent to construction professionals who are studying or have studied a postgraduate construction management course in the UK. The survey covers 21 British universities including UCL, the last of which was investigated further as a case study to gain more insight. The findings suggest that there is sufficient evidence to conclude that course content is a statistically significant determinant of the perceived value of the course, and the value of the course is not fully perceived by students.

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# **CHAPTER 1**

## **INTRODUCTION**



### **1.1. Rationale for the research**

The literature is rich with papers that provide recommendations, guidance and advice to higher education programmes such as the publication of The Quality Assurance Agency for Higher Education (QAA, 2006; QAA, 2008; QAA, 2010). When it comes to construction management programmes, some scholars look into the content of such programmes and propose a framework (Yepes et al., 2011), while others discussed the soft skills implementation problems in such courses (Affandi et al., 2012). Also, some scholars considered the teaching methods used in these courses and proposed solutions (Lowe 1991), and others pointed to the gap between what students learn from university and what the construction industry really needs. To the best knowledge of the author, there has not been a study that considers the above-mentioned aspects and beyond as well as evaluates postgraduate construction management (PCMC) in the UK. The added value of this dissertation is that it reviews the literature on the value of construction management courses at graduate level, evaluates the current value of these courses in UK and specifies areas of weakness.

### **1.2. Research goals**

The dissertation aims to establish the perceived value to students of postgraduate construction management courses (PCMC) in the UK. In order to achieve this aim, four objectives were set:

- 1- To provide a general overview of the value factors of the course.
- 2- To provide a general overview of success factors of course content.
- 3- To conduct a survey to evaluate these factors in a number of PCMCs in the UK.
- 4- To test the relationship between course content and perceived value.

This research will test two hypotheses:

- Hypothesis one: The value of postgraduate construction management courses (PCMC) in UK is not fully perceived by students.
- Hypothesis two: There is a positive relationship between the course content and the perceived value of post-graduate construction management courses (PCMC) to students.

### **1.3. Dissertation contents**

This dissertation consists of five chapters; chapter 1 provides a brief introduction to the topic under investigation, also stating the research aim, objectives and hypotheses. It is followed by chapter 2, which is a review of literature on the value that students perceive from construction management courses and the guiding parameters that help these courses to be best delivered. Chapter 3 illustrates the approaches and techniques used to gather data in order to investigate the research objectives and

the rationale of designing these techniques; it also provides a description of the research sample and briefly describes the methods used to analyse the data. The results of the survey and the case study and the hypothesis testing are presented in chapter 4. Finally, a brief summary, findings, recommendations and the limitations of this work are presented in Chapter 5.

It should be mentioned at this point that this research is limited by the number of respondents, the over-representation of English universities and the subjectivity of the scoring system. Another limitation is that the majority of respondents are recent graduates or will graduate soon, which does not allow the testing of the long term value of the PCMCs.

# **CHAPTER 2**

## **LITERATURE REVIEW**

## 2.1. The perceived value to students

This section of the review looks into what aspects of knowledge, skills, competencies and benefits a student undertaking a postgraduate construction management course in the UK (PCMC) is expected to acquire and master upon completing the course.

Yepes et al., (2011) stated that understanding the different phases of the construction project life cycle, and the different levels of the organisational breakdown were mentioned in the literature as essential factors of managerial competencies. However, they argued that these two concepts, or two dimensions, were mentioned separately, and an effective construction management course at a graduate level should cover them both. Yepes et al., (2011) presented their argument as shown in figure (1) which they developed from Pellicer et al. (2009).

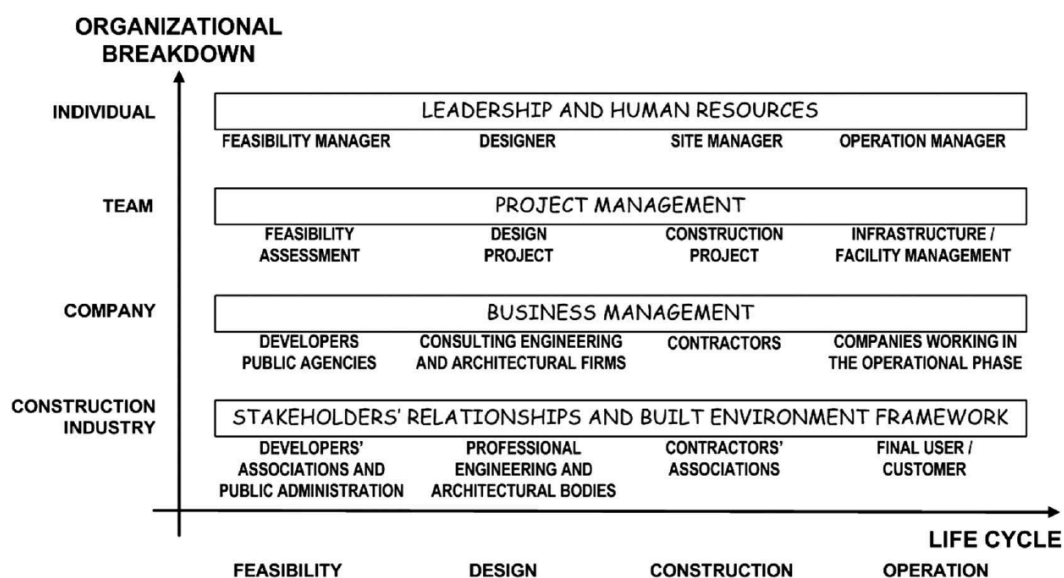


Figure (1). The proposed model of management and administration in construction. Source (Yepes et al., 2011, p. 49) developed from (Pellicer et al. 2009, p. 2376)

Regarding the lifecycle, Yepes et al. considered the typical four phases: feasibility, design, construction, and operation (Stuckenbruck, 1981). Concerning the organisational levels, they argued that it could be seen at four levels: individual, team, company and construction industry level.

At the individual level, leadership and human resources are key concepts to be internalised. Dainty et al. (2003) concluded that acquiring leadership skills is one of the most important success factors for construction project managers; combined with other factors, it would lead to superior performance and improve project outcome. Leadership skills encompass abilities such as conducting constructive negotiations, conflict resolution and team building. These abilities are crucial to any professional in the construction industry as this industry is known for high disputes and bad management of relationships between its different parties. The construction industry is characterised by mistrust, lack

of cooperation and harmony, and adversarial attitudes adapted by different players in the industry (Dulaimi and Kumaraswamy, 2000) and (Dulaimi et al., 2002), this would eventually affect the overall performance of the construction industry. For example, Greenwood (2001) investigated the main-contractor and sub-contractor relationship and concluded that it is more adversarial than cooperative.

On the subject of human resources, it is considered one of the key competencies for project managers in the construction industry to maintain an efficient performance (Edum-Fotwe and McCaffer, 2000). Odeh and Battaineh (2002)'s findings highlight the importance of efficient human resources management; they concluded that developing human resources is one of the key solutions to the problem of costly construction delays, and they pointed to the urgent need of training in this regard.

Adequate understanding of different aspects of project management is associated with the team level; Yepes et al., (2011) adopted Romero and Pellicer (2008)'s breakdown of project management (time management, cost management, resources management, quality management, environmental management, and safety and health management) in his model.

Regarding the company level, business management is established as the core principal; Yepes et al. (2011) stated that it should include topics such as operational and strategic planning, financial management, total quality management, and marketing, among others.

Finally, stakeholder relationships are the main focus of the higher level. It considers the entire life cycle of the project and includes understanding different type of procurements, especially private finance initiatives (PFIs) and strategic partnering as they are emerging in the construction industry (Yepes et al., 2011).

The Quality Assurance Agency for Higher Education QAA (2008) indicated that a master's degree should enable its graduates to demonstrate critical awareness of current issues and matters related to the academic discipline they are studying and should also enable them to critically evaluate and critique advanced research and scholarship and their methodologies. Moreover, it should improve the graduate's self-learning ability which is necessary for continuing professional development. QAA (2010) indicated that a master's programme, of any kind, should enable its graduates to independently conduct a research project using a range of appropriate techniques and research methods.

Elmuti (2004) suggested that managers need to be educated not only in 'hard skills', but also in 'soft skills'. He argued that the latter is missing in management education and efforts should be made to promote such skills in order to create collaborative managers with open perspectives. Affandi et al. (2012) investigated soft skills within the construction industry context, they pointed out that these skills are needed to secure immediate integration of the graduates into the industry. Riley et al. (2008)

noted that construction management professionals work in complex environments that require intense communication between different parties and thus construction management professionals should acquire have high level of interpersonal and soft skills.

Baláž and Williams (2004) investigated the positive impact of studying in the UK (whether degree courses or language/vocational courses) on international students, namely Slovakian students. They concluded that a high level of social recognition and improving one's self-confidence were the main advantages of studying in the UK for the students surveyed. Social network construction was also another important benefit from studying in the UK.

Atalah and Muchemedzi (2006) conducted a survey to investigate the low enrolment rate at the Master of Industrial Technology in Construction Management program at Bowling Green State University. Although their study targeted one particular course, they stated that their methods and findings could be used for other courses. They found that the respondents believed that a postgraduate course would prepare them to play the role of a senior manager in the future. Arditi and Polat (2009) stated that many construction professionals, such as engineers and architects, pursue a postgraduate course in construction management in order to advance in their career beyond the technical roles. In addition Lowe (1991) stated that working as a manager, whether for the construction company or construction client, was the most desirable objective from pursuing such courses.

Finally, the monetary value of undertaking a master's programme is another point to investigate. It was found that postgraduate qualifications would enable its holders in the UK to earn £5,500 more per year compared to the holders of a Bachelor's degree only (Lindley and Machin, 2013).

## **2.2. Course Content**

This section of the review aims to derive a recommendation from literature on how the course could be best delivered. It investigates a number of areas such as teaching methods, assessment methods and feedback on students' work.

The method used for teaching and delivering the required information is a crucial factor that affects the perceived value of PCMCs. There might be a gap between what lecturers teach and what students learn; this could be attributed to the delivery and teaching methods. Elmuti, (2004) stated that selected education approaches are crucial to the successful of management education.

Monks and Walsh (2001) considered the teaching process as a key issue in management education, not only in terms of what is taught, but also how it is taught, how the classroom experience is managed and how it is assessed.

Teach and Govahi (1993) concluded that the use of different teaching methods and techniques, when teaching management skills, is effective as they may complement each other in conveying the skills required.

Affandi et al. (2012)'s findings indicated that students appreciated innovative ways of teaching such as class activities to learn new skills. Mintzberg and Gosling (2002) emphasized the importance of interactive learning. They stated, "Managers are not vessels to be filled with knowledge, but active learners who must be fully engaged in the process". Page 66.

Mintzberg and Gosling (2002) argued that in management courses one should depend less on the traditional amphitheatre model where the focus is on the lecturer, and instead students should be seated at round tables to facilitate discussion, the sharing of ideas, reflection on their experience, and learning from one another.

Lowe (1991) pointed out that construction management courses have an interdisciplinary nature; thus, a number of problems will arise when organising such courses. The academic background of students varies, and their undergraduate study is highly specialised and narrow; thus, students of one profession may display misunderstandings and underestimations of the role of other professionals, which will lead to a negative attitude between students with different professions. Moreover, there is a problem of 'alienation' that faces 'mature students', students who get back to studying after spending a number of years in the industry. To overcome these problems, Lowe (1991) suggested the use of simulation exercises and group-project work, which will help promote teamwork and mutual understanding.

One way of doing so is to make students work in teams and play out the role of different parties in a mock activity such as the appraisal of construction or development project. In such simulation and role-playing activities, students will work in teams in a collaborative environment, get into negotiation, and conduct presentations in front of other students. Supervisors must make sure that students will be playing the roles of unfamiliar different professionals or 'role reversal'. The aim is to break professional barriers and promote teamwork and mutual understanding. Lowe (1991) also pointed to the weakness in verbal presentation skills among students which could be overcome by introducing such mock activities.

Moreover, they illustrated that the course should allow the students to learn, not only from their lecturers, but also from one another as they possess different skills, come from different academic backgrounds and have a wide range of professional experience. One student's weakness could be another's strength. This can be achieved by, for example, the mock activity described earlier. This

kind of learning will create generalist managers who are able to coordinate different construction professionals.

The Quality Assurance Agency for Higher Education (QAA) published a document in 2010 relating to the master's degree in the UK. QAA (2010)'s document acts as a 'reference point' to provide advice, guidance and practical help to different parties interested in master's programmes in the UK. QAA (2010) stated that there are different methods of assessment such as essay assignment, oral examination, problem-solving exercises, oral presentation etc.; whatever the used combination of assessment methods is, it should effectively assess the intended learning outcomes. Moreover, assessment methods should not only assess the intended learning outcome of each course's module individually, but it should also assess the integration and synthesis of these modules across the programme (QAA, 2010).

QAA (2006) shed light on the feedback on students' performance. It stated that the feedback on assessed work should be constructive, sufficient and should provide useful advice that could improve their performance. Moreover, the timing of the feedback is important; it should be given during the learning process so that students can use it to improve their work before the end of the module and subsequently score higher marks (QAA, 2006).

Lowe (1991) pointed to the gap between what students learn from university and what the construction industry really needs. Affandi et al., (2012) cited a number of studies concluding that construction-industry's employers believe that university education is not addressing the industry's needs. Moreover, there is a wide variety when it comes to the academic background and professional experience of the students; thus, the content should be comprehensive, and a suitable range of elective modules should be provided to cover every need and fill any gap (Atalah and Muchemedzi, 2006).



**CHAPTER 3**

**RESEARCH DESIGN**

**AND**

**METHODOLOGY**

### **3.1. Scope of chapter**

This chapter describes the approaches and techniques used to gather data in order to investigate the research objectives, and the rationale of designing these techniques; also, it provides a description of the research sample and briefly describes the methods used to analyse the data.

### **3.2. Data collection approaches**

This dissertation adopted two approaches to data collection; a survey approach and a case study approach. The survey approach was chosen to evaluate postgraduate construction management courses (PCMCs) in the UK as the aim of this research was to gather data from a relatively large number of respondents. The survey is a descriptive one as it illustrates the opinion and attitude of the respondents toward the PCMC in the UK.

After looking at the overall picture of PCMCs in the UK, one course was chosen to be analysed deeply in order to have a better understanding of what can be done to achieve a higher perceived value. Thus, the case study approach was used to analyse PCMCs at University College London (UCL), as case studies are suitable when an in-depth analysis is needed (Naoum, 1998).

### **3.3. Data collection techniques**

For the survey approach, a questionnaire was the data collection technique chosen because it is the most widely used to collect data when conducting surveys (Naoum, 1998). The respondents of the survey are construction professionals who are undertaking a postgraduate course in construction management in the UK, or have already graduated from the course.

As for the case study approach, a personal interview was chosen as the data collection technique as it is most suitable for case studies (Naoum, 1998); however, it was preceded by a questionnaire whose results illustrated the drawbacks of the PCMC at UCL, and constituted the main topics discussed in the personal interviews. The respondents for the case study are construction professionals who are undertaking a postgraduate course in construction management at UCL, or have already done the course.

#### **3.3.1. The Rationale of research questionnaire**

The design of a questionnaire should not be arbitrary, but instead should be based on a literature review, and related to the research objectives (Naoum, 1998). The questionnaire initially consisted of two parts that correspond to the research objectives; part A 'The perceived value of PCMC to students', and part B 'Course content'. All the questions of both parts were derived from the literature

review discussed in the previous chapter. The same questionnaire was used for the survey and the case study. The questionnaire is provided in appendix A.

Part A consists of five sections; career prospects, personal value, research skills, hard and soft skills, and knowledge acquired. Part B entails four sections which are content challenges, teaching methods, assessment methods and feedbacks.

In addition to questions that were based on the literature review, a two-stage approach was adopted to identify what construction professionals who have done or are currently undertaking a PCMC in the UK consider to be the most valuable factors or features of PCMCs. In the first stage, ten professionals were asked, via email, the following question: “What features or factors of the postgraduate construction management course are most valuable for you?”. Out of ten, six people responded. Their responses are presented in appendix B.

Analysing these responses led to the following seven factors of perceived value; course subjects, quality and intensity of case studies, quality and intensity of industry speakers, feedback on student work, site visits, quality of reading list and group work.

In the second stage, the respondents were asked to choose the top five factors and rank them in order of importance, and identify their degree of satisfaction with each factor based on their experience in studying PCMCs in the UK; this constitutes part C of the questionnaire. Naoum (1998) cited Oppenheim (1996) who stated the maximum number of objectives to be ranked under normal survey condition is ten. Thus, asking respondents to rank five objectives is acceptable.

The three parts of the questionnaire were preceded by demographic information and general questions related to the respondent’s master degree. The demographic information entails questions related to gender, location, job level and job sector of the respondents and the number of employees within their organisation. The format of these questions and the corresponding responses were adopted from the questionnaires used by CIOB (2009) and CIOB (2013). The rationale of using some questions from other questionnaires could be justified by Naoum (1998)’s statement:

“Examining other questionnaires to identify possible clues through which to construct yours is essential at this stage. This means that you should look at good questions or questionnaires in books, journals, dissertations, theses etc. and try to copy ideas. Remember, previous authors of past work have given their research a great deal of thought, and you can frequently benefit from their thinking when designing your questionnaire.” Page. 70

The questionnaire was designed online using an upgraded account on ‘SurveyMonkey’ which is an online survey development cloud-based software, and was open for one month in June 2017.

### 3.3.2. The design of research questionnaire

The Likert-type rating scale (Likert, 1932) was used for part A. Weijters et al. (2010) pointed out that two points should be considered when choosing a response format. First, one should decide on the number of response categories, whether to choose an even number of responses forcing the respondent to pick a side, or an odd number of response allowing a neutral choice. Second, one should consider the labelling of response categories, whether ‘fully labelled’ where each response category is explicitly labelled, or labelled at the extremes (endpoint labels), where only the first and last responses are labelled. Revilla et al. (2014) concluded that the 5-item scale is better for research than the 7 or 11-item scale when using agree/disagree rating scales; they found that the more the response categories, the lower the quality of the collected data. However, they did not take the type of labelling into account when comparing between the three rating scales. Unlike Revilla et al., Weijters et al. (2010) developed a framework for selecting the response format that considered not only the number of response categories but also the labelling. This framework considers the study population and study objective as determinants of choosing the response scale format, as shown in figure (2).

Weijters et al. (2010) argued when the population has high cognitive ability and verbal skills (such as students), and the study objective is an opinion measurement, a fully labelled 5 or 7-point format is more suitable to use. Although it seems that in such a case, Weijters et al. have a preference of a 7-point over a 5-point format scale, the pilot study of this dissertation suggested that 5-point format is more suitable probably due to the large number of questions presented in the questionnaire. Regarding the format of part B, different rating scales were thought to be more suitable to use.

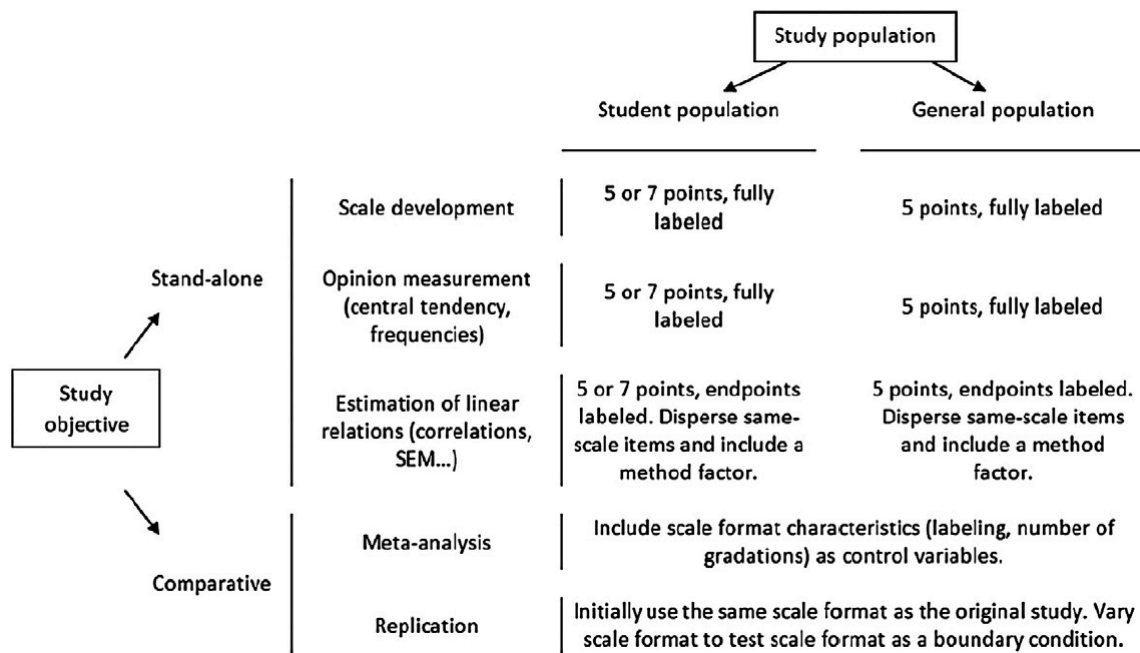


Figure (2). Preliminary decision framework for selecting a response scale format. (Weijters et al., 2010, p. 246)

### 3.3.3. A pilot study

A 'trial run' for the questionnaire should be done before distributing it to the whole sample of survey (Naoum, 1998). There are a number of points that pilot-questionnaire respondents should be asked when doing the pilot study; clarity of instructions, clarity of questions, attractiveness of questionnaire layout, time taken to fill in the questionnaire and whether the respondent objected to answering any of the questions and if there are any important topics related to the research aims and objectives that have been overlooked (Bell, 1996) cited by (Naoum, 1988).

The pilot study sample consisted of five respondents who had different characteristics; males and females, British and international students, some that have already completed the course and others that are still in the process of doing their dissertations; also, the work experience of the pilot-study respondents varied from one to eleven years. Thus, the pilot study sample is considered to be representative. The respondents completed the questionnaire in the presence of the author (whether in person or via phone) and each question was discussed with each one of them.

All the respondents agreed that no major topic had been omitted; thus, no additional sections were added to the questionnaire. Also, none of the respondents objected to answering any of the questions; thus, none of the questions were deleted. However, there were a number of amendments to the questionnaire; some questions were decomposed into sub questions, the wording of some questions which caused some confusion to the respondents was changed to make them more clear and

understandable. In addition, the order of some questions were changed so that the sequence of the questions moved from simple to complex, and some of the response categories were modified and/or added.

The initial questionnaire was adjusted based on the feedback from each respondent before moving on to the next respondent. The amount of adjustments needed was getting smaller as the pilot study was moving on, until it reached the fifth respondent who did not suggest any major amendments; thus at that point the questionnaire was ready to be distributed to the research sample.

### **3.3.4. Rationale of interviews**

The case study was supplemented by interviews with nine students undertaking a PCMCs at UCL. The results obtained from the case-study questionnaire shed a light on a number of drawbacks of the PCMCs at UCL, those are the part B sections that scored low based on a scoring system that is described later in the next chapter. Thus, the nine students were asked to give their opinion on the teaching methods, assessment methods, feedback, and the challenges they have faced during this course in terms of its suitability to their previous knowledge and experience.

## **3.4. The sample**

### **3.4.1. The overall research sample**

The sample of this research constitutes 75 construction professionals who are undertaking or have done a PCMC in the UK. 375 construction professionals were contacted to fill in the questionnaire, out of which, 75 filled in the questionnaire: the response rate is 20%.

The overall research sample consists of 75 construction professionals. Of the sample, 72%, are male and 28% are female. 69% are between 21 and 30 years of age and 28% between 31 and 40, 39% of respondents work in organisations that employ more than 501 employees, followed by 29% that work in organisations that employ less than 20 staff. The majority of the respondents are recent graduates or will graduate in 2018, as seen in figure (3). 64% have work experience outside the UK, and 31% have worked in London. The majority of respondents describe themselves as working/having worked at a middle management level within the project management and site management sectors. 67% of the respondent have only up to 4 years of work experience, see figure (4).

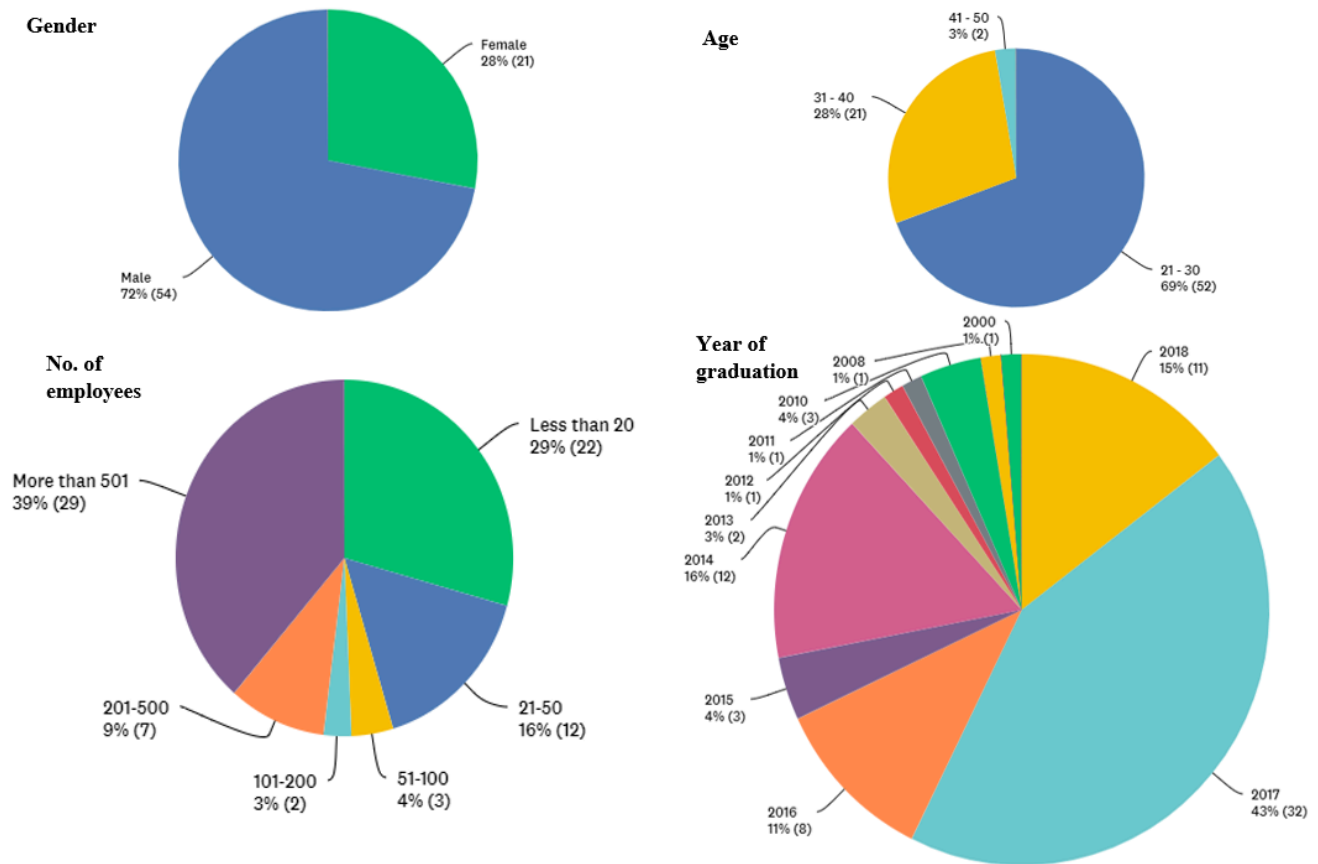


Figure (3). The overall research sample demographic and general information, part 1



Figure (4). The overall research sample demographic and general information, part 2

### 3.4.2. The survey sample

The survey targeted construction professionals who are currently undertaking a PCMC in UK or have already completed the course. At first, PCMCs in 20 different university were selected arbitrarily. Next, using an upgraded LinkedIn account, 300 construction professionals (15 per each university) were contacted and asked to fill in the questionnaire after briefly elaborating the purpose and the importance of the study. Initially, Only 35 construction professionals participated in the questionnaire. The remainder of the sample were contacted again which resulted in more respondents, making the total number of the sample equal to 54 respondents. 8 of the 54 responses were incomplete, and thus considered invalid. Therefore, the valid responses were 46, making the response rate of the survey 15% (46/300). The low response rate could be justified by the fact that the author of this dissertation has no previous connections with construction professionals who have done PCMCs in the UK, and used LinkedIn as the only mean of recruiting people to fill in the questionnaire. Although it is next to impossible to check the validity of what respondents stated in their LinkedIn profile in the Education section, two criterion were taken into consideration before contacting any potential respondent; the number of connections in the respondent's LinkedIn profile has at least 100 connections, and the Experience and Education sections are properly filled. Table (1) illustrates some details of the surveyed universities.

The survey sample consists of 46 construction professionals. Of the sample, 83% are male and 17% are female. 61% are between 21 and 30 years of age and 35% between 31 and 40, 43% of respondents work in organisations that employ more than 501 employees, followed by 24% that work in organisations that employ less than 20 staff. The majority of the respondents graduated after 2013 or will graduate soon (2017 or 2018), figure (5). 54% have work experience outside the UK, and 35% have worked in London. The majority of respondents describe themselves working/have worked at a middle management level (50%) within the project management and site management sectors. 76% of the respondent have only up to 6 years of work experience as shown in figure (6).



University	Course title	No. Respondents	Accredit by		
			RICS	CIOB	Other
London South Bank University	Construction Project Management	2	yes	yes	yes
Kingston University	Management in Construction with Law	1			yes
	Management in Construction	2		yes	yes
	Structural Design & Construction Management	1			yes
Northumbria University	Construction Project Management with BIM	5		yes	
University of Central Lancashire	Construction Project Management	1			
Oxford Brookes University	Project Management in the Built Environment	2	yes	yes	
University Of South Wales	Construction Project Management	2	yes		yes
University of Westminster	Construction Project Management	1	Yes	Yes	
Sheffield Hallam University	Construction Project Management	1	yes	yes	
City, University of London	Construction Management	5			yes
University of Reading	Construction Management	4	yes	yes	
	Construction Cost Management	1	yes	yes	
Robert Gordon University	Construction Project Management	1	yes	yes	yes
University of Salford	Construction Management	1	yes	yes	yes
	Project Management in Construction	1	yes	yes	yes
University of Birmingham	Advanced Engineering Management: Construction Management	4			
Loughborough University	Construction Project Management	2			
University of Liverpool	Project Management for Construction and Infrastructure	1			yes
University of Manchester	Construction Project Management	2	yes		yes
University of Leeds	International Construction Management and Engineering	1			yes
Anglia Ruskin University	Construction Management	1	yes		
Glasgow Caledonian University	International Project Management (Construction Management)	1	yes	yes	yes
Coventry University	Construction Project and Cost Management	1	yes	yes	
	Construction management	2		yes	

*Table (1). The 20 surveyed universities and their details*

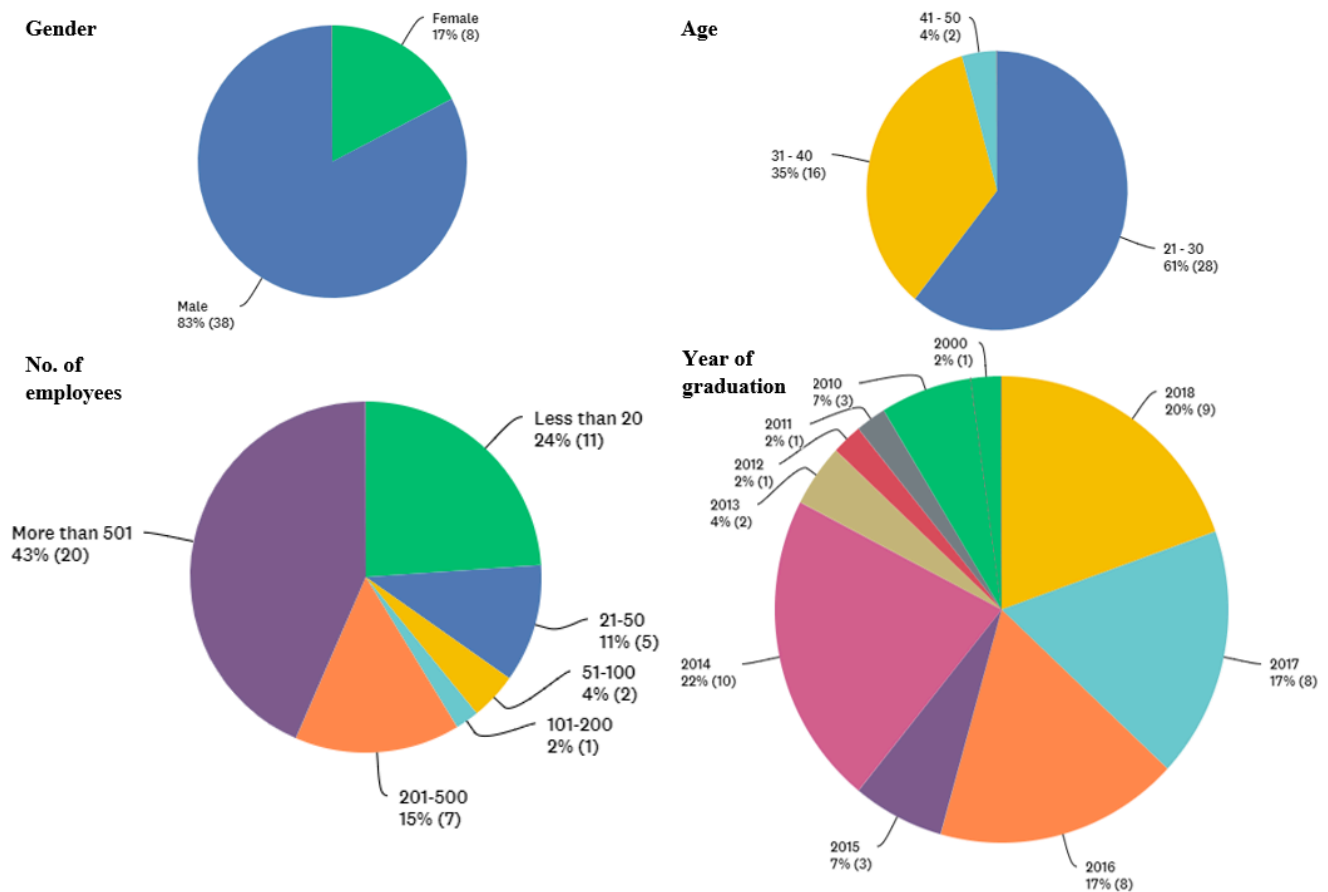


Figure (5). The survey sample demographic and general information, part 1

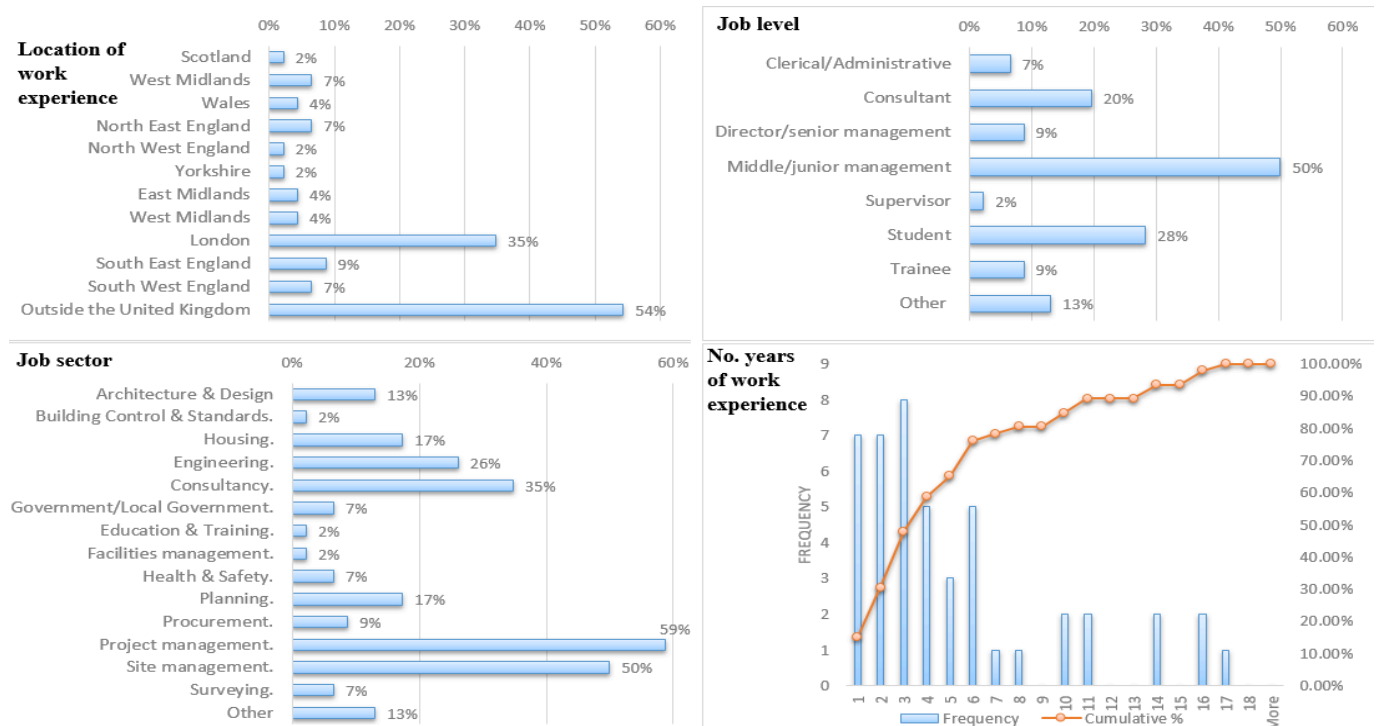


Figure (6). The survey sample demographic and general information, part 2

### **3.4.3. The case study sample**

The case study mainly targeted construction professionals who are currently undertaking a PCMC at UCL, and whom the author knows in person, in addition to some professionals who have already graduated from this course (contacted via LinkedIn). The questionnaire was sent to 60 current students: 26 of them filled in the questionnaire. 15 construction professionals who have graduated from the course were contacted via an upgraded account on LinkedIn: only 3 of them filled in the questionnaire. All in all, the response rate of the case study is 39% (29/75).

The Case study's sample consists of 29 construction professionals. Of the sample, 55% are male and 45% are female. 83% are between 21 and 30 years of age and 17% between 31 and 40, 38% of respondents work in organisations that employ less than 20 employees, followed by 31% that work in organisations employing more than 501 staff. The majority of the respondents graduate in 2017, as shown in figure (7). 79% have work experience outside the UK, and 24% have worked in London. The majority of respondents describe themselves as students and 31% described themselves as working/having worked at a middle management level within the project management sector. 79% of the respondent have only up to 4 years of work experience, see figure (8).

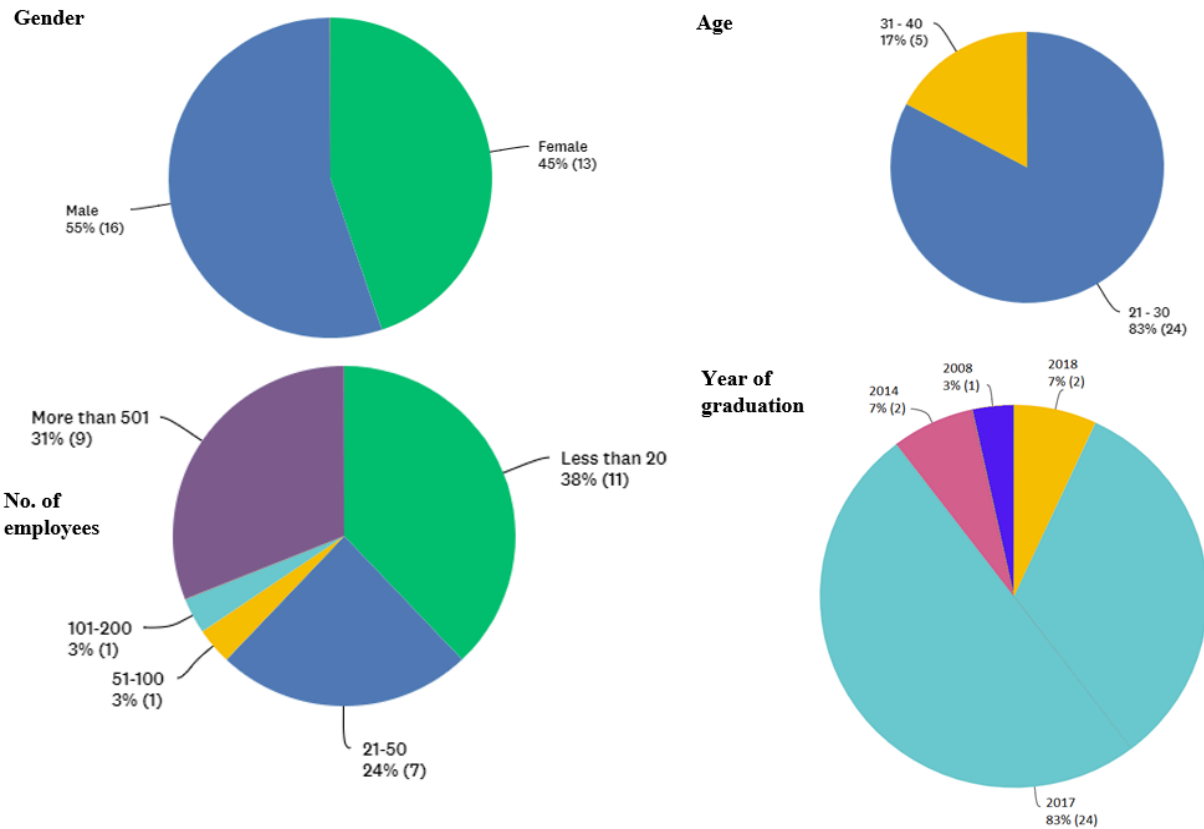


Figure (7). The case study sample demographic and general information, part 1

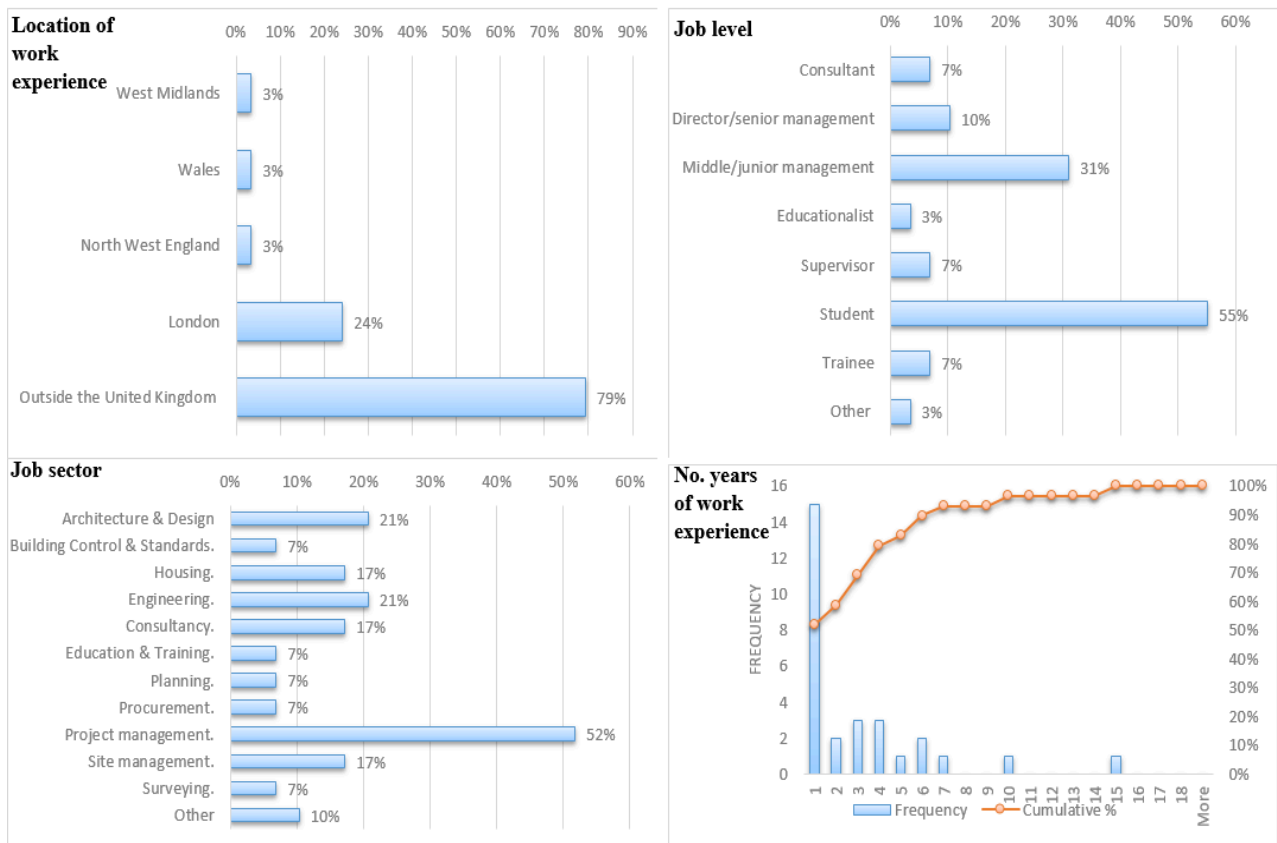


Figure (8). The survey sample demographic and general information, part 2

### **3.5. Method of analysis**

The descriptive statistics method of analysis was used to give an overview of the results and to analyse the data obtained from the questionnaire both for the survey and the case study. The responses were analysed in percentages and in actual numbers when relevant. Pie charts and bar charts were mainly used to demonstrate the findings in addition to other charts. The inferential statistics method was also used in this dissertation on one occasion; the correlation coefficient ( $r$ ) and P-value were calculated to investigate whether there is a strong relationship between part B (course content) and part A (the perceived value of PCMC to students).

## **CHAPTER 4**

### **ANALYSIS OF RESULTS**

#### 4.1. Scope of chapter

This chapter discusses the survey results encompassing those from 20 universities in the UK, it also illustrates the scoring system used to give the questionnaire responses a numerical value in order to conduct a further analysis. Based on the results, the research's hypotheses were tested. Next, it discusses the survey results encompassing those from 20 universities in the UK. Based on these results, the research's hypotheses were tested. This chapter also looks deeper at the PCMC at UCL as a case study and presents its findings. Finally, the chapter concludes with a brief sensitivity analysis of the survey results.

#### 4.2. The scoring system

Tableau Desktop 10.3.2 software was used to present the results and diverging stacked bar charts were mainly used to graphically display most of the data as this technique is recommended for Likert and related scales (Heiberger and Robbins, 2014); each bar represents a certain question which was split between positive and negative parts in a way that will be explained later in this chapter. Pie charts and Gantt charts were also used to present some of the data. The response categories were assigned values 1 to 5. Table (2) shows each response with its associated assigned value. Answers that have a value of 1 or 2 were considered negative, answers that have a value of 4 or 5 were considered positive, whereas half of answers with a value of 3 were considered positive, and the other half was considered negative.

Assigned value	1	2	3	4	5
Indicated colouring					
Negative/Positive values	Negative values		Positive values		
Question ID	Optional answers				
Likert scale question	Completely disagree	Disagree	Neither agree nor disagree	Agree	Completely agree
Q36	High difficulty	Moderate difficulty		Low difficulty	No difficulty
Q37	Relatively huge gap		Relatively small gap		No considerable gap
Q41, Q42, Q43, Q50	Never	Sometimes		Frequently	Constantly
Q45, Q48	Not at all		to some extent		Yes, very much
Q46	Mainly concentrated on one method	Varies little		Have a good degree of variety	Varies a lot
Q49	Not useful at all	Not useful most of the time		Useful most of the time	Extremely useful

Table (2). The scoring system

The average rate of response (ARR) was calculated for each question that had an assigned value. Moreover, a new factor was defined as Negativity Percentage (N%) for each question with an assigned value as follow:

$$N\% \text{ of question } Q_x = \frac{\text{No. responses to } Q_x \text{ with value 1} + \text{No. responses to } Q_x \text{ with value 2} + 50\% \text{ No. responses to } Q_x \text{ with value 3}}{\text{Total number of responses to } Q_x}$$

Note: Questions Q17, Q18, Q19, Q20, Q33, Q38, Q39, Q40, Q44, Q47, Q51, Q52, Q53, Q54 and Q55 were analysed separately without using the scoring system.

It should be mentioned that the numerical scores presented in the following sections are not definitive. They are based on the abovementioned scoring system which is subjective. Had different scoring systems been used, the scores might have been different. Section 4.6. is a sensitivity analysis that addresses this point.

### 4.3. Survey results

#### 4.3.1. The perceived value of PCMCs to students

##### Questions

This section considers questions Q15 to 35, which constitute part A of the questionnaire ‘The perceived value of PCMC to students’ which consists of five categories: personal value, career prospects, research skills, soft and hard skills and knowledge acquired. See Tables (3).

##### Results

Figure (9) displays the responses to ‘career prospects’ questions (Q17, Q18, Q19 and Q20). Figure (10) shows the ARR to the other categories’ questions of part A in descending order and classified based on their category. In figure (10), the above-mentioned scoring system was used, in which each bar represents one of the Likert scale questions, and is split into negative and positive parts. The ARR of each question is shown inside the bar; the ARR and N% for each category are presented, and the overall ARR and N% for part A are presented too. Figure (11) shows the results of question Q33 which measures the knowledge acquired in the components of project management.



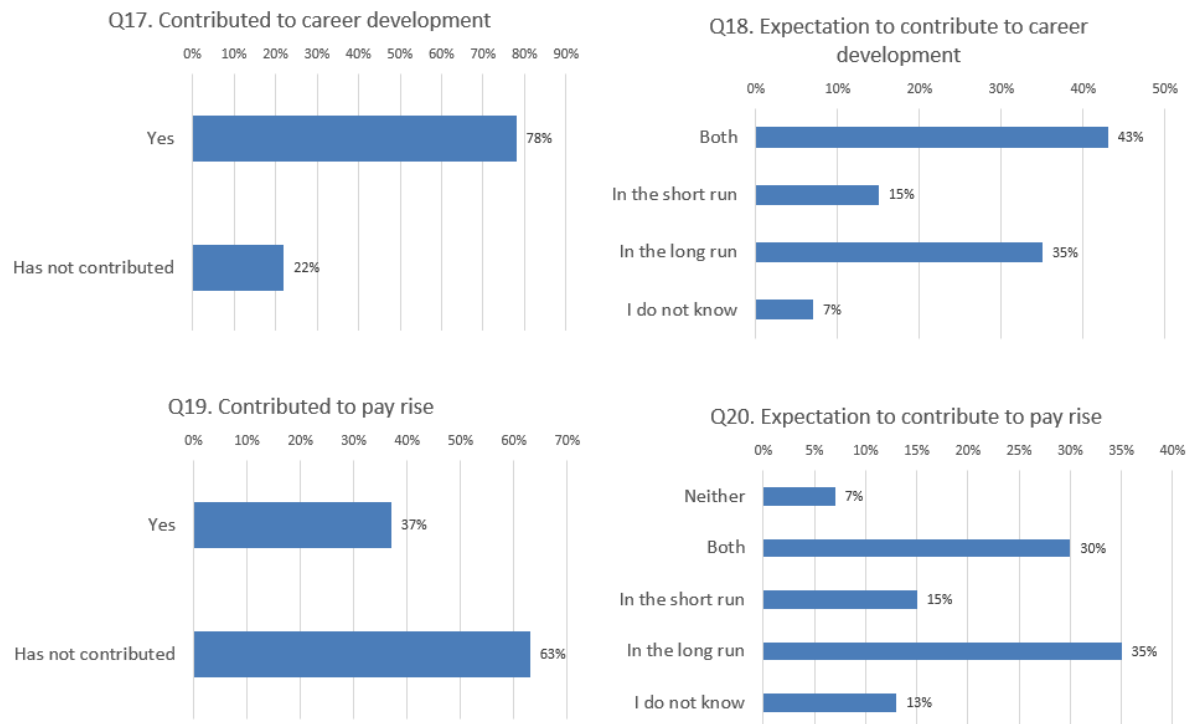


Figure (9). Survey results, career prospects

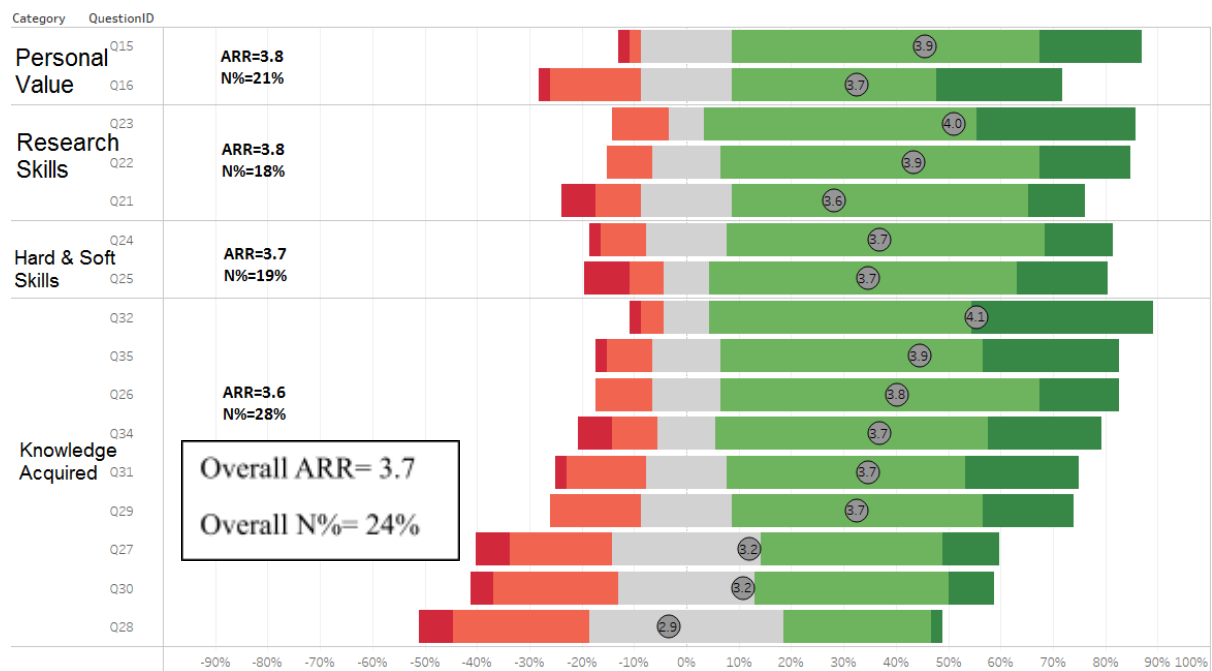


Figure (10). Survey results, part A, Likert scale questions

QID	Questions	Category
Q15	The Master's course improved your self-confidence and helped you attain a high level of social recognition and be more valued	personal value
Q16	You were able to build a professional social network with your classmates while studying the Master's course.	
Q17	Has the Master's course already contributed to your career development?	Career Prospects
Q18	The Master's course would contribute to your career development.	
Q19	Has the Master's course already contributed to your pay rise?	
Q20	The Master's course would contribute to your pay rise	
Q21	The Master's course enabled you to critically evaluate research and scholarship, and critique their methodologies.	research skills
Q22	The Master's course provided you with enough knowledge and skills to conduct research projects independently using the appropriate research methods and techniques.	
Q23	The Master's course improved your self-learning ability required for continuing professional development.	
Q24	The Master's course helped you acquire hard or conceptual skills (diagnosing and analysing complex situations, problem solving, decision-making, collecting and analysing information).	hard & soft skills
Q25	The Master's course helped you acquire soft or human skills (such as the ability to communicate well, understand, motivate and work efficiently with other people in teams).	
Q26	The Master's course provided you with awareness of contemporary issues and the forefront of your discipline.	knowledge acquired
Q27	The Master's course helped you acquire enough knowledge about the feasibility phase.	
Q28	The Master's course helped you acquire enough knowledge about the design phase.	
Q29	The Master's course helped you acquire enough knowledge about the construction phase.	
Q30	The Master's course helped you acquire enough knowledge about the Operation phase.	
Q31	At the individual level, the Master's course helped you acquire enough knowledge about leadership and human resources.	
Q32	At the team level, the Master's course helped you acquire enough knowledge about the components of project management (time management, cost management, resources management, quality management, environmental management, and safety and health management).	
Q33	Please identify the areas in which you feel that the Master's course provided you with enough knowledge about	
Q34	At the company level, the Master's course helped you acquire enough knowledge about business management (operational and strategic planning, financial management, total quality management and marketing).	
Q35	At the construction industry level, the Master's course helped you acquire enough knowledge about stakeholders' relationships during the entire life of the project, and on different kind of procurement routes, especially private finance initiatives (PFI) and strategic partnering.	

Table (3). Questions of part A, The perceived value

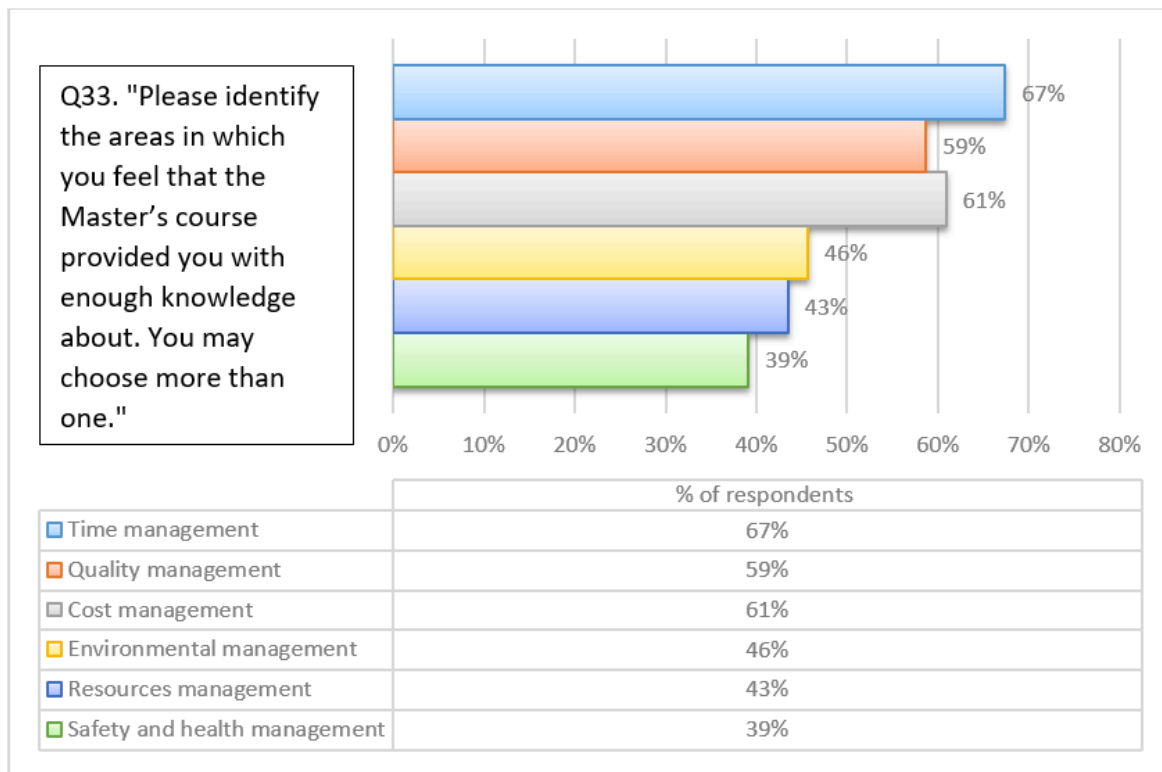


Figure (11). Knowledge acquired in the components of project management, survey results

### Commentary

- o Students consider the PCMC as an investment for the future in terms of career development and pay rise, whether in the short term or in the long term, with higher expectations for the long run.
- o 78% of the respondents indicated that the course has already participated in their career prospects.
- o The overall ARR, in terms of part A the perceived value, of the 20 universities is 3.7. This indicates that there is some lost value.
- o Q27, Q28, and Q30 have the lowest score with 3.2, 2.9 and 3.2 respectively; these questions are all in the 'acquired knowledge' category, and related to the project's lifecycle (feasibility, design and operation phases)
- o Taking the four categories into account, the survey results show the four categories scored almost the same with the 'knowledge acquired' category scoring the lowest.
- o Regarding the knowledge acquired in the components of project management, more than half of the respondents did not think that they acquired enough knowledge about environmental management, resources management and health and safety management.

### 4.3.2. Course content

#### Questions

This section considers questions Q16 to 50, which constitute part B of the questionnaire ‘The course content’, which consists of four categories: content challenges, teaching methods, assessment methods and feedback on students work. See Table (4).

#### Results

Figure (12) displays results of questions Q38, Q39 and Q40, which were considered not suitable to be treated in the scoring system; and thus, they were analysed separately. Figure (13) illustrates the ARR of the other questions of part B in descending order and classified based on their category. Finally, figure (14) provides an overview to the survey results showing the distribution of the 20 universities based on their ARR values.

QID	Category	Question
Q36	Content's challenges	Taking your previous knowledge and experience into account, how would you describe the challenge of the content of the Master's course?
Q37		Do you think that the construction industry requires certain skills and knowledge that your Master's course failed to provide? Do you think there is a gap between what your Master's course offered and what is actually needed in the construction industry?
Q38	Teaching methods	In terms of type of content, how would you describe your master's course overall?
Q39		Which type of content would you prefer?
Q40		In general, how would you describe you Master's course methods of teaching?
Q41		Did your Master's course include activities that require group work?
Q42		Did your Master's course include activities that require verbal presentations?
Q43		Did the Master's course include simulations and role-playing exercises, such as mock activities where students play the role of various contract parties, e.g. appraisal of construction or development project?
Q45		Was the Master's course designed in a way that allows a student to learn from other students' experience, skills and knowledge?
Q46	Assessment methods	How would you describe the assessment methods of the Master's course?
Q48		At the module level, do you think that the assessment methods effectively assessed the intended learning outcome from each module?
Q49	Feedback	How do you describe the feedback given on your work during your Master's course?
Q50		Did the academic staff provide you with feedback on your work during the learning process and before the final submission/exam?

Table (4). Questions of Part B, course content

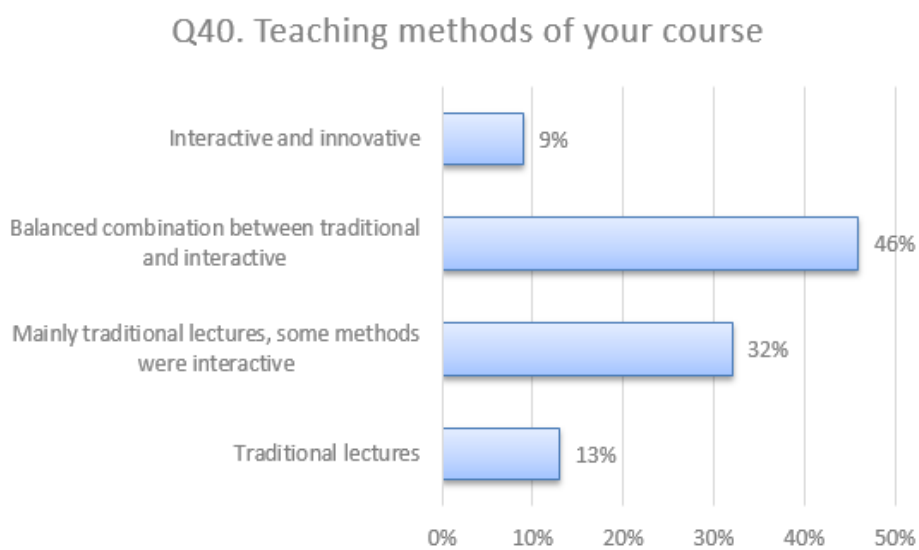
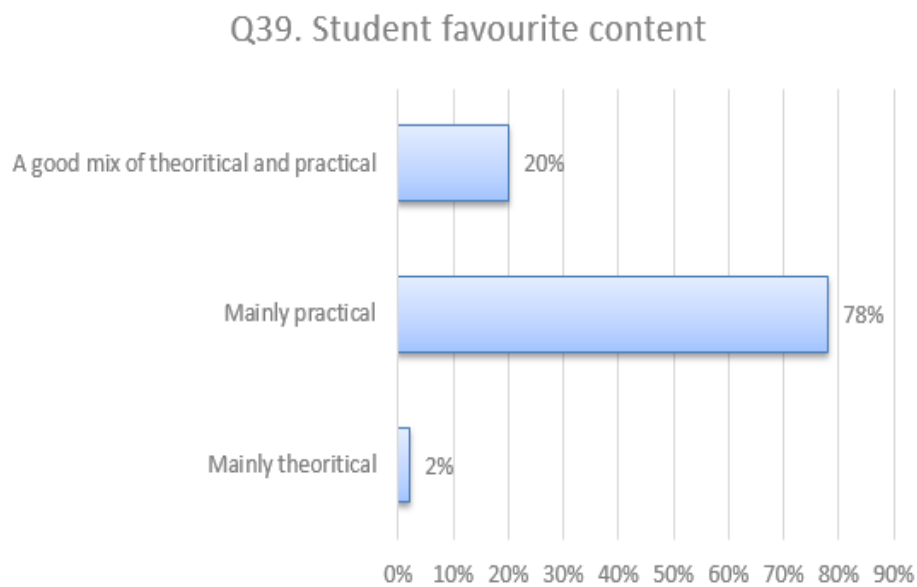
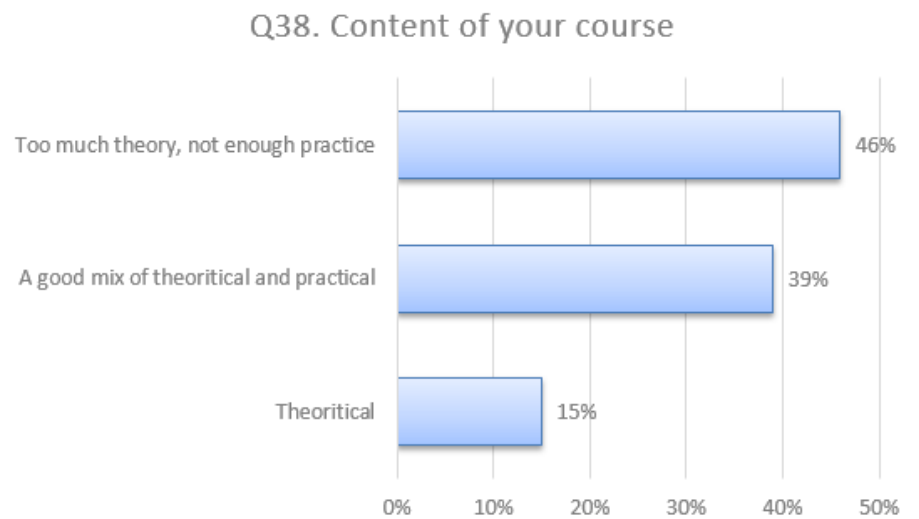


Figure (12). Survey results, part B, questions Q38, Q39 and Q40

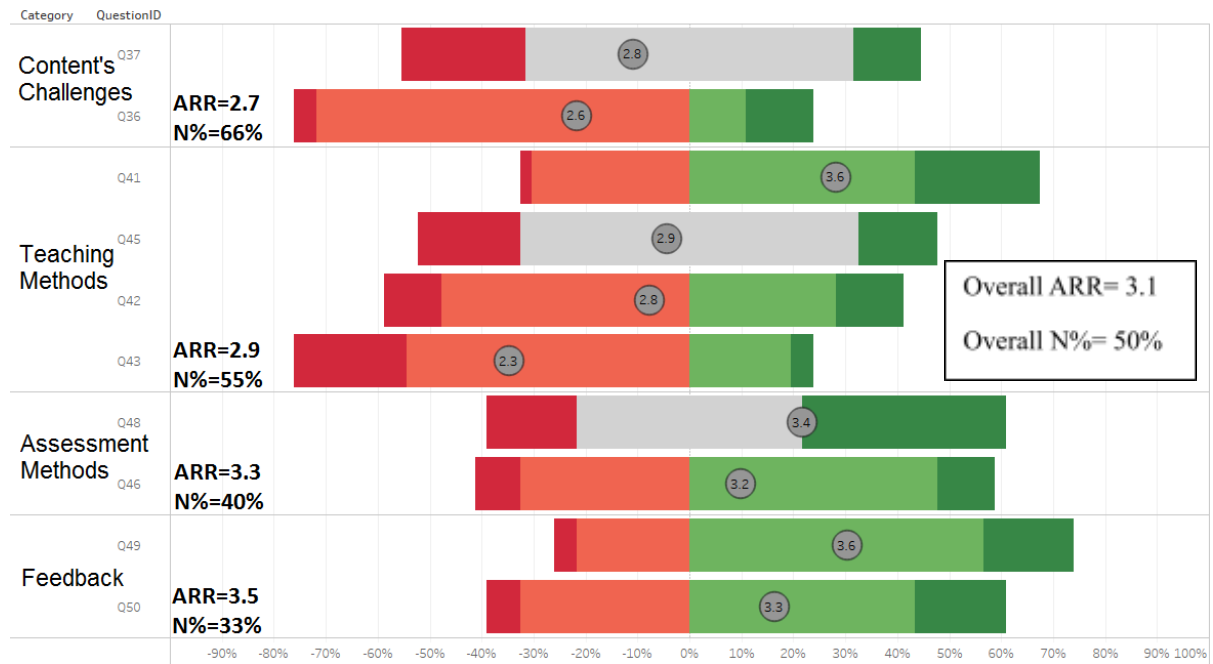


Figure (13). Survey results, part B

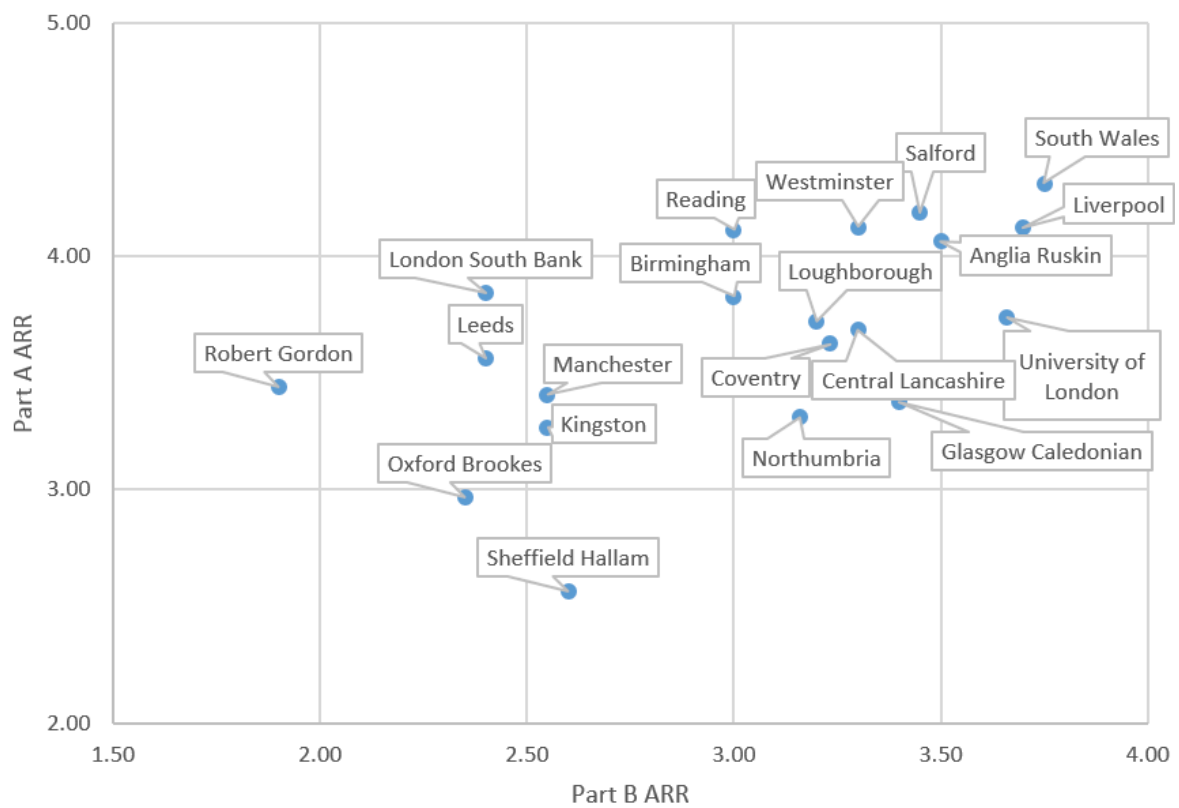


Figure (14). Distribution of the surveyed universities based on their ARR values

## Commentary

- o More than half of the survey respondents indicated that the course was mainly theoretical with insufficient practical aspects, while 78% of the respondents considered content with a good mixture of theoretical and practical aspects to be their preferred choice.
- o The results shows that PCMCs at British universities have a high degree of negativity (N%=50%) when evaluating the course content.
- o Both of the ‘teaching methods’ and ‘content challenges’ categories have N% more than 50% with ARR equal to 2.9 and 2.7 respectively. In particular, Q43 which belongs to the former section and Q36 which belongs to the later section have the lowest ARRs; 2.3 and 2.6 respectively. Q43 concerns the availability of role-playing exercises in the course, and Q36 investigate the suitability of the course content to the student’s previous knowledge and experience.

### 4.3.3. Satisfaction and importance of factors of value

#### Questions

Parts A and B of the questionnaire were mainly built based on the literature review. However, this research went further by briefly asking a number of students what factors they think are important to make a PCMC more useful and successful. This preliminary study resulted in seven factors, which were added to the questionnaire as a third part, part C. Respondents to the questionnaire were asked to select the top five factors among these seven factors, and rank them in order. In addition, they were asked to specify their degree of satisfaction for each of the seven factors based on their experience undertaking a PCMC in the UK.

#### Results

Each ranking was given a certain score (First: 5 points, Second: 4, Third: 3, Forth: 2 and Fifth: 1); then the total points for each factor were summed up. Next, based on the total points for each factor, the order of importance of each factor was derived. The score of the most important factor, ‘course subjects’ with a score of 106, is considered to be equal to 100%; based on which, the degree of importance of other factors are calculated. Table (5) summarises the results.

Factor of value	Total score	Degree of importance	Degree of satisfaction
Course subjects	179	100%	74%
Quality and intensity of Case studies	128	72%	61%
Quality and intensity of industry speakers	111	62%	60%
Group work	78	44%	65%
Feedback on student work	77	43%	68%
Site visits	76	42%	52%
Reading list	29	16%	65%
Overall degree of satisfaction = <b>64%</b>			

*Table (5). Satisfaction and importance of factors of value, survey result*

### Commentary

Course subjects, case studies and industry speakers are the top three factors in terms of importance. The fact that case studies and industry speakers came in the top 3 factors reflects a preference among students towards more practicality in PCMCs which supports the findings from Q39 in figure (12).

- o The overall degree of satisfaction concerning the factors of value is low with a score of 64% which means there is room for improvement.
- o Ideally, the degree of satisfaction should be equal to or above the degree of importance. Figure (15) investigates the previous point; it has two axes that are the degree of importance and the degree of satisfaction. Ideally, each point, which represent one factor of value, should be located on the 45-degree line or above.
- o Figure (15) illustrates that the top three factors (course subjects, case studies and industry speakers) are all under the 45-degree line, which means more effort should be spent on these three important areas.



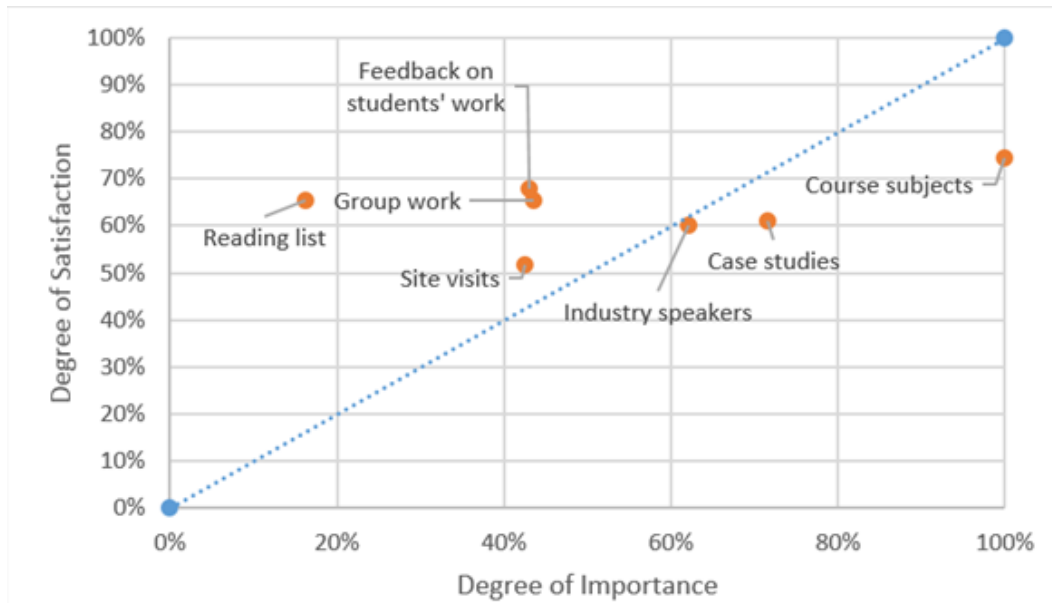


Figure (15). Satisfaction and importance of factors of value, survey result

#### 4.4. Testing the hypotheses

Figure (16) is a star chart summarising the survey results. It has 8 axes representing the 8 categories of part A and part B. It shows that the value of PCMCs in UK is not fully perceived by students (part A categories); thus, it is safe to say that the research's first hypothesis is accepted.

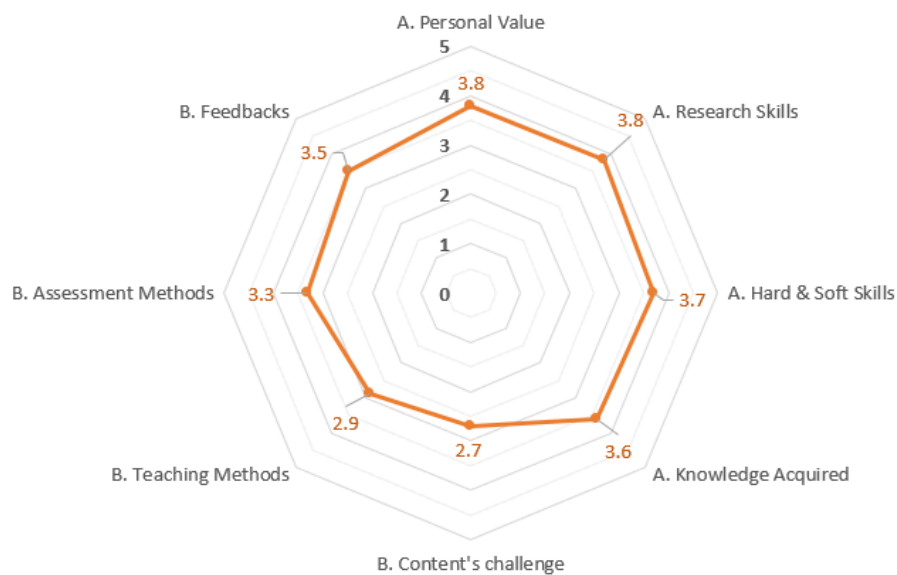
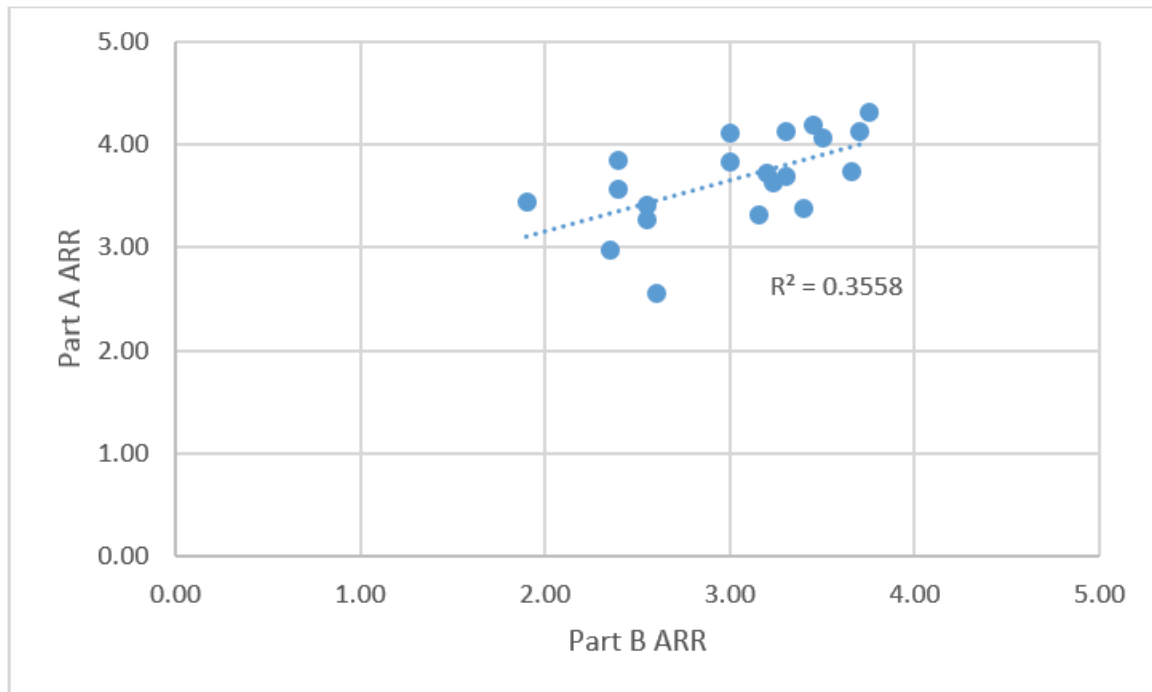


Figure (16). Summary of the survey results

Figure (17) shows the distribution of the 20 surveyed universities among two axes; the horizontal axis represents the ARR of part B, the vertical axis represents the ARR of part A. Table (6) provides the ARR of part A and part B for each universities.

University	ARR of part A, perceived value of PCMC	ARR of part B, course content
Anglia Ruskin University	4.06	3.50
City, University of London	3.74	3.66
Coventry University	3.63	3.23
Kingston University	3.27	2.55
London South Bank University	3.84	2.40
Loughborough University	3.72	3.20
Northumbria University	3.31	3.16
Oxford Brookes University	2.97	2.35
Robert Gordon University	3.44	1.90
Sheffield Hallam University	2.56	2.60
University of Birmingham	3.83	3.00
University of Central Lancashire	3.69	3.30
University of Leeds	3.56	2.40
University of Liverpool	4.13	3.70
University of Manchester	3.41	2.55
University of Reading	4.11	3.00
University of Salford	4.19	3.45
University Of South Wales	4.31	3.75
University of Westminster	4.13	3.30
Glasgow Caledonian University	3.38	3.40

*Table (6). ARR of the surveyed universities*



*Figure (17). Examining the correlation between part A and part B*

Running a regression analysis on the previous data on Excel gives a P-value equal to 0.005499, that is a P-value of less than 5%; thus, the null hypothesis 'H0: there is no relationship between part-A's ARR and part-B's' is rejected. Therefore, there is sufficient evidence to conclude that there is a statistically significant positive relationship between the course content and the perceived value of the course. The research's second hypothesis is then accepted. Having said that, it is worth mentioning that some scholars think that the P-value is not determinant enough; Westfall and Young (1993) stated: "While a P value can inform the reader whether an effect exists, the P value will not reveal the size of the effect. In reporting and interpreting studies, both the substantive significance (effect size) and statistical significance (P value) are essential results to be reported." P. 279. However, further statistical analysis is outside the scope of this dissertation

## 4.5. Case-study results, the PCMC at UCL

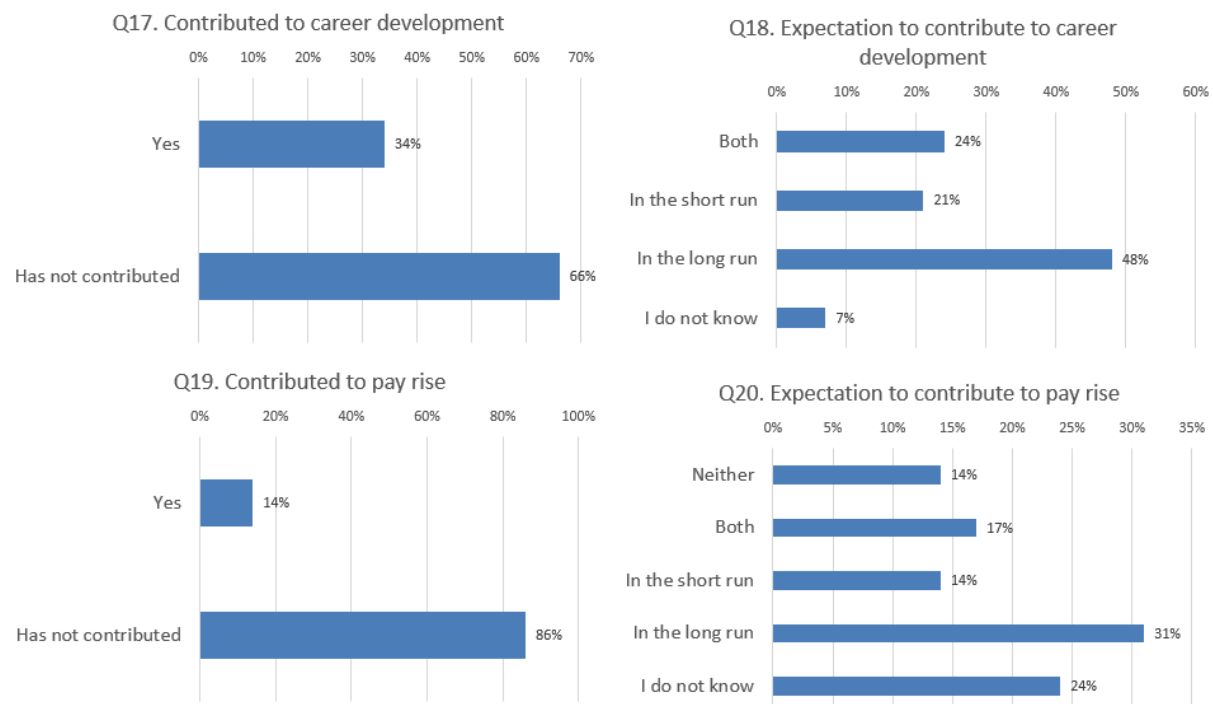
### 4.5.1. The perceived value of the PCMC to students at UCL

#### Questions

This section considers part A questions, Q15 to 35.

#### Results

Figure (18) displays the responses to the ‘career prospects’ category. Figure (19) shows the ARR to the other categories’ questions of part A in descending order and classified based on their category. Figure (20) shows the results of question Q33 which measures the knowledge acquired in the components of project management.



*Figure (18). Case-study results, career prospects*

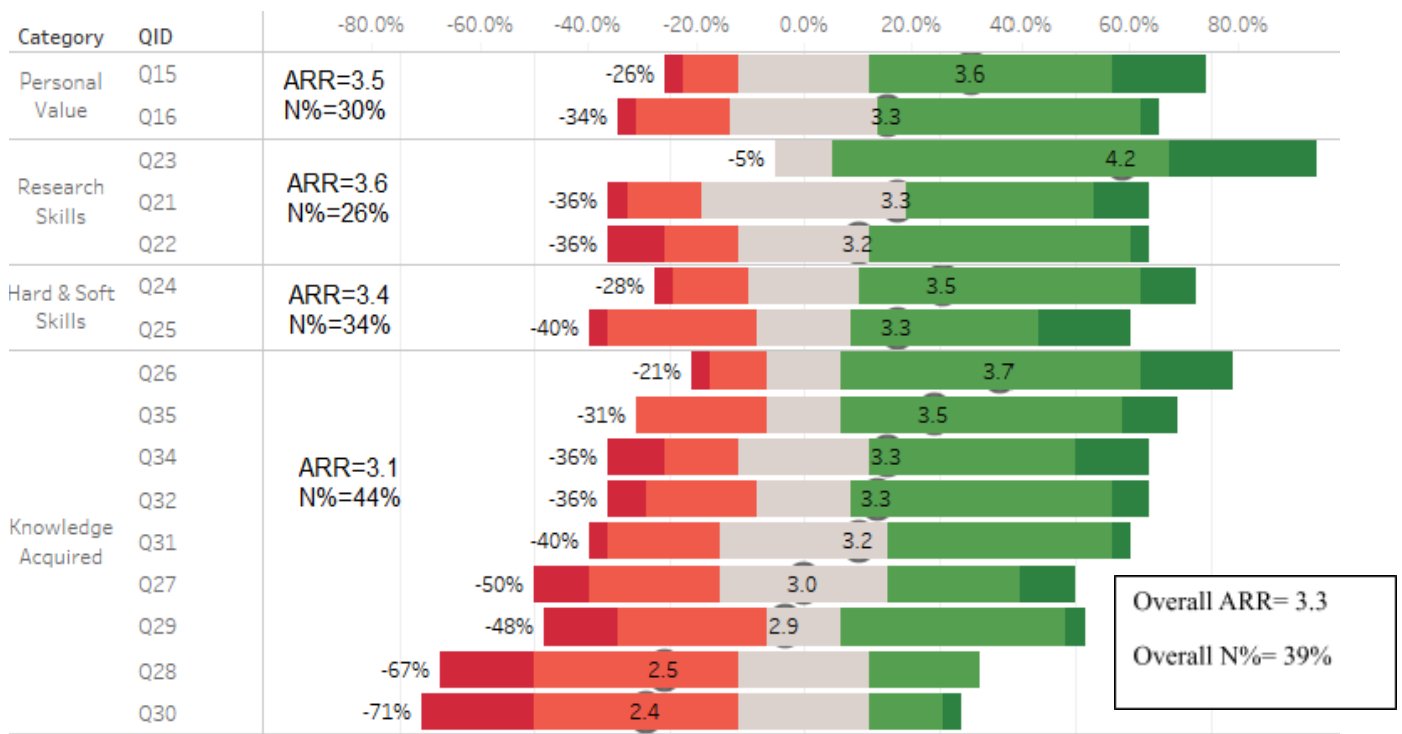


Figure (19). Case-study results, part A, Likert scale questions

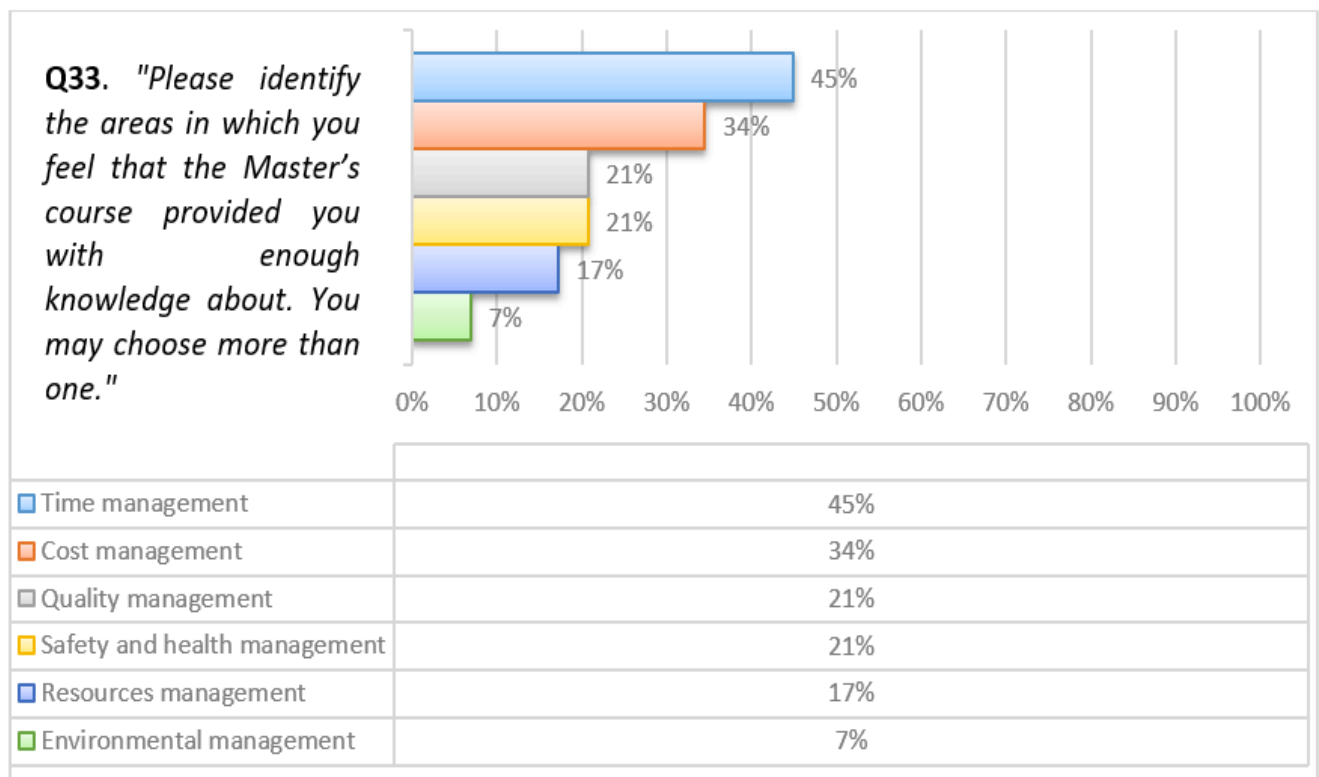


Figure (20). Knowledge acquired in the components of project management, case-study results

## Commentary

- o Respondents consider the PCMC an investment for the future in terms of career development and pay rise, whether in the short term or in the long term, with higher expectation for the long run.
- o The fact that the majority of respondents of the case study are in their final stages of their Master's degree and have not graduated yet explains why they indicated that the course has not yet participated to their career development and pay rise. However, some of them were already able to secure a job in the UK although they have not graduated from the course yet.
- o The overall ARR, in terms of the perceived value, is 3.3 out of 5 with negativity degree  $N\%=39\%$ , that indicates that the value is not fully perceived by students in this course.
- o Questions Q27, Q28, Q29 and Q30 have the lowest score; these questions are all in the 'acquired knowledge' category, and, more precisely, they are related to the project's life-cycle (feasibility, design, construction and operation).
- o Taking the four categories into account, the results show that 'personal value', 'research skills', and 'soft and hard skills' categories scored almost the same, with score of 3.5, 3.6 and 3.4 respectively; however, the 'knowledge acquired' category lagged behind with a score of 3.1 and comparatively high N%.
- o The respondents did not think that the PCMC at UCL has provided them with enough knowledge about any of the six components of project management, as all of these six components scored less than 50%, with time management being the one with highest score at 45%, and environmental management being the lowest at 7%.

Appendix (C) considers part A questions classified based on the demographic information of the respondents. The results show that taking the different demographic groups into account did not result in any significant differences. The biggest variance was between respondents who have worked inside the UK, and between those who had work experience elsewhere; with score of 3.5 and 3.2 respectively. This could be justified to the fact that the former group has already gain some understanding of the British construction industry, and better English language skills which might enable them to take the most out of the course. However, even this variance is not significant.

#### **4.5.2. UCL course content**

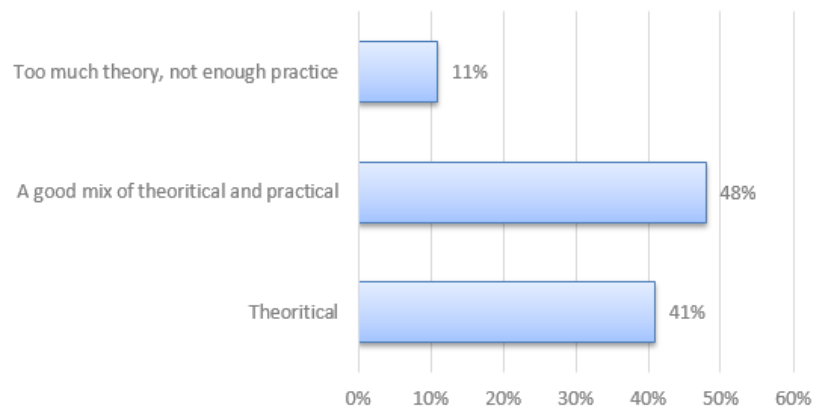
##### **Questions**

This sections consider part B questions Q16 to Q50.

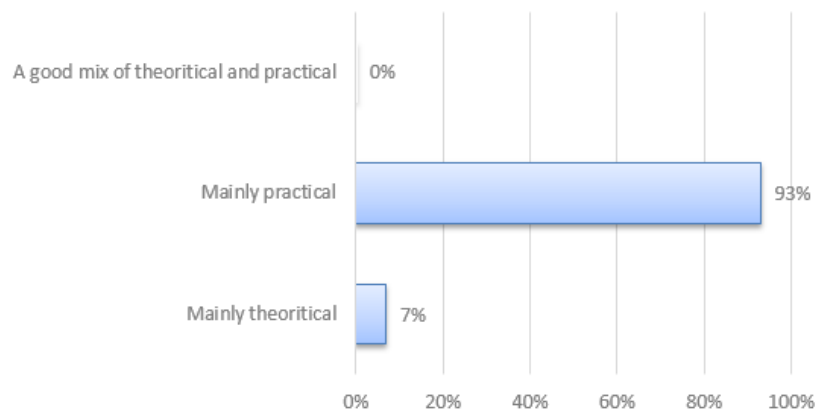
##### **Results**

Figure (21) displays the results of questions Q38, Q39 and Q40. Figure (22) illustrates ARR of the other questions of part B in descending and classified based on their category. And finally, figure (23) provides a summary of the case-study findings.

## Q38. Content of your course



## Q39. Student favourite content



## Q40. Teaching methods of your course

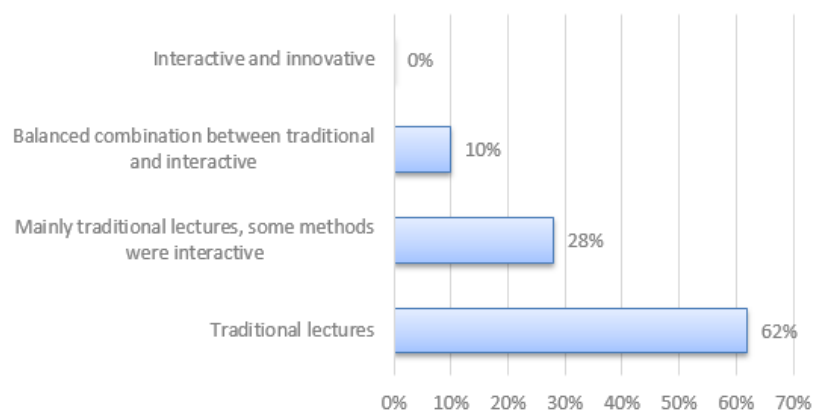


Figure (21). Case-study results, part B, questions Q38, Q39 and Q40



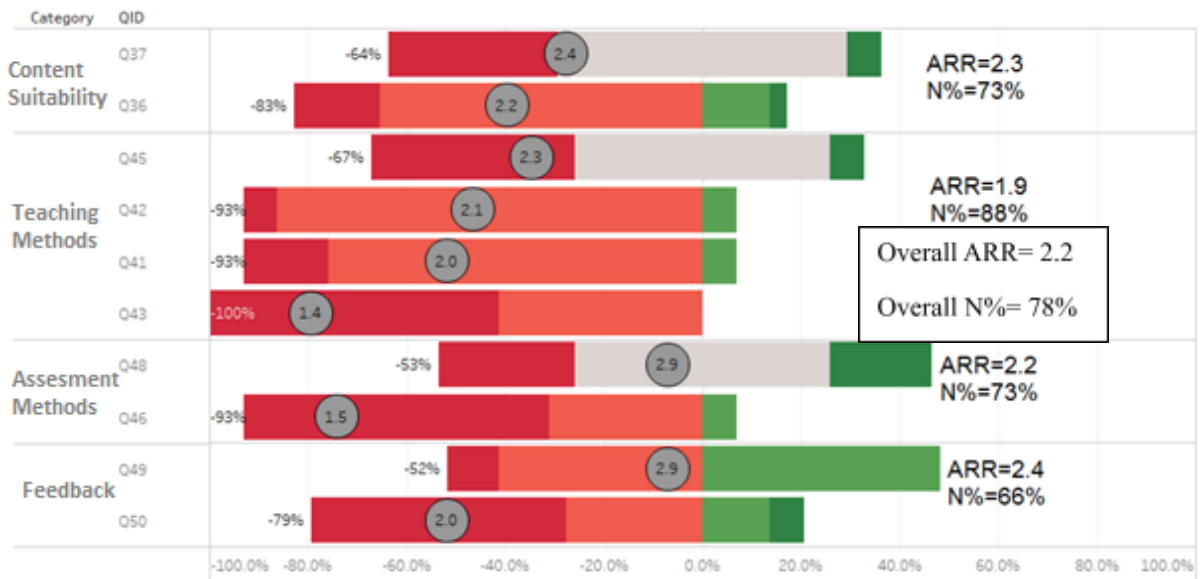


Figure (22). Case-study results, part B

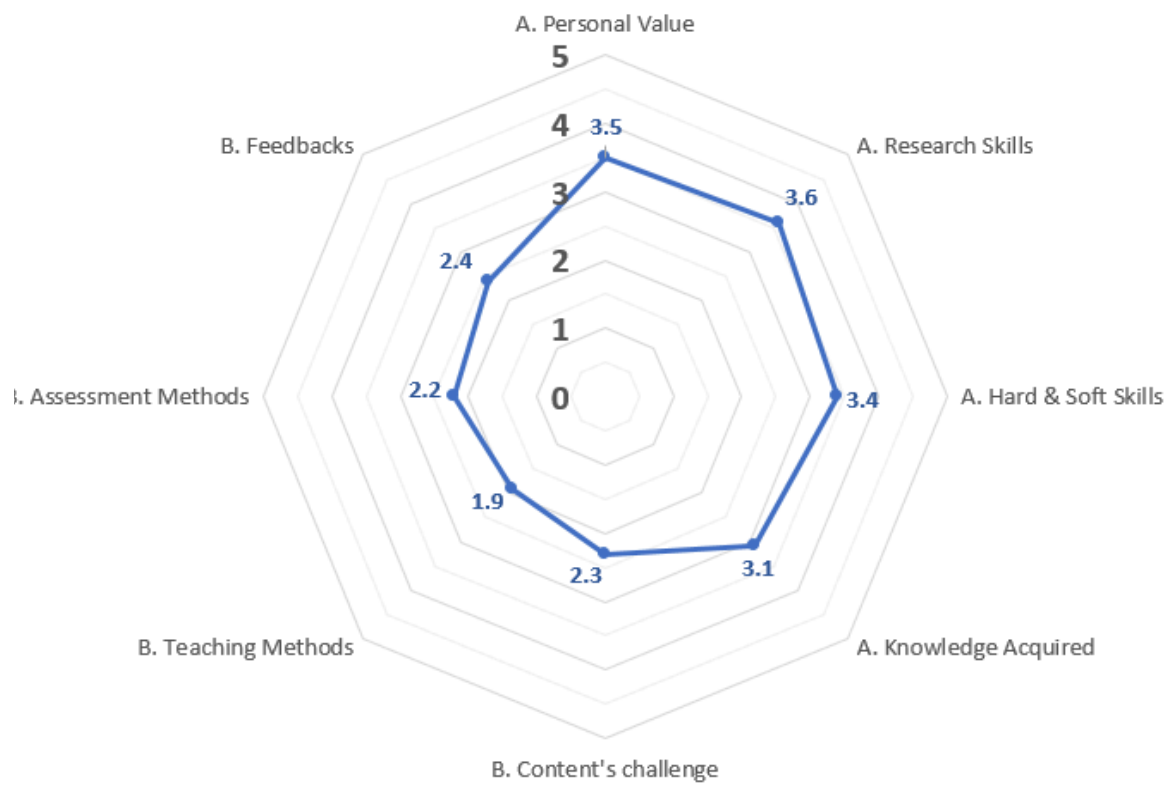


Figure (23). Summary of the case-study findings

## Commentary

- o 90% of the case-study respondents indicated that the course was mainly theoretical with insufficient practical aspects, while 93% of them preferred a content with a balanced mixture theoretical and practical aspects.
- o The results shows that the PCMC at UCL has a remarkably low score when it comes to part B, course content. ARR = 2.2 out of 5, with N% = 78%.
- o All the four categories of part B have low scores, with the ‘teaching methods’ category being the lowest with ARR 1.9.
- o Figure (23) shows that the value of the PCMC at UCL is not fully perceived (part A categories); however, it is possible for this value to be better perceived as there is a room for improvement in the course content (part B categories), and the positive relationship between part A and B was found to be statically significant in the previous section.

### 4.5.3. Satisfaction and importance of factors of value, PCMC at UCL

#### Questions

This section deals with part C of the questionnaire.

#### Results

Table (7) shows the level of satisfaction and orders the factors of value in terms of importance, based on the view of the case-study respondents.

Factor of value	Total score	Degree of importance	Degree of satisfaction
Course subjects	106	100%	67%
Quality and intensity of Case studies	79	75%	47%
Quality and intensity of industry speakers	74	70%	53%
Feedback on student work	51	48%	43%
Site visits	45	42%	33%
Reading list	38	36%	72%
Group work	39	37%	43%
Overall degree of satisfaction = <b>51%</b>			

*Table (7). Satisfaction and importance of factors of value, case study*

## Commentary

- o Course subjects, case studies and industry speakers are the top three factors in terms of importance. The fact that case studies and industry speakers came in the top 3 factors, reflects the tendency among students towards more practicality.
- o The overall degree of satisfaction with the factors of values is considerably low with scores of no more than 51%. Six out of the seven factors has less than 50% satisfaction degree.
- o Figure (24) shows that the top five factors of value are all under the 45 degree line.

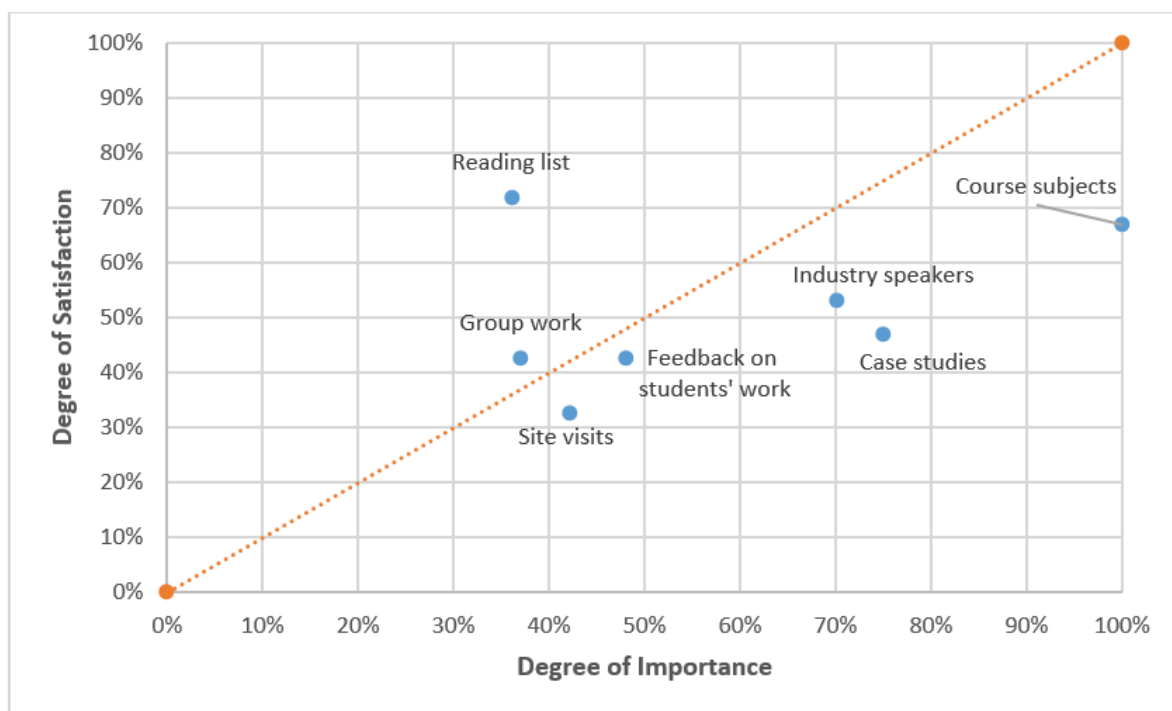


Figure (24). Satisfaction and importance of factors of value, case study

### 4.5.4. Students' interviews.

#### Question

Following the analysis of the case-study data, a number of areas of weaknesses in the course were identified. Afterwards, nine students undertaking a PCMC at UCL were interviewed and asked to give their opinion on these areas of weakness. The interviews were semi structured ones.

#### Results

Table (8) represents the summary of the interview data analysis. It shows the problems the course is facing and the position of each interviewee concerning the problem, whether in agreement or not.

Drawbacks	Interviewee ID								
	A	B	C	D	E	F	G	H	I
There was not enough support during the period of doing the assignment	✓		✓	✓	✓	✓	✓		✓
Low opportunity to bond/interact with fellow students	✓	✓	✓	✓		✓	✓		✓
Lack of training in project management software	✓	✓	✓	✓		✓	✓		✓
Not enough verbal presentation exercises	✓	✓	✓	✓			✓		✓
Not enough interaction between lecturers and students	✓		✓	✓			✓	✓	✓
Competitiveness led to less collaboration between students during	✓	✓	✓	✓			✓		✓
Feedback on student work did not provide sufficient justifications in the case of low score.	✓	✓	✓			✓	✓		
Feedback was brief and did not provide students with enough guidance to improve their work.	✓		✓	✓		✓	✓		
People are less committed to group work because it is not graded	✓		✓	✓		✓			✓
Some lecturers were not active enough on Moodle		✓	✓	✓	✓			✓	
The economic modules and their assignments were difficult, and extra support is needed.			✓	✓	✓	✓			✓
Amount of group work is not enough			✓	✓			✓		✓
Not enough case studies and/or low variety			✓	✓				✓	✓
Not enough industry speakers	✓		✓		✓				✓

Table (8). Summary of the analysis of the students' interviews

### Commentary

Due to the word limit, this section provide details on only few areas that were discussed in the interviews.

#### Interaction with lecturers:

Most of the interviewees felt that there was not enough interaction with the lecturers, mainly due to the large number of students. The main method of interacting and receiving support from the lecturers was Moodle, the virtual learning environment; however, not all students felt confident enough to ask their questions publicly and they preferred to ask the lecturers in person. Moreover, some indicated that not all lecturers are active on Moodle and others took a long time to reply and/or replied briefly. In the case of resubmitting, some interviewees who had failed some modules and were asked to resubmit, said it was often difficult to arrange a meeting with the main lecturer to discuss what could be done to avoid another failure. In some optional modules where the number of students was relatively low and more interaction and discussion between the lecturer and students took place, some interviewees thought that this helped them obtain higher grades in the assignments.

### Feedback on students' work:

A number of interviewees indicated that the quality of the feedback varied depending on the marker; some feedback was brief, insufficient and should be more detailed. Moreover, some of interviewees who scored low marks said that they did not receive enough justification on why they were given a low mark. They think the feedback was general and did not focus enough on what went wrong in students work. Also, some thought the feedback did not elaborate enough on what could be done to improve the work; this problem is more serious when a student faces resubmission.

### Collaboration between students

Some students believe that the course was designed in a way that makes students work individually. Some think the reason for this is the lack of group-work activities. Others believes the problem lies in the quality of these activities and not the quantity; the fact that these activities were not graded did not encourage students, or at least some of them, to put enough efforts and collaborate effectively with others. Moreover, the topics of the group-work activities are, most of the time, related to assignments that will be graded afterwards for each individual students. Thus some interviewees think that some students were not encouraged to share all their knowledge so that they will not allow other students to copy their thoughts and ideas in their assignments. This drives students to be more of a solo player than a team player. Some thought that more events and none academic activities should be included in this course to help students to bond with one another better and achieve higher collaboration. The competitive atmosphere in class was the main reason for low collaboration according to the majority of the interviewees.

### Case study:

All respondents believe that case studies are one of the most valuable aspects of the course; however, few of them said that there were not enough. Some noted that the majority of the case studies were UK-based; additional case studies from outside the UK may add value to the course. One respondent indicated that cases lacked variety as they were mainly focused on infrastructure projects.

#### 4.6. Sensitivity Analysis

It is important to bear in mind that the numerical scores presented in this dissertation are not definitive. They are based on the scoring system presented in table (2) which is somehow subjective. Had different scoring systems been used, the scores might have been different.

For example, question Q42 has four response categories; ‘never’, ‘sometimes’, ‘frequently’ and ‘constantly’ with assigned value 1, 2, 4, and 5 respectively. One could assign 2.5 to ‘sometimes’ instead of 2, and 3.5 to ‘frequently’ instead of 4 to make the scale better distributed. Others could argue that while it is ok to give responses such as ‘a relatively huge gap’ a value of 1, other responses such as ‘no’, ‘not useful at all’ and ‘never’ should not be treated equally, and thus, should not have the value of 1 but rather 0. Moreover, while this dissertation considered a scale of five points for part B responses to be similar to part A’s scale, someone could find a scale of four points is more suitable to part B. Not to mention that other response categories could be presented to the same questions and this may also lead to different scores.

Having said that, preliminary sensitivity analysis was done testing three other possible scoring scenarios; each scenario diverts from the scoring system presented in table (2). Scenario 1 use 2.5 instead of 2 and 3.5 instead of 4 for the questions that have four response categories. Scenario 2 assigns value of 0 to some response categories as discussed in the previous paragraph. Scenario 3 combines the previous two scenarios together. Table (9) explain the scoring system used in each scenario. Table (10) shows the ARR of part B for the three different scenarios in comparison to the results obtained from the scoring system.

value	0	1	2	2.5	3	3.5	4	5
The scoring system used		High difficulty	Moderate difficulty				Low difficulty	No difficulty
		Relatively huge gap			Relatively small gap			No considerable gap
		Never	Sometimes				frequently	constantly
		Not at all			To some extent			Yes very much
		Mainly concentrated on one method	Varies little				Have good degree of variety	varies a lot
		Not useful at all	not useful most of the time				Useful most of the time	extremely useful
scenario 1		High difficulty		Moderate difficulty		Low difficulty		No difficulty
		Relatively huge gap			Relatively small gap			No considerable gap
		Never		Sometimes		frequently		constantly
		Not at all			To some extent			Yes very much
		Mainly concentrated on one method		Varies little		Have good degree of variety		varies a lot
		Not useful at all		not useful most of the time		Useful most of the time		extremely useful
scenario 2		High difficulty	Moderate difficulty				Low difficulty	No difficulty
		Relatively huge gap			Relatively small gap			No considerable gap
	Never		Sometimes				frequently	constantly
	Not at all				To some extent			Yes very much
		Mainly concentrated on one method	Varies little				Have good degree of variety	varies a lot
	Not useful at all		not useful most of the time				Useful most of the time	extremely useful
scenario 3		High difficulty		Moderate difficulty		Low difficulty		No difficulty
		Relatively huge gap			Relatively small gap			No considerable gap
	Never			Sometimes		frequently		constantly
	Not at all				To some extent			Yes very much
		Mainly concentrated on one method		Varies little		Have good degree of variety		varies a lot
	Not useful at all			not useful most of the time		Useful most of the time		extremely useful

Table (9). Three possible scenarios for the scoring system

	The scoring system used	scenario 1	scenario 2	scenario 3
<b>ARR of Part B, course content</b>	2.2	2.3	2.0	2.1

*Table (10). Sensitivity analysis, ARR of Part B under different scenarios*

Although no significant differences could be noticed under the different scenario, caution should be exercised when considering the numerical results presented in this dissertation.

Moreover, all questions were treated equally and no weighting was used: introducing different weights to the different questions would also lead to different scores. The number of response categories and their labels affect the response bias which may distort attitudes to information (Greenleaf, 1992). Thus, using different response scale format may result in different results. In addition, an agree/disagree rating scale has a number of drawbacks (Revilla et al., 2014); for example, it is subject to ‘acquiescence response bias’, that is the tendency of the respondent to accept the statement offered and agree with any assertion and regardless of the content (Krosnick, 1991).

All in all, the scoring system, the weighting, the number of response categories, the labelling of these response and the way questions are stated all have an effect on the results. Thus, the scores provided in this dissertation should not be taken as definitive ones.



# **CHAPTER 5**

## **CONCLUSION**

## 5.1. Summary

The aim of this dissertation is to establish the perceived value of postgraduate construction management courses (PCMCs) in the UK. In order to achieve this aim, four objectives were set. The first and the second objectives, to provide a general overview of the perceived value factors of the course and to provide a general overview of the success factors of course content, were achieved through reviewing the literature. The third objective, to evaluate these factors in a number of PCMCs in the UK, was accomplished via a research questionnaire that was distributed to respondents who are undertaking or have already completed a PCMC in 20 different British universities. This questionnaire was based mainly on the literature review in addition to a two-stage approach where students were asked to specify the degree of importance and satisfaction concerning a number of factors. The survey results supported the validity of the research first hypothesis, the value of PCMCs in UK is not fully perceived by students. The final objective, to test the relationship between course content and the perceived value, was realised through an inferential statistics method where the P-value and correlation coefficient ( $r$ ) were calculated; their value supported the second hypothesis of this research, there is a positive relationship between the course content and the perceived value of PCMCs to students. Finally, a case study concerning a specific PCMC at UCL was conducted where 29 respondents filled in the questionnaire; the results of the case study also goes along with the survey findings and add more support to both of the research hypotheses.

## 5.2. Findings

Reviewing the literature, in order to accomplish the first objective, led to a number of factors of value that should be perceived when undertaking a PCMC in the UK. Those factors can be sorted into four categories:

- a) Personal value: that looks into the social recognition, improved self-confidence and building a professional social network.
- b) Research skills: which are concerned with the ability to evaluate related researches and independently conducting a research project properly, in addition to the ability of continuous personal development.
- c) Hard and soft skills: which cover a range of abilities such as problem solving, decision making, good communication skills and the ability to work with others.
- d) Knowledge acquired: which concern the understanding of the different phases of the construction project life cycle, and the different levels of the organisational breakdown, in addition to the awareness of contemporary issues the construction industry.

Reviewing the literature, in order to accomplish the second objective, led to a number of factors that determined the success of the course content. Those factors can be sorted into four categories:

- a) Content challenges: which looks into the suitability of the content in terms of the student's previous knowledge and experience and market demand.
- b) Teaching method: which looks into the quality and quantity of group works, verbal presentation, role playing exercises and the design of course in a way that allow students to learn from each other's previous knowledge and experience.
- c) Assessment method: in terms of their variety and its aptitude to assess the intended learning outcome.
- d) Feedback on student work: in terms of its benefit when before submission the assignments or afterwards.

The results of the survey, which were conducted to accomplish the third objective, show that the overall average rate of response (ARR) on the perceived value of PCMCs for 20 surveyed universities is equal to 3.7 out of 5, which indicates the validity of the research first hypothesis that the value of PCMCs in the UK is not fully perceived by students. The results also show an even lower score for the course content with an ARR equal to 3.1 out of 5.

Running a regression analysis on the survey data, the ARR of the established value as the dependent variable and the ARR of the course content the independent variable, results in a P-value equal to  $0.005499 < 5\%$ . Therefore, there is sufficient evidence to conclude that the course content is statistically significant determinant of the perceived value of the course. This result support the validity of the second hypothesis.

The findings from the case study, a PCMC at UCL, are in line with the survey findings that there is a statistically significant positive relationship between the course content and the perceived value of the course.

### 5.3. Research limitations

Caution should be exercised when considering the findings of this dissertation. It is designed to provide only initial conclusions about PCMCs in the UK. It is constrained by a number of limitations:

- a) The number of respondents was relatively small: there were only 75 respondents in total. Moreover, the ARR of the majority of the surveyed universities was calculated based on one or two respondents only.
- b) Although the aim of this dissertation was to evaluate PCMCs in the United Kingdom, the majority of the surveyed universities are located in England with only a few universities outside.
- c) The scoring system used to derive the ARR and N%, and later to test the relationship between part A and part B is subjective. As mentioned earlier in the sensitivity analysis section, using different scoring scenarios may have led to different scores: also, weighting was neglected in this dissertation and all elements were treated equally. Moreover, using different numbers of response categories, different labelling of these response and different way of stating the questions may also have led to different results.
- d) Although this research demonstrated, statistically speaking, that there is some kind of relationship between the course content and the perceived value of the course, this relationship was mainly based on (r) and the P-value; some scholars believe that more statistical analysis should be done to further test this relationship.
- e) The findings are solely based on the students' views. The questionnaire is a self-assessment. For example, it is the students who determine their competency in the 8 elements of the 'knowledge acquired' category, this could be over- or under-estimated.
- f) The majority of the respondents are recent graduates or will graduate soon. Although the advantage of this is that it gives an up to date overview of the current situation, the disadvantage is that it does not allow testing the long term value of PCMCs.

## 5.4. Recommendations

In order for a PCMC to achieve higher perceived value by students, the courses administration should improve the course content. The course administration could use the components of Part B as a guide for enhancement.

This dissertation aimed to prove a relationship between part A of the questionnaire, the perceived value of PCMCs, and part B, the efficiency of the course content. However, findings from part C of the questionnaire and the analysis of the case study interviews demonstrates the importance of the case studies and industry speakers in terms of their quality and intensity in the course. Moreover, the interview analysis shed a light on the significance of the interaction level between the lecturers and the students (whether in person or via online platforms), and the ability of the course structure to ‘break the ice’ between students and moderate the level of competition in order to achieve a higher level of collaboration. The previous elements are somehow missing from part B of the questionnaire; therefore, to improve the evaluation of the course content, additional questions concerning these elements should be added to part B of the questionnaire.

The ARR of a number of the surveyed universities were calculated based on the response of one or two participants, a larger number of respondents from each university is required to obtain more accurate findings.

The majority of the respondents are either recent graduates or will graduate soon: a more comprehensive sample would include respondents with a balanced mixture regarding their year of graduation, and this will allow a longitudinal evaluation of the value of PCMCs in the UK.

This dissertation only considered the point view of the students. In order to obtain a more comprehensive picture of PCMCs in the UK, a number of employers should be asked to evaluate the performance of their employees before and after undertaking the Master’s degree.

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## Appendix A: The questionnaire

\* 1. Gender:

- ☐ Female
- ☐ Male
- ☐ Other

\* 2. Age:

- |                                   |                                   |
|-----------------------------------|-----------------------------------|
| <input type="radio"/> 20 or under | <input type="radio"/> 51 - 60     |
| <input type="radio"/> 21 - 30     | <input type="radio"/> 61 - 65     |
| <input type="radio"/> 31 - 40     | <input type="radio"/> 66 and over |
| <input type="radio"/> 41 - 50     |                                   |

\* 3. Job level (current or previous )

*If you have more than one experience, you may choose more than one option.*

- ☐ Clerical/Administrative
- ☐ Consultant
- ☐ Director/senior management
- ☐ Middle/junior management
- ☐ Educationalist
- ☐ Supervisor
- ☐ Student
- ☐ Trainee
- ☐ Retired
- ☐ Other (please specify)

\* 4. Years of work experience

\* 5. Location of construction related work experience (current or previous):

*If you have worked in more than one location, you may choose more than one option.*

- ☐ Scotland
- ☐ Northern Ireland
- ☐ West Midlands
- ☐ Wales
- ☐ North East England
- ☐ North West England
- ☐ Yorkshire
- ☐ East Midlands
- ☐ West Midlands
- ☐ London
- ☐ South East England
- ☐ South West England
- ☐ Ireland
- ☐ Outside the United Kingdom (please specify)

\* 6. Job sector:

*If you have worked in more than one sector you may choose more than one option.*

- |  |   |
|--|---|
| <input type="checkbox"/> Architecture & Design         | <input type="checkbox"/> Facilities management. |
| <input type="checkbox"/> Building Control & Standards. | <input type="checkbox"/> Health & Safety.       |
| <input type="checkbox"/> Housing.                      | <input type="checkbox"/> Planning.              |
| <input type="checkbox"/> Engineering.                  | <input type="checkbox"/> Procurement.           |
| <input type="checkbox"/> Consultancy.                  | <input type="checkbox"/> Project management.    |
| <input type="checkbox"/> Government/Local Government.  | <input type="checkbox"/> Site management.       |
| <input type="checkbox"/> Education & Training.         | <input type="checkbox"/> Surveying.             |
| <input type="checkbox"/> Other (please specify)        |   |

\* 7. Number of employees:

*in your current/Last organisation.*

- |                                    |                                     |
|------------------------------------|-------------------------------------|
| <input type="radio"/> Less than 20 | <input type="radio"/> 101-200       |
| <input type="radio"/> 21-50        | <input type="radio"/> 201-500       |
| <input type="radio"/> 51-100       | <input type="radio"/> More than 501 |

\* 8. Undergraduate qualification:

\* 9. Type of the Master's degree in the UK:

*If you have more than one, please consider the most related one.*

- ☐ Taught master's degree or specialised/advanced master's degree
- ☐ Research master's degree
- ☐ Practice/professional master's degree
- ☐ Other (please specify)

\* 10. Title of your Master's degree:

\* 11. University:

\* 12. Year of graduation:

13. Your grade/expected grade:

- ☐ Distinction ☐ Diploma
- ☐ Merit ☐ Deferred
- ☐ Pass
- ☐ Other (please specify)

\* 14. Finance of your Master's degree:

- ☐ Self-finance
- ☐ Financed by employer
- ☐ Financed by others

⊕ NEW QUESTION



or Copy and paste questions

PREV

NEXT

Please answer each question statement below by choosing how strongly you agree or disagree with each statement.

- \* 15. The Master's course improved your self-confidence and helped you attain high level of social recognition and be more valued.

☐ Completely disagree
 ☐ Agree  
☐ Disagree
 ☐ Completely agree  
☐ Neither agree nor disagree

- \* 16. You were able to build a professional social network with your classmates while studying the Master's course.

☐ Completely disagree
 ☐ Agree  
☐ Disagree
 ☐ Completely agree  
☐ Neither agree nor disagree

- \* 17. Has the Master's course already contributed to your career development?

☐ Yes  
☐ Has not contributed

- \* 18. The Master's course would contribute to your career development ...

☐ In the long run
 ☐ Neither  
☐ In the short run
 ☐ I do not know  
☐ Both

- \* 19. Has the Master's course already contributed to your pay rise?

☐ Yes  
☐ Has not contributed

- \* 20. The Master's course would contribute to your pay rise ...

☐ In the long run
 ☐ Neither  
☐ In the short run
 ☐ I do not Know  
☐ Both

- \* 21. The Master's course enabled you to critically evaluate research and scholarship, and critique their methodologies.

☐ Completely disagree
 ☐ Agree  
☐ Disagree
 ☐ Completely agree  
☐ Neither agree nor disagree

---

\* 22. The Master's course provided you with enough knowledge and skills to conduct research projects independently using the appropriate research methods and techniques.

☐ Completely disagree

☐ Agree

☐ Disagree

☐ Completely agree

☐ Neither agree nor disagree

\* 23. The Master's course improved your self-learning ability required for continuing professional development.

☐ Completely disagree

☐ Agree

☐ Disagree

☐ Completely agree

☐ Neither agree nor disagree

\* 24. The Master's course helped you acquire hard or conceptual skills (diagnosing and analysing complex situations, problem solving, decision-making, collecting and analysing information).

☐ Completely disagree

☐ Agree

☐ Disagree

☐ Completely agree

☐ Neither agree nor disagree

\* 25. The Master's course helped you acquire soft or human skills (such as the ability to communicate well, understand, motivate and work efficiently work with other people in teams).

☐ Completely disagree

☐ Agree

☐ Disagree

☐ Completely agree

☐ Neither agree nor disagree

\* 26. The Master's course provided you with awareness of contemporary issues and the forefront of your discipline.

☐ Completely disagree

☐ Agree

☐ Disagree

☐ Completely agree

☐ Neither agree nor disagree

\* 27. The Master's course helped you acquire enough knowledge about the feasibility phase.

☐ Completely disagree

☐ Agree

☐ Disagree

☐ Completely agree

☐ Neither agree nor disagree

\* 28. The Master's course helped you acquire enough knowledge about the design phase.

☐ Completely disagree

☐ Agree

☐ Disagree

☐ Completely agree

☐ Neither agree nor disagree

---

\* 28. The Master's course helped you acquire enough knowledge about the design phase.

- |  |  |
|--|--|
| <input type="radio"/> Completely disagree        | <input type="radio"/> Agree            |
| <input type="radio"/> Disagree                   | <input type="radio"/> Completely agree |
| <input type="radio"/> Neither agree nor disagree |  |

\* 29. The Master's course helped you acquire enough knowledge about the construction phase.

- |  |  |
|--|--|
| <input type="radio"/> Completely disagree        | <input type="radio"/> Agree            |
| <input type="radio"/> Disagree                   | <input type="radio"/> Completely agree |
| <input type="radio"/> Neither agree nor disagree |  |

\* 30. The Master's course helped you acquire enough knowledge about the operation phase.

- |  |  |
|--|--|
| <input type="radio"/> Completely disagree        | <input type="radio"/> Agree            |
| <input type="radio"/> Disagree                   | <input type="radio"/> Completely agree |
| <input type="radio"/> Neither agree nor disagree |  |

\* 31. At the individual level, the Master's course helped you acquire enough knowledge about leadership and human resources.

- |  |  |
|--|--|
| <input type="radio"/> Completely disagree        | <input type="radio"/> Agree            |
| <input type="radio"/> Disagree                   | <input type="radio"/> Completely agree |
| <input type="radio"/> Neither agree nor disagree |  |

\* 32. At the team level, the Master's course helped you acquire enough knowledge about the components of project management (time management, cost management, resources management, quality management, environmental management, and safety and health management).

- |  |  |
|--|--|
| <input type="radio"/> Completely disagree        | <input type="radio"/> Agree            |
| <input type="radio"/> Disagree                   | <input type="radio"/> Completely agree |
| <input type="radio"/> Neither agree nor disagree |  |

\* 33. Please identify the areas in which you feel that the Master's course provided you with enough knowledge about. You may choose more than one.

- ☐ Time management
  - ☐ Quality management
  - ☐ Cost management
  - ☐ Environmental management
  - ☐ Resources management
  - ☐ Safety and health management
  - ☐ Other
-

\* 34. At the company level, the Master's course helped you acquire enough knowledge about business management (operational and strategic planning, financial management, total quality management and marketing).

☐ Completely disagree

☐ Agree

☐ Disagree

☐ Completely agree

☐ Neither agree nor disagree

\* 35. At the construction industry level, the Master's course helped you acquire enough knowledge about stakeholders' relationships during the entire life of the project, and on different kind of procurement routes, especially private finance initiatives (PFI) and strategic partnering.

☐ Completely disagree

☐ Agree

☐ Disagree

☐ Completely agree

☐ Neither agree nor disagree

⊕ NEW QUESTION



or [Copy and paste questions](#)

PREV

NEXT

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\* 36. Taking your previous knowledge and experience into account, how would you describe the challenge of the content of the Master's course?

- ☐ No difficulty
- ☐ Low difficulty
- ☐ Moderate difficulty
- ☐ High difficulty

\* 37. Do you think that the construction industry require certain skills and knowledge that your Master's course failed to provide? Do you think there is a gap between what your Master's course offered and what is actually needed in the construction industry?

- ☐ No considerable gap
- ☐ Relatively small gap
- ☐ Relatively huge gap
- ☐ I do not know

\* 38. How would you describe your master's course overall?

- ☐ Theoretical
- ☐ Too much theory, not enough practice
- ☐ A good mix of theoretical and practical
- ☐ Mainly practical

\* 39. Which type of content would you prefer?

- ☐ Mainly Theoretical
- ☐ A good mix of theoretical and practical
- ☐ Mainly practical

\* 40. How would you describe you Master's course methods of teaching?

- ☐ Traditional lectures
- ☐ Mainly traditional lectures, some of the methods were interactive and innovative
- ☐ Balanced combination between traditional and interactive and innovative methods
- ☐ Interactive and innovative

\* 41. Did your Master's course include activities that require group work?

- ☐ Never
- ☐ Sometimes
- ☐ Frequently
- ☐ Constantly



\* 42. Did your Master's course include activities that require verbal presentations?

- ☐ Never
- ☐ Sometimes
- ☐ Frequently
- ☐ Constantly

\* 43. Did the Master's course include simulation and role-playing exercise, such as mock activities where students play the role of various contract parties, e.g. appraisal of construction or development project?

- ☐ Never
- ☐ Sometimes
- ☐ Frequently
- ☐ Constantly

44. If it does, did the academic staff direct the student to take on an unfamiliar role different from his/her profession / did you have to take on unfamiliar role to complete this activity?

- ☐ Yes
- ☐ No

\* 45. Was the Master's course designed in a way that allows a student to learn from other students' experience, skills and knowledge?

- ☐ Not at all
- ☐ To some extent
- ☐ Yes very much

\* 46. How would you describe the assessment methods of the Master's course?

- ☐ Mainly concentrated on one method
- ☐ Varies little
- ☐ Have good degree of variety
- ☐ Varies a lot

47. If you answered "Mainly concentrated on one method" or "Varies little " What was the main method?

- |   |                                  |
|---|----------------------------------|
| <input type="radio"/> Written Examination | <input type="radio"/> Report     |
| <input type="radio"/> Oral Examination    | <input type="radio"/> Group work |
| <input type="radio"/> Essay               | <input type="radio"/> Others     |

\* 48. At the module level, do you think that the assessment methods effectively assessed the intended learning outcome from each module?

- ☐ No
- ☐ To some extent
- ☐ Yes

\* 49. How do you describe the feedback given on your work during your Master's course?

- ☐ Not useful at all
- ☐ not useful most of the time
- ☐ Useful most of the time
- ☐ Extremely useful

\* 50. Did the academic staff provide you with feedback on your work during the learning process and before the final submission/exam?

- ☐ Never
- ☐ Sometimes
- ☐ Frequently
- ☐ Constantly

\* 51. Would you please indicate, in priority order, the top 5 factors that make a master's course valuable  
Please indicate which factor is first in importance, which is second, which is third and so forth.

	First	Second	Third	Forth	Fifth
Content of the course	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Quality and intensity of Case studies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Quality and intensity of industry speakers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Feedback on student work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Site visits	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reading list	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Group work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

\* 52. Based on your experience undertaking a Master's course, please indicate your level of satisfaction for each factor (please tick up to 25%, 50%, 75% or 100% for each factor)

	Up to 25%	50%	75%	100%
Content of the course	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Quality and intensity of Case studies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Quality and intensity of industry speakers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Feedback on student work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Site visits	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reading list	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Group work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

53. Please feel free to add any additional comments you think relative to this study.

54. Please provide your email address if you would like to take part in a 20-minute interview


55. Please provide your email address if you would like to receive a copy of the results

NEW QUESTION

or Copy and paste questions

PREV

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## **Appendix B: The response of five current and previous PCMC students to factors of values question.**

This section presents the response of five construction professionals who are doing or have undertaken a PCMC in the UK when asked the following question: “What features or factors of the postgraduate construction management course are most valuable for you?”

**Respondent No. 1,** “The subjects and the delivery methods were the most valuable. Case studies used from the construction industry about recent projects were very useful and memorable. Working in groups definitely is a factor to enhance communication and team working skills. To be honest, personally I did not like case studies when I did the master. But now I see the benefits as I still remember most of them. We had only one industry speaker and I cannot say I remember the session. The most memorable aspect of the MSc I did was a site visit to Shell. I believe site visits are very effective in terms of solidifying the taught knowledge. Recently, some management courses are using simulation games as ways of teaching and practicing in the same time. I have not tried them myself but my impression from student’s feedback is that they are useful.”

**Respondent No. 2,** “Most definitely the content of the course – it helped me to build a theoretical understanding of the principles of construction management and construction economics. These principles were the fundament requirements needed for new entrants in the industry to grasp. The content of the course provided a concise overview of the theoretical knowledge. This background would enable me – I hope – with several years of professional experience to become a competent construction practitioner.”

**Respondent No. 3,** “The most useful part of the course for me was the quality and intensity of the case studies and industry speakers as these helped make what was at times quite a theoretical course more applicable to my work. Some of the pre-reading was also useful because this usually includes case studies. Site visits weren't very useful as they were often just what we would have at work.”

**Respondent No. 4,** “I would say that the knowledge of the speakers was of a high importance. A lot of the content within (Respondent mentioned a name of a module) is very relevant to the industry conditions. (Respondent mentioned a name of another module) was a good module for group participation which encouraged us to also do individual research to the development side of construction, which I had limited

**Respondent No. 5,** “I would definitely say content of the course modules, they cover the width of many subjects, from economics to marketing to organisational behaviour to construction management. This gives me chance to understand the fundamentals of subjects which I have not previously learned

as I did Engineering as bachelor's degree. And would help in understanding how different subjects approach the problems.”

### Appendix C: The perceived value of PCMC to students at UCL, based on demographic information.

This section considers part A questions classified based on the demographic information of the respondents. Figures (C1), (C2), (C3) and (C4) illustrates the responses of part A categories classified based on gender, years of work experience, location of work experience and the undergraduate qualification respectively. Table (9) provides detailed results based on the demographic classification.

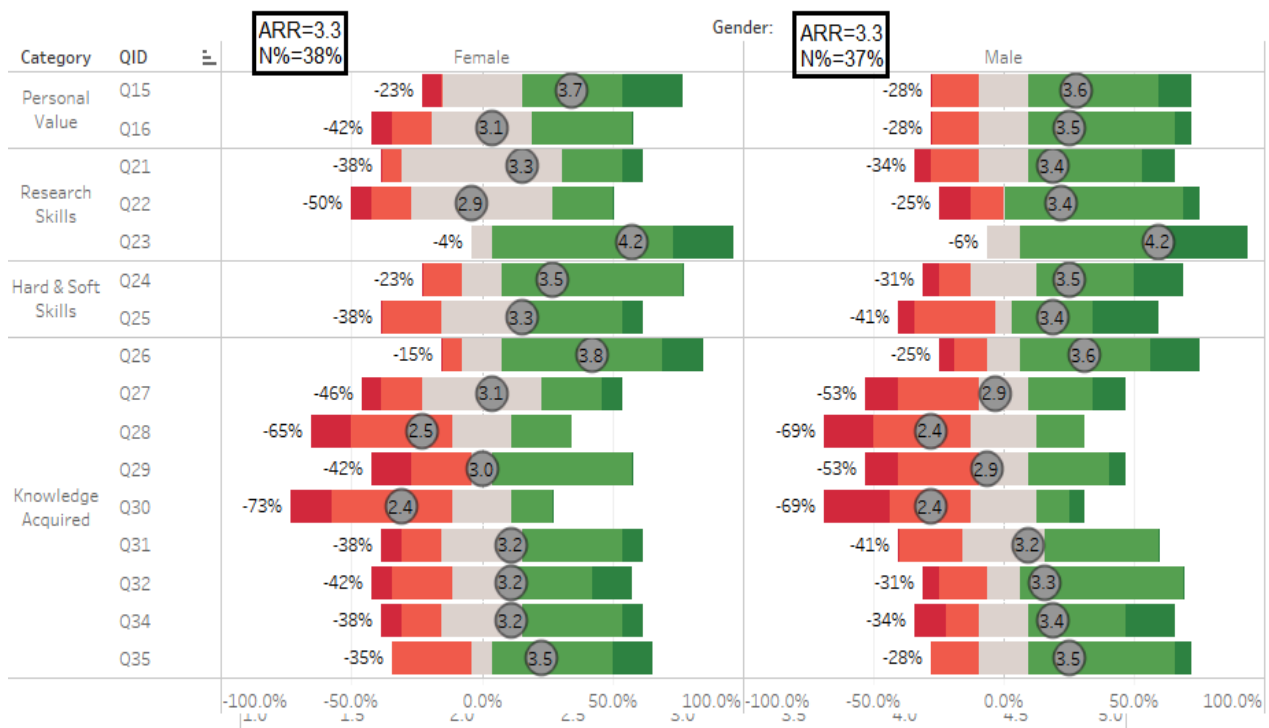


Figure (C1). Case study results, part A, Likert scale questions, categorised and classified based on Gender

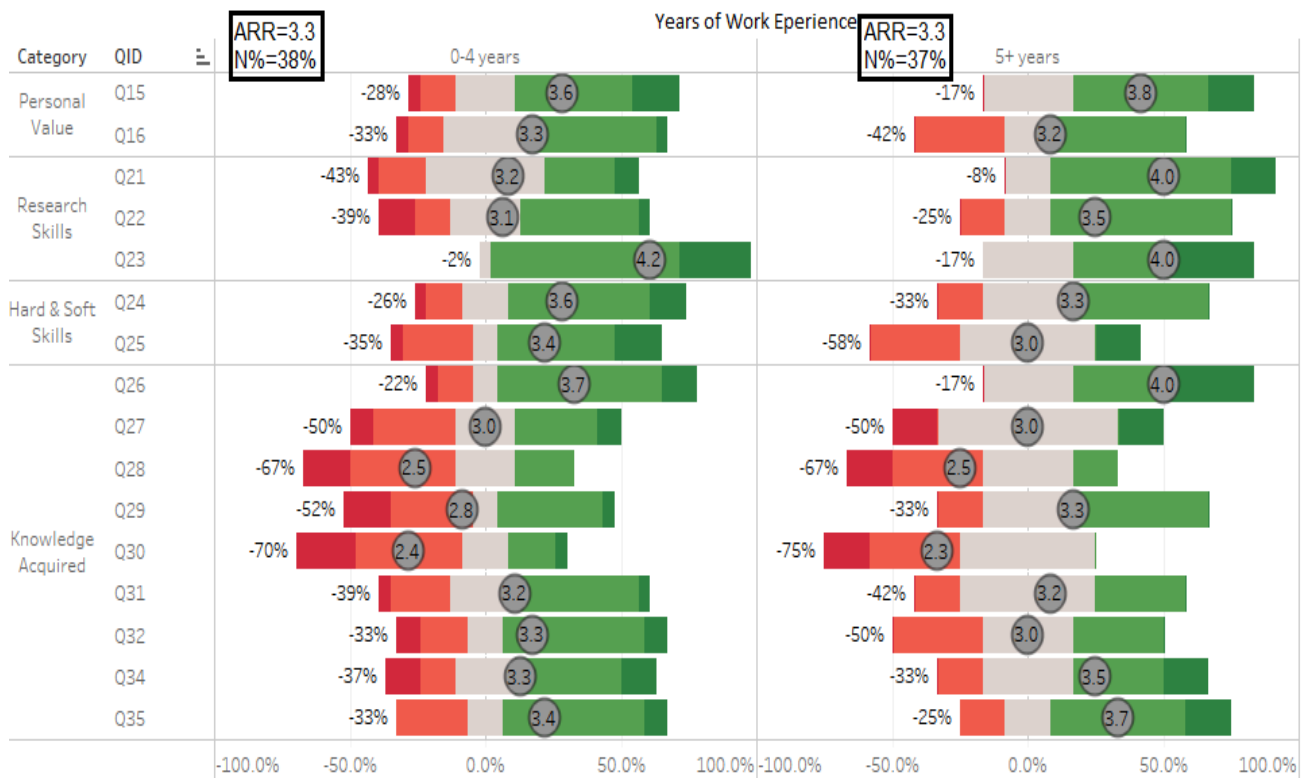


Figure (C2). Case study results, part A, Likert scale questions, categorised and classified based on years of work experience

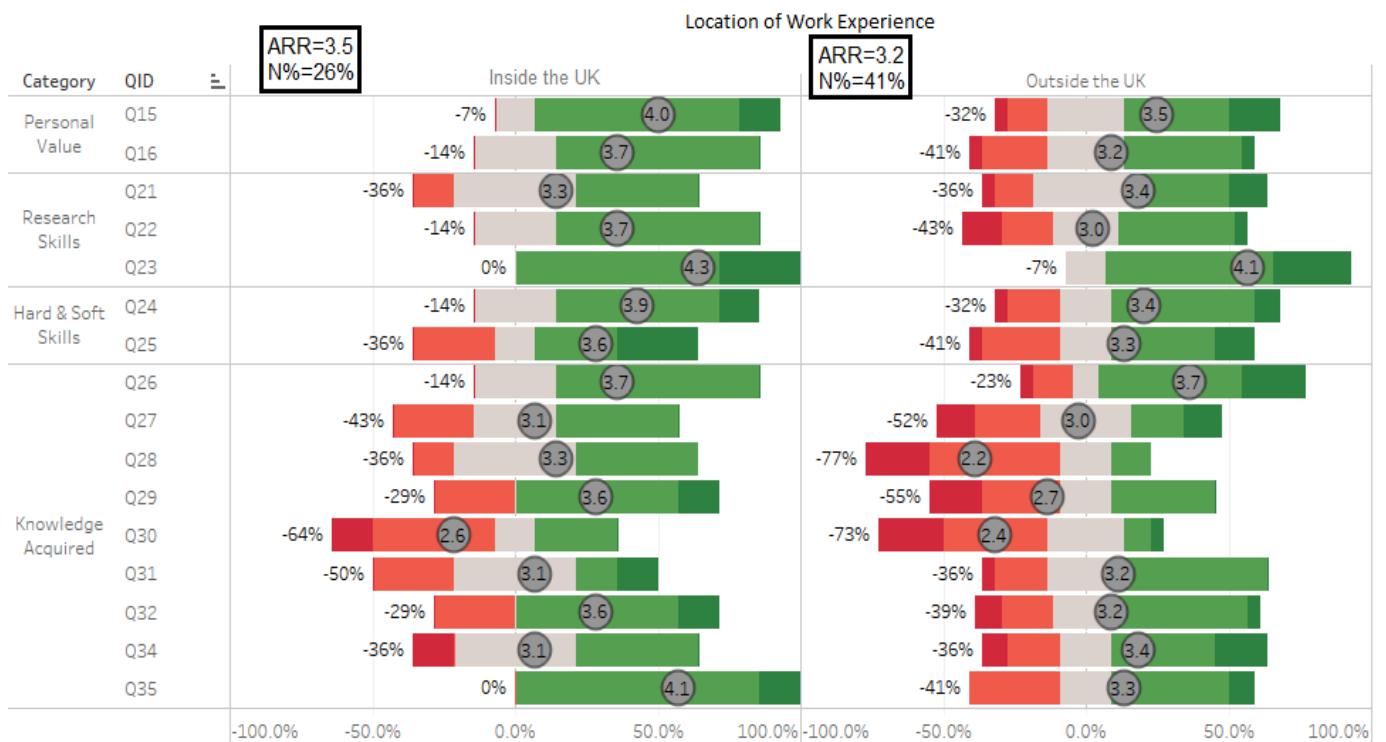


Figure (C3). Case study results, part A, Likert scale questions, categorised and classified based on location of work experience

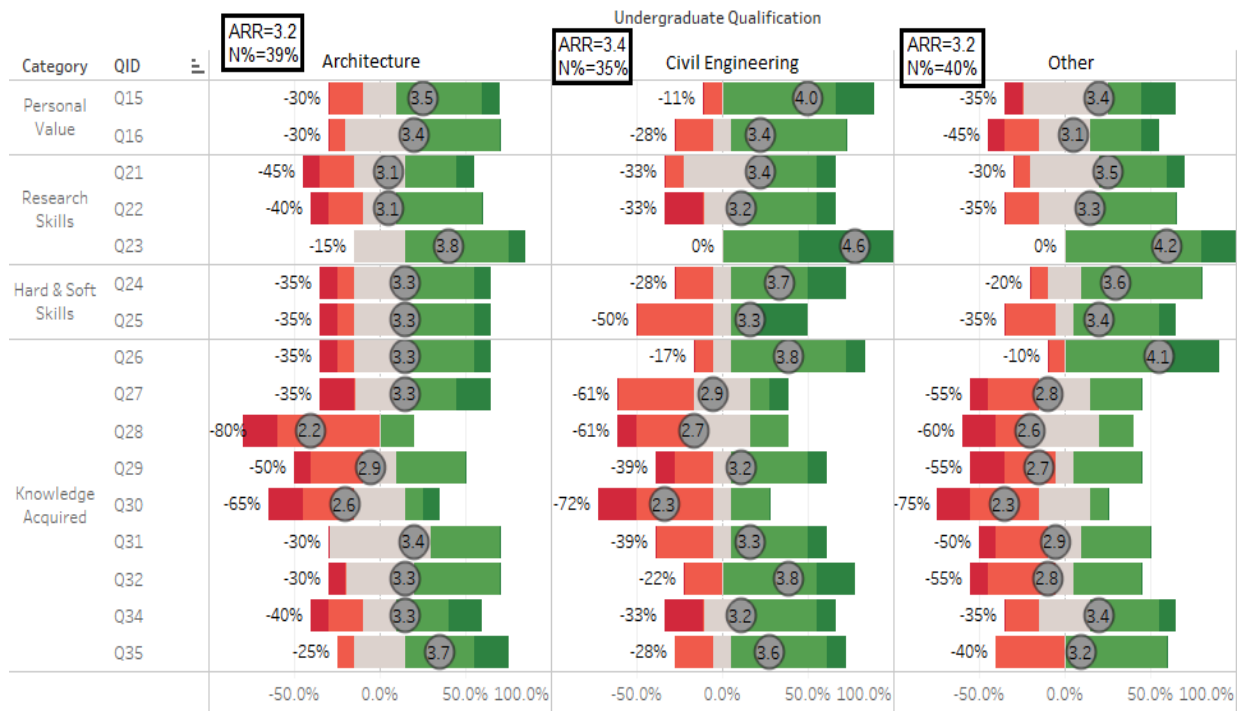


Figure (C4). Case study results, part A, Likert scale questions, categorised and classified based on undergraduate qualification