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An Assessment of Postgraduate Education Needs for Construction Managers

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DECLARATION

I herby declare that the work presented in this thesis towards the award of Masters (M.A.) in Third Level Learning and Teaching is entirely my own work, except where otherwise referenced. This thesis has not been submitted for any academic assessment at this or any other 3rd level institute.

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DEDICATION

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ABSTRACT

Postgraduate education can take on different meanings for individuals. It can be interpreted according to an individual or group of individuals' ontological and epistemological position. The meaning of education and its purpose is not standardised. Education and its purpose is varied and shaped by an individual's experience. This research is an assessment of the postgraduate education requirements of construction managers. It explores the type of knowledge that is considered as essential to the role of a construction manager. It asks industry representatives, academic and professional representatives to rate the importance and relevance of the identified knowledge. The need for this research has been identified by the Department of Construction Management at the Dublin Institute of Technology (DIT) in their strategic plan. The findings of this research have lead to the development and design of a new framework for a new taught masters programme in construction management. The research highlights the need for 21st century construction professionals to evolve and develop, to meet the challenges of an increasing focus on the environment, the economy and technology. A survey based questionnaire was used to assess the education requirements of construction managers. The results of the survey confirmed a need for construction managers to achieve a postgraduate qualification. The newly developed framework acknowledges the need for academic postgraduate programmes to encourage experiential learning and embrace a pedagogy which enables participants to practise and experience the practical elements of construction management in conjunction with the theoretical knowledge which informs and identifies construction management processes.

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LIST OF ABBREVIATIONS

ABE	The Association of Building Engineers
ACEI	Association of Consultant Engineers Ireland
BERA	British Educational Research Association
BRE	Building Research Establishment
CIF	The Construction Industry Federation
CIOB	The Chartered Institute of Building
CIRA	Construction Industry Research Association
CPD	Continuous Professional Development
CSO	Central Statistics Office
DIT	Dublin Institute of Technology
EI	Engineers Ireland
FÁS	Foras Áiseanna Saothair
IBEC	Irish Business and Employers Confederation
IUA	Irish Universities Association
PMI	Performance Monthly Indicator
PPP	Private Public Partnership
RIAI	The Royal Institute of the Architects of Ireland
RICS	Royal Institute of Chartered Surveyors
SCS	The Society of Chartered Surveyors
SEAI	Sustainable Energy Authority of Ireland
SLMRU	Skills and Labour Market Research Unit
SME	Small to Medium Size Enterprise
TCD	Trinity College Dublin
UNEP	United Nations Environment Programme
UK	United Kingdom
WIT	Waterford Institute of Technology

CHAPTER ONE

INTRODUCTION, OVERVIEW AND SUMMARY

1.1 Introduction

Although the Irish construction industry is in decline, the need for continued education in construction remains important because of changes in the environment, the economy and in technology. Before the economic decline one in seven of the Irish workforce were employed in construction (Fitzpatrick Associates, Davis Langdon Consultancy, Talbot Associates, 2003). According to the Skills and Labour Market Research Unit (SLMRU, 2003) the second highest number of personnel (the highest being craft workers) employed in the construction industry assumed the role or parts of the role at varied levels of a construction manager. The report identified that 25% of this occupational group have secondary level or lower qualifications, 32% have higher secondary level or further education training and 43% have third level undergraduate qualifications. With an estimated 32,600 jobs lost in construction at the end of 2007 and a further 49,000 jobs lost by the end of 2008 (DKM Consultants, 2009), education inclusive of postgraduate education for construction managers needs to play an integral part in Ireland's construction industry recovery.

This thesis is an assessment of postgraduate education for construction managers. It explores the opportunities at postgraduate level to reshape construction education. Consideration is given to the argument that construction professionals must be provided the time and space at postgraduate level to consider the impact their industry has on the common good. Ideas and suggestions are explored about how industry's impact on society can be greatly influenced by the way construction managers approach their role. Content and delivery of current postgraduate programmes in Ireland and the United Kingdom (UK) are presented. This data is combined with the questionnaire survey data and used in the design process for the development of a framework for a new postgraduate programme for construction managers.

The construction industry consists of a number of professional disciplines who have evolved independently of each other. Until very recently, individuals who have been educated in a non management discipline tended to assume the roles of a construction manager. Construction management as a recognised profession is relatively recent to Ireland and the UK, and educational programmes dedicated to imparting knowledge specific to the management of constructions projects tend to have evolved from professions such as civil engineering and surveying.

There are numerous third level institutions across the UK offering taught masters in construction management. Variation of content from programme to programme tends to be at a minimum. There are a number of construction industry professional bodies with established Continuous Professional Development (CPD) pathways that recognise undergraduate and postgraduate education as key to reaching the pinnacle of the construction profession they represent. It has proven difficult to find research that concentrates specifically on how postgraduate education in construction management can contribute to the needs of the construction industry. The high number of multi professions either practicing or teaching construction management, adds to the complexity of what industry and academia perceive as important knowledge gain for a construction manager participating in postgraduate education.

1.2 The aim of the study

The aim of this study is to assess the postgraduate educational needs of construction managers and identify a framework for developing an appropriate postgraduate taught programme.

1.3 The research question

The main questions arising from this assessment of postgraduate education for construction managers are as follows:

1. What are the perceived formal education needs at postgraduate level for construction managers in Ireland?
2. How should taught postgraduate programmes for construction managers be delivered?

1.4 Objectives

The objectives of this research are as follows:

1. Carry out desk research into currently available postgraduate construction management programmes in Ireland and the United Kingdom.
2. Build a profile of the types of programmes currently on offer to Irish construction professionals who wish to expand their management skills.
3. Assess the educational values of current postgraduate construction management programmes and determine if the content compares with industry's and general society's needs.

1.5 The need for this study

The research question forwards the hypothesis that in order for a student to attain construction management skills, they need to be subjected to multiple sources and perceptions of knowledge from academics, professional bodies, industry and their own cohort of participating students. Academics are under increasing pressure to re-think their teaching practice and provide participating students with clear learning objectives for each programme. Educational institutions are competing to form close links with industry partners, and as a result, there can be a tendency for programmes to be determined by the perceived customer needs (Gallagher, 2000). Programmes run the risk of being measured by timely completion, student satisfaction, adequacy of resources and attention to the effectiveness of supervisors (Gallagher, 2000). Programme design requires considerable study, as is the intention of this thesis. This research has determined the need for a new postgraduate programme in construction management. The results of this research has lead to the development of a new

postgraduate construction management framework which differs from current programme frameworks and involves a theoretical, practical and holistic approach to educating construction managers.

1.6 Summary of Methods

The following research methods were employed:

1. An analytical desk research survey of existing postgraduate education programmes for construction managers.

Analysis of the desk research requires one to consider if the identified programmes are striving to maintain a balance between technical, strategic, civic and moral aspects of construction management.

2. A questionnaire based survey.

Survey questions were designed to draw specifically on what can be learnt from the experiences of all construction stakeholders, the perceived expectations of construction professionals, and the construction industry opinions towards the effectiveness of postgraduate education for construction managers.

3. The results from 1 and 2 above were combined to propose a new programme framework.

The study interprets from the information gathered, whether the support systems for the managers are encouraging them towards Continuous Professional Development (CPD) or postgraduate education, are there improvements which could and should be made to the existing postgraduate programmes, and is there an argument for the development of a programme which promotes *'different orientations and various profiles in order to accommodate a diversity of individual, academic and labour market needs'* (Berlin Communiqué, 2003, p,4).

1.7 Overview

This thesis provides an overview and critical discussion of the main themes and perspectives within existing postgraduate construction management education. The introductory section outlines: the rational for continuing to educate construction professionals in the field of construction management, the aim of this study, the main questions being researched, the key objectives and the need for this research.

The thesis continues in Chapter two to consult the literature that contributes to current enquiries and research within the field of higher education and the professional development of construction personnel. The literature survey covers the following areas:

- A profile of the Irish construction industry.
- Professional bodies in Irish construction.
- The discipline of construction management.
- The changing environment of a construction manager.
- Learning in higher education.

Chapter three provides some debate around the main differences between education and training. It looks at the education and training models on offer to construction managers in the UK, and on a global scale. It considers if there are education and training models which can be employed or adapted to suit the current needs and future direction of the Irish construction industry. It provides examples of how the Irish construction industry might recover.

Chapter four is an explanation of the research methodologies employed. It justifies the choice of research methods used. Consideration is given to the four important elements that are central to the research process:

- Epistemology
- Theoretical perspective
- Methodology
- Methods

The questionnaire design process is explained and the boundaries of the study established. The limitations, de-limitations and assumptions of this research are clearly defined.

Chapter five provides the desk research and the survey findings and analysis. It links the analysis of the desk research to that of the survey. It provides the basis for the argument that a new programme in construction management is required. It is the start of the design process in the development of this new framework for the proposed programme.

Chapter six is a conclusion of everything discussed and argued in this thesis. It is a reminder of all the essential points made throughout. It presents the proposed framework for a new postgraduate programme in construction management. It refers to the questionnaire survey data, the desktop survey data and the literature review to support the argument for this new framework.

Chapter seven highlights the areas which require further exploration. It provides recommendations in relation to future research. The findings of this thesis lead to the recommendation of a new postgraduate programme in construction management to be established. It confirms the need for closer collaboration between higher education, communities, professional bodies and the construction industry. It recommends the new programme framework as the way forward for all postgraduate programmes in construction management.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

A review of the literature relating to Ireland's construction industry defines the industry profile over a ten year period from 2000 to 2009. Acknowledgement of the construction professions and the professional bodies contributing to the construction industry is provided. The discipline of construction management is explored and an argument for the current and future direction of the construction industry is presented. The context and change in learning at higher education level is examined.

2.2 Irish construction industry profile

The Irish construction industry has played a key role in the development of Ireland's economy. It was one of this country's largest employers, and it was responsible for generating 20% of the country's income. In 2005, the Central Statistics Office (CSO) recorded 89,117 people were directly employed in the construction industry. This number increased in 2006 to 97,484 people directly employed (Central Statistics Office, 2009). At the peak of the construction boom in 2007 the number of people directly employed in construction increased to 260,000 (Central Statistics Office, 2009)

According to Davis Langdon PKS (2006), the structure of the Irish construction industry consists of a large number of small to medium sized companies, many of whom operate on a regional basis, with just 12-15% of the estimated 6,000 construction firms employing more than 20 people.

The accepted European definition for Small Medium Enterprises (SME) is as follows:

- A medium-sized enterprise is defined as:

An enterprise which employs fewer than 250 persons and whose annual turnover does not exceed EUR 50 million or whose annual balance-sheet total does not exceed EUR 43 million.

- A small enterprise is defined as:

An enterprise which employs fewer than 50 persons and whose annual turnover and/or annual balance sheet total does not exceed EUR 10 million.

EU Recommendation 2003/361/EC (micro, small and medium sized enterprises)

Davis Langdon PKS (2006) estimate that, no one company has more than 3% of the Irish market. The Irish construction industry is characterised by a number of smaller companies who operate across both residential and commercial sectors. The practice of larger contractors employing specialist subcontractors rather than expanding their own labour force has become the preferred method of business in Ireland (Davis Langdon PKS, 2006). It is estimated that around 42% of total construction is undertaken by contracting companies employing more than 20 people, with the remainder being undertaken by smaller companies. The industry has faced a number of challenges such as the introduction of fixed price government contracts and an increase in the number of foreign-based firms entering the Irish market (Kelly, 2005). It continues in 2010 to face challenges such as excessive stock on the housing market and the continuation of the current slowdown in construction output in the coming years.

During the first quarter of 2007 the construction output suffered it first decline in 14 years (DKM, Economic Consultants, 2007). This was a direct result of the slow down in new home purchasing and consumer purchasing trends. By the end of 2008, the continued decline in new house registrations combined with the global economic crises saw massive job losses in the construction industry. The Irish construction stakeholders

now more than ever, need to be innovative in their design, manufacturing and construction processes and use the time during this economic slow down to study international best practice developments, with the view to using and adapting them for use in Ireland/Europe. Ireland needs to start collaborating on a global scale to ensure our construction industry can adapt to this ever changing environment.

The Irish Business and Employers Confederation (IBEC) stated in 2000 that the skills of construction professionals and their ability to adapt to the rapidly changing economic environment remain instrumental to the future of Ireland's construction sector for us to have competitive advantage. This argument continues to hold weight in 2010 due to continuing European regulations which are further strengthening the goal of a single market within the EU, coupled with the global market downturn. As far back as 1992 Roche and Tansey argued for the need to increase the '*Irish Skills profile and for it to mirror best European practice*' (Roche and Tansey, 1992, p.151). Construction companies and the Irish Government may now need to reflect on the above arguments of IBEC, Roche and Tansey, and give strong consideration to their merit for future survival of construction in Ireland

The pressures of globalisation mean that in order to remain competitive, the level of skills in Irish construction must also be comparable to skill levels in competitor countries beyond the European Market. At the Lisbon Summit of the European Council (2000), it was agreed that Europe would aim to become "*the most dynamic knowledge based economy in the world, leading to more and better jobs and greater social cohesion*" (Cited in Fitzpatrick Associates report, 2002, p.24). Doyle (2000) stated that the challenge of transforming Ireland's construction industry required an emphasis on business and technical skills, and on areas such as a positive attitude to work, problem solving, communications, flexibility and learning demonstrated on an ongoing basis. This was written at a time when Ireland was coming out of its previous recession. Now that we are in the midst of another recession, it may be prudent to reflect on the merits of the construction industry developing a dynamic knowledge based industry to help withstand future global shocks.

In October 2006 the Skills and Labour Market Research Unit (SLMRU) in Foras Áiseanna Saothair[1] (FÁS) carried out a study for the Expert Group on Future Needs (EGFN). This study found that it is very difficult to be precise about the level of employment market demand for construction related management graduates, as there is no official coded classification in FÁS employment terms. The study went on to find that construction managers fall under a classification known as '*building managers'* and that building managers in 2005 were the second highest number of personnel employed in the construction industry. The evidence from this SLMRU study demonstrates that there is a pool of construction managers who will benefit from further education. This thesis will endeavour to prove any such further education must include a mix of formal and Continuous Professional Development (CPD) at postgraduate level.

In April 2010, DKM Economic Consultants reported there were 132,800 people directly employed in construction. They went on to report that this figure was likely to reduce further because of the complete stop in new house building. The Ulster Bank Performance Monthly Indicator (PMI)[2] in March 2010 indicated that the construction industry decline had begun to slow down. The PMI for March shows signs that increased construction activity is expected to start in January 2011. Future survival of Irish construction companies means they can no longer rely on the domestic market. Companies will need to ready themselves to export their knowledge, expertise and skills to Europe and beyond. A recent Irish Construction 2010 Outlook survey conducted by Mazars (cited in Business & Leadership, 2010) indicates that France continues to have a strong market in commercial property and public sector infrastructure. The findings of this survey suggest that Irish construction companies have a real opportunity to get involved in Private Public Partnership (PPP) projects in transport, social housing and renewable energy. Postgraduate education of construction managers may become part of the strategy for Irish construction companies to ready themselves for the expected European upturn. The arguments from Roche and Tansey (1992), Doyle (2000), Kelly

[1] Training and Employment Authority
[2] The Ulster Bank PMI is a seasonally adjusted monthly index designed to measure the overall performance of the construction economy by tracking output, new orders, employment and prices.

(2005) and IBEC (2000) remain as important to companies seeking guidance on how to survive this recession and prepare for the emerging economy as they did during the last recession and beginning of Ireland's first real economic upturn.

2.3 Professional bodies in Irish construction

There are numerous professional bodies that exist in construction to further individual professions and to protect the interests of their construction professionals and the public they serve. The following is a summary of construction related professional bodies registered in Ireland:

- Engineers Ireland (EI).

They state that their primary role is to be a representative voice of engineering professions in Ireland. They represent all engineering disciplines.

- The Society of Chartered Surveyors (SCS).

Represents chartered surveyors practising in Ireland. These surveyors are in the main practising in property and construction.

- The Association of Building Engineers (ABE).

The ABE represent construction technologists working in the built environment. This includes representing those involved in planning, design, construction and maintenance of the built environment.

- The Chartered Institute of Building (CIOB).

Represent a diverse group of industry professionals. Their membership includes clients who use the services of built environment specialists regularly, consultants, construction managers, contractors, regulation specialists and those involved in research and education.

- Association of Consultant Engineers Ireland (ACEI)

The ACEI was established to represent the business and professional interests of firms and individuals actively employed in consultant engineering.

- The Construction Industry Federation (CIF).

Primarily represents business interests of construction professionals in construction related areas such as home building, general contracting, mechanical and electrical contracting and specialist contracting.

- The Royal Institute of the Architects of Ireland (RIAI).

Represents professionally qualified architects in Ireland. Their membership qualification procedures are recognised in law and in both national and EU regulation, as the required standard applicable to practising architects.

Professional bodies are considered as the catalyst in the development of learned societies in specific disciplines. Professional bodies concentrate on providing their members with the most up to date information relating to their profession, advancing the knowledge of its members, encouraging and enabling their members to maintain high standards and establishing ethical guidelines which ensure professional competence is upheld. Professional bodies encourage student membership and offer opportunities and support. The majority of professional bodies in construction recognise the importance of developing and maintaining standards and policies for education. They actively encourage their members to participate in research such as life long

learning in construction. The result of one such study, led to the development of a framework for Continuous Professional Development (CPD) in construction, under the Minerva European Project titled: EU use of Standards in Competence in CPD for Construction Industry Practitioners (EUSCCCIP). The results of this study led to the identification of a structure for best practice throughout Europe, to be utilised in the development of individual member countries' CPD policies and practice. Browell (2000) suggests there are benefits to higher education becoming involved in CPD such as closer links to industry, and opportunities for funding research. Professional bodies endeavour to act as the voice of its professionals; they strive to identify and when necessary improve on the characteristics that define their members as professionals.

A definition of Professionalism has proven difficult to find, as '*Little systematic attention has been devoted to understanding the topic'* (Fullan and Hargreaves, 1992). Day (1999) defines professional development as *'a process by which, alone and with others,* professionals *review, renew and extent their commitment…'.* Boyt, Lusch and Naylor (2001) describe professionalism as an individual's attitude and behaviour towards their profession. Professionalism is seen as a socially constructed attitude where individuals assert their right for autonomy and accept the consequences of their decisions (Helsby, 1995). The literature on professionalism (Freidson, 2001; Hoyle, 2001; Hoyle and Wallace, 2005) identifies its characteristics as having a distinct body of knowledge, established regulation to entry, service to the public and mutual recognition. The institute of professional development provides the following definition:

> *The systematic maintenance, improvement and broadening of knowledge and the development of personal qualities necessary for the education of professional and technical duties throughout the practitioner's working life*
>
> (Institute of Professional Development, 2008)[3]

[3] The Institute of Professional Development http://www.trainingzone.co.uk/icpd [Accessed Sept 08]

These definitions confirm that professional development is centred, self directed, independent learning. The challenge is in identifying what is governing individuals' decision making. Is it the need to meet with Continuous Professional Development (CPD) assessment criteria of their professional body or the need to sustain and develop their abilities as a professional.

The professional institutes in construction have given measured consideration to performance criteria which enables them to assess the level of provisional skills of an individual. The professional bodies in construction have formed the opinion that those who embark on a career in construction management, need to be provided with direction on how best to develop and improve on their professional skills effectively. Professional institutes and educationalists must remain cognizant that personal beliefs about how knowledge should be acquired, directly influences an individual's understanding, ability to solve problems and to learn, and is often the rational for their professional behaviour (Hofer and Pintrich 2002; Schommer, 1994).

With a high level of exposure to various levels of learning experiences, professionals often find their personal beliefs change as they gain more insight into their personal learning processes and motivation (Buehl and Alexander, 2001). Knowledge and understanding of one's personal learning styles encourages continuous learning at both work and college (Koller, Baumert and Neubrand, 2000, cited in Müller, Rebmann and Liebsch, 2008, p.92). Davey, Powell, Cooper and Powell (2004) state that programmes of learning aimed specifically at people in the work place need to be tailored to meet with individual needs.

The supporting evidence of how construction defines professionalism comes in the form of established guidelines set out by chartered institutes, such as the Chartered Institute of Builders (CIOB) who look for evidence of problem solving, leadership, developing teams, managing work quality, responsibility for others, acceptance of responsibility, managing resources and sharing knowledge. Other construction related chartered institutes, such as the Royal Institute of Chartered Surveyors (RICS), the Society of

Chartered Surveyors (SCS) and Engineering Ireland (EI) place a similar emphasis on individuals providing evidence over and above achieving their primary degree. The SCS for example, have identified that professionals need to demonstrate the ability to manage organisational resources, decision making and the overall management of a team. The CIOB have interpreted professionalism by adopting practices which ensure its members achieve quality and maintain high standards.

> *Chartered members are amongst the most highly regarded professionals working throughout the international construction industry. Our membership represents the wide diversity of roles within the construction industry and promotes the delivery of high work standards and values.*
> (Chartered Institute of Builders, 2008)

Routes to membership for professional bodies involve a regulatory professional review which all applicants must undergo before being awarded the status of full membership. The professional review focuses on occupational competence, management competence and commitment to professionalism.

2.4 The discipline of construction management

According to Ashworth (2009), construction management as a discipline was not taught as an undergraduate degree in the UK and Ireland until the late sixties. He maintains that those charged with the delivery of construction education, believed that the focus at undergraduate level should be on building technology and construction management principles taught at postgraduate level. Langford (2009) contends the role of construction/building management was evident in ancient Chinese, Egyptian, Greek and Roman culture. He believes that it was during the era of the industrial revolution that the practice of construction management was developed. The management skills developed during this period are still very evident today.

The role of a construction manager is best described as the person with responsibility for the management of change. The construction manger manages construction projects which have a definite start and finish date, and it is his/her responsibility to identify and

meet milestones at key stages of the allocated time. The CIOB define the manager of construction projects as the person who has overall responsibility for planning, control and coordination, budget, timing and that the quality of build meets with client's stated requirements.

Construction management has developed over the years into a variety of roles concerned with the different phases involved in a construction project. It is not unusual to have a number of construction managers on one site with responsibility for specific areas of the site. They schedule and coordinate all design and construction processes, including the selection, hiring, and overseeing of contractors. They meet regularly on site to co-ordinate and communicate progress of their areas; normally they do not physically partake in any actual assembly of the build. Construction managers determine the best way to get materials onto site, and are charged with the development of the most cost-effective plan and schedule for completing each construction phase. They divide all required construction activities into logical steps, estimating and budgeting the time required to meet established deadlines. Construction managers need to understand terms and reference of contracts, be able to read plans correctly, understand the implication specifications have on the project, and ensure all personnel are working on site in accordance with current building regulations.

Practical construction experience is considered very important for becoming a construction manager. This can be obtained through work placement during undergraduate study, progression from a construction related trade, or from other construction related profession. The construction process is considered to be dynamic and complex because its project-based nature is individually tailored to meet client specifications (Raiden and Dainty, 2006). The role of the Construction Manager has become increasingly complex, and employers are now recognising the need for more of their managers to become educated in technologies specific to the effective and efficient management of construction projects. According to Egbu and Robinson (2005), the construction industry is constantly having to adjust to economic change, seek out new markets in the global economy, deal with increasing competition for fewer projects,

keep abreast with and be informed of the impact technology will have on their business model, and adhere to new and increasing demands from clients and society.

Langford (2009), states that the boundaries of the discipline of construction management are much broader than the boundaries of the profession of construction management. He supports this argument by pointing out that a profession is *'clearly a body of knowledge which has been gathered to ensure an evenness of standards of services to the public…*' (p.1*),* and that members of a profession are required to act at a recommended level of competence in the specific profession. The discipline of construction management is expected to *'span over several professions and conjoin with other disciplines'* (Langford, 2009, p.1). Construction management remains distinct from each of the other disciplines it joins, such as architecture, planning, surveying and engineering.

2.5 The changing environment of construction management

Construction companies have moved away from the pyramid type management structure, where the decision makers are situated on the top and the implementers are at the bottom. Today, the construction industry operates to a team based, decentralised, decision making and implementation business model (Meister, 1998). Clusters of smaller, self governing, site specific units are more efficient in the time it takes to deliver a service to customers compared to the slower hierarchy decision making process (Meister, 1998). Construction companies are structured to the extent that there are now fewer mangers with authority over workers and have instead created teams of workers with more line management responsibilities. The old psychology of work hard and be a good time keeper and you will have a job for life, has changed dramatically. Today, workers are expected to build up a work/career related portfolio, continually develop with technological advances and remain efficient for the sake of the company's competitiveness. This new psychology will ensure employees can gain employment with any company working within their field. The perception is, that by changing the

psychology from employment for life to the development of employability skills, the employees take responsibility for their own careers.

Construction employees are expected to take an active and constructive role in how they conduct their tasks. They are no longer required to continue to do a job as per instructions, but they must now think about improving on the processes, by analysing, asking questions, getting full clarification on issues they have yet to understand and become creative thinkers when looking for more cost effective options for the delivery of a product or service. They must be willing to experiment with new ideas and use opportunities such as interactions with co-workers or customers to build on their existing knowledge. In order for companies to remain flexible enough to adapt to and meet the demands of a changing market, the emergence of self governing teams within these companies have become more prevalent. Individuals not only need interpersonal skills such as effective communication, but they now must have the ability to work with and as a team. These teams must be open, transparent, and sharing best practice processes across the organisation. Construction employees must now be able to make decisions at a local level and justify how these decisions improve on the overall performance or solve an unexpected problem (Meister, 1998).

Atkin (2009) believes that the discipline of construction management is at a crossroads. The route or routes this profession choose to follow will determine the long term survival of this discipline. It is his belief that the construction industry could begin to lead the way by converting their business models into environmental based business plans. Climate change is an accepted reality. The debate around it, being a natural phenomenon or brought on by other factors is still ongoing. Governments have agreed and committed to reducing the carbon footprint of their nations. With construction companies and their clients adopting an environmental business ethos, the role of the construction manager will need to add value to the life cycle of the building projects they are charged with long after the building is complete. Existing building stock will need upgrading to assist in the reduction of carbon production. Atkin (2009) argues that the future role of a construction manager will require this profession to extend their

knowledge into science and engineering. He contends the current position of design and build will need to shift to a greater emphasis on design, build and operational/life cycle. He points out that the expected increase in global temperature over the next 30 years may mean retrofitting of existing stock will no longer be an option. *'Replacement and refurbishment of the building stock on a massive scale will accelerate over the coming decades'* (Atkin, 2009, p.143). The client will want to see how their building project will contribute to savings (financial, carbon and other) over its life cycle.

2.6 Learning in Higher Education

Providers of higher education are currently debating key issues which surround the reasons for implementing skills development into their existing programmes. Higher education providers internationally, are experiencing higher numbers of students participating on programmes. This increase in numbers has led to increased competition for graduates looking for employment in their profession. It is generally accepted that potential employers consider undergraduate awards as a means to provide them with a measure of an individual's attributes.

The Irish Universities Association (IUA) in October 2005 produced a report titled: *Reform of 3rd Level and Creation of 4th Level Ireland: Securing Competitive Advantage in the 21st Century,* which states that Ireland's future economy will be grounded on knowledge. The report suggests that universities must change in order to produce a new level of innovative undergraduates. The IUA strongly believes that these newly produced innovative graduates will progress into postgraduate programmes. The IUA stated in their 2005 report that '*through a reformed innovative 3rd level, the universities will produce a new breed of entrepreneurial 3rd level graduates entering and improving the workplace and the wider society*' (p.3). The IUA have identified the need to develop flexible, innovative and responsive programmes of postgraduate education incorporating skills development, and strong links with external stakeholders featuring strongly.

The postgraduate *'can be considered to be the pinnacle of student academic achievements'* because it proves the student has gained the ability to apply a wide range of skills at a consistently high standard (Fallows and Steven, 2000, p.5). In the past, postgraduate graduates *'have often undertaken this qualification with the express purpose of gaining entry to often very limited job opportunities'* (Fallows and Steven, 2000, p.5). With today's economy and the development of knowledge economy populations, people are required to be flexible, embrace change and partake in life long learning, thus making it all the more important for higher education systems that provide programmes encompassing well rounded education for its participants.

Such programmes will still need to recognise and incorporate basic education philosophical theories such as:

- How people learn (Gardiner's multiple intelligences).

There is no universal agreement as to what constitutes intelligence. What is clear is that as human beings we exhibit a broad range of intelligences. Human intelligence is often regarded as a single *general factor*, but can also be considered as a set of *special abilities* (verbal, spatial etc.), or multiple intelligences, after Howard Gardner. His theory set out to establish that rather than a single form of intelligence as a measure of a persons intellectual abilities, multiple intelligences allows for a broader range of human potential. Today higher education benefits from a more diverse and challenging student group, and as a result has in itself become a more rounded form of education. Gardner's groundbreaking research and theory on the nature of human intelligence and educational processes have altered the ways in which psychologists and educators view human intelligence and creativity. It offers an alternative to the view of intelligence as unitary and fairly stable, encouraging instead a focus on developing particular individual capabilities to their highest potential (Barlett, Burton and Peim, 2002, p.155).

- Social Learning (Piaget, Vygotsky and Bandura).

Social learning is learning by copying others; by observing behaviours, attitudes, and skills within a social environment (Stones, 1996). Social learning theory has become more cognitive since the 1970s, and can be considered a bridge or transition between behaviourist learning theories and cognitive learning theories (Rutledge, 2000). Bandura maintains: '*Thoughts are always influencing actions, and actions are always influencing thoughts'* (cited in Gage and Berliner, 1998, p.241). Research has recognised that people learn more successfully by experience, either by practice, or reading about experiences (Reece and Walker, 2003). Reece and Walker (2003) suggest that the learning process should be considered in three phases; experience, reflection and specific learning. Illeris (2004) maintains in his three dimensional model of learning, that learning is (1) a social process taking place between the individual and its surroundings, (2) the cognitive process which is responsible for the acquisition of content and (3) the emotional process which is involved in all learning.

- The value of community learning and how such learning can be created and nurtured in a classroom environment. (Wenger, Lave, McDermott and Snyder).

Working with the assumption of learning being social and deriving largely from our day to day experiences, Lave and Wegner (1991) developed their model of situated learning which proposed that learning involves the process of engagement in community practice. They argue that community learning takes place at work, home, school, college and during civic or leisure pursuits. Their theory suggests that it is human nature for us to be constantly in pursuit of some form of enterprise, at any given time. This pursuit of enterprise can range from basic survival to pleasurable highs. As these enterprises are defined, individuals will engage as core participants or peripheral participants and interact with each other and the world. It is this interaction and the tuning accordingly of the relationships with each other and the world, during the pursuit of an enterprise

that activates the collective learning. According to Etienne Wenger (1998), a community of practice defines itself along three dimensions:

1. What it is about – its joint enterprise as understood and continually renegotiated by its members.
2. How it functions – mutual engagement that bind members together into a social entity.
3. What capability it has produced – the shared repertoire of communal resources (routines, sensibilities, artifacts, vocabulary, styles, etc.) that members have developed over time.

A community of practice involves much more than the technical knowledge or skill associated with undertaking some task. Members are involved in a set of relationships over time (Lave and Wenger, 1991), and communities develop around things that matter to people (Wenger, 1998). The fact that they are organising around some particular area of knowledge and activity gives members a sense of joint enterprise and identity. For a community of practice to function, it needs to generate and appropriate a shared repertoire of ideas, commitments and memories. It also needs to develop various resources such as tools, documents, routines, vocabulary and symbols that in some way carry the accumulated knowledge of the community.

- The preparation of students to be active participants rather than passive recipients. (Engeström, Y., Miettinen, R. and Punamäki, R -L).

Using third generation interpretations of activity theory, Engestrom developed a general framework used to conceptualise human activities. This framework provides a clear description of how people learn and society evolves from a naturalist's perspective. Engestrom's (2001, 2004) social perspective of learning, addresses learning, knowledge production and expertise, as skills that are constructed and forced to change as a result of multiple interactions with and across communities of practice. His proposal relating to the processes of learning incorporates the activity theory as the base concept. Engestrom's aim is to explain and identify what he terms as *'expansive learning'*. He

develops this theory by drawing on Bateson's (1972) theory of learning, and in summary proposes expansive learning takes place as a collective endeavour through questioning/reconstruction.

It is equally said (Eisenstadt and Vincent, 2000; Ravenscroft, 2001; Tam, 2000) that educational philosophy must recognise the factors that are contributing to its growth in popularity. Factors such as:

- The growing necessity for lifelong learning.

The task force on lifelong learning established by the Irish Government in 2002 states that developed economies have moved into post industrial development phase. The report outlines how the emphasis is now on the ability to acquire knowledge, skills and competencies in an environment of constant change. The emphasis on lifelong learning is being further promoted by initiatives such as '*Europe of Innovation and Knowledge'* launched in 2000 at the Lisbon European Council and built on at subsequent Councils. According to Lynch (1997) the creation of wealth is no longer solely dependent on land, labour and capital as traditionally defined. Ireland is becoming more reliant on a knowledgebased economy because it continues to lack the industrial infrastructure that underpins more powerful economies (Lynch, 1997). If Ireland is to develop knowledge as a form of capital, it needs to develop education as a sound infrastructure.

- The development of upskilling work practices.

There is an increased interest from employers, researchers and policy makers on the question of what constitutes learning and how it is facilitated in the workplace. Reeve and Gallacher (1999) state that learning in the workplace *'is seen as a flexible form of learning which enables employees to engage in the regular process of up-dating and continuous professional development…'* . Ashton and Sung (2002) argue that learning/upskilling in the workplace will increase individual performance and productivity. Others contend learning/upskilling in the workplace gives greater job satisfaction and self fulfilment while potentially facilitating a policy of a socially and

equally inclusive society offering better jobs to a skilled, knowledgeable and flexible workforce (Matthews, 1999; Senge, 1991).

Traditionally, higher education undergraduate and postgraduate taught programmes have been developed using lecturer centred learning inputs. In recent years, higher education has adopted a more student or learner centred approach by introducing modular programmes with defined learning outcomes which seek to describe the students learning progress in terms of knowledge obtained and the ability to use that knowledge. Higher education programme developers have begun to ensure, the module descriptors are designed in a way that the postgraduate students can engage with the knowledge and skills being presented. The design of a module for Level 9 postgraduate taught education may pose complex pedagogical challenges that might require a built in evaluation process which enables the educator to improve on and further develop a range of materials that support student learning. Engaging in an evaluation process affords the postgraduate student and lecturer the opportunity to contribute to the effectiveness of the programme. Programme developers have begun to appreciate that postgraduate students will bring to any programme of learning, some knowledge, understanding and experience of previous education, and this will influence how the postgraduate student makes sense of the material presented and how they will go about studying it. Postgraduate students will participate in a module with their own established form of study habits which may be inappropriate for achieving the expected competencies established by *'the relevant community of scholars and/or practitioners',* (Bologna Process, 2004, pp.65-66).

2.7 Summary

A review of the literature relating to how the construction industry developed and contributed to Ireland's economic growth during the period from 2000 to 2009 was discussed. Consideration was given to the evidence uncovered relating to the high number of recently unemployed, and the still large number of employed construction professionals who have yet to attain a postgraduate qualification in the discipline of

construction management. A review of the currently available reports demonstrated that the Irish construction industry has projected and is planning for an increase in construction activity to commence in January 2011. Some reports have indicated that the Irish construction industry can no longer rely on the indigenous market alone for future survival over the long term, but must now prepare itself to compete on the global market. The reports emphasised that the future of Irish construction included the exporting of their knowledge, expertise and services.

The literature pertaining to the purpose and function of chartered professional bodies was considered and conclusions drawn. The literature established that the main role of a professional body was to further the knowledge and professionalism of the individual discipline they represent and protect the interests of both the professionals and the public they serve. The available literature provided an overview of the number of professional bodies established to represent the multi disciplines working in construction. The idea that the discipline of construction management could span the multi professions of construction but still remain distinct, was put forward by Langford, (2009), a modern contributor to the education of construction managers. Further research literature established the commitment professional bodies have to education and Continuous Professional Development (CPD). The literature review revealed the establishment of a European wide best practice CPD framework for the adoption and utilisation of all member states.

The definition of professionalism proved to be consistent among the identified professional bodies representing construction professionals. Consideration was given to the established membership criteria set down by the identified bodies. Education and CPD were identified as an integrated part of progression and maintenance of the varied levels of membership. The literature unveiled a question which will need future research relating to the motivation behind construction professionals partaking in CPD and education programmes, upon completion of their undergraduate qualifications and entry onto the next rung of the professional body membership ladder.

Past and future roles of the discipline of construction management were debated. The constantly changing environment of construction was attributed to the evolving role of a construction manager. Factors such as the earth's environment, advancing technology and a decreasing global demand for construction are seen as current reasons why Irish construction companies must re-invent their existing business models and why with the increase in knowledge workers, professional autonomy of individuals or groups of individuals is increasingly becoming the norm.

The literature relating to learning in higher education is expansive and has had many expert contributors to the debate down through the years. The literature reviewed for the purpose of this thesis was kept within the boundaries of issues directly relating to the education of postgraduate students, who for the most part, tend to be adults returning to education, having been away from formal education gaining work experience since graduating with their undergraduate degrees. The literature confirmed the established viewpoint which relates to the idea that Ireland needs to develop education as its primary infrastructure in the creation of future national wealth. Consideration was given to the modern day theorists shaping Ireland's current higher education. Finally, the main national and European policies affecting how construction companies will need to conduct their business in the future and how higher education to construction professionals have the tools and accepted philosophical theories to keep pace, were identified.

CHAPTER THREE

EDUCATION AND KNOWLEDGE GAIN IN CONSTRUCTION MANAGEMENT

3.1 Introduction

This chapter provides an overview of education, the growth of construction management as a discipline and discusses sources of knowledge gain available to construction managers in Ireland, United Kingdom (UK) and internationally. A discussion around how higher education can contribute to future growth and subsequent turnaround of the Irish construction industry is initiated.

3.2 Overview of education and training

Education for adults can be split into technical, vocational and non-vocational such as humane studies and personal development. Education attempts to provide a '*ladder at different levels through which a man or woman could rise through their trade or profession'* (Merricks, 2001). There are many views and answers about the purpose of adult education, and these answers tend to be reflective of the current economic and cultural society. Vocational education or training is directly related to enhancement of the economy and is seen by the student primarily as individual gain, but it has more general advantages to companies and the wider society. Non-vocational education tends to concentrate on the idea of citizenship and the self development of individuals for the greater good of society. There has been a change in non-vocational or knowledge education from being only open to the elite through full-time formal education, to being accessible to the common work force through part-time modules. The primary degree was the ultimate for the professional but has become the first requirement for a job, and it is the professional development and further training through non-traditional methods of education that seems to empower this new concept of a knowledge work force.

Modern educationalists are beginning to agree more and more that acquiring knowledge through formal education and training or informal education and training, are equally accepted forms of knowledge gain. The modern educationalist views these approaches to learning as different paradigms of learning, each having different epistemological assumptions and beliefs about knowledge and knowing (Beckett and Hager, 2002; Hager, 2004). Formal learning is defined as operating through a standard paradigm of learning and is broadly defined to include schools and higher education institutes. Hager (2004) contends formal learning involves the learner as an object being taught, the learning is almost exclusively an individual activity and it is considered and understood to be a process to acquire knowledge. Hager (2004) notes that the views of some who consider the standard paradigm of learning to be the most desirable form of learning and that learning which occurs outside of the higher education setting, is considered as inferior. Theories of learning that differ from the standard paradigm have been termed by Hager (2004) as emerging paradigm of learning. Informal or everyday learning which can be found in the family, the community and the workplace is more social, and moves the individual away from the centre of focus (Engestrom, 1991, 1994, 2001, 2004; Lave and Wenger, 1991; Wenger, 1998). The emerging paradigm theorists argue that learning is fundamental to human activity; it is situated learning and occurs through a processes of taking part in communities of practice. Hager (2004) refers to the alternative of the standard paradigm as emerging due to the diverse range of critical writing, and the fact that the main theorists see informal learning not as a paradigm but as something that is fluid and continually reconstructed.

Since the early seventies, the United Kingdom (UK) has been debating about the difference between education and training in construction. Ashworth (2009) confirms that there are those involved in the teaching of construction at higher level that do not pay much attention to either terminology. There is a common consensus among UK, Irish, and European construction professionals that both formal knowledge gain taking place in the classroom environment of the higher education institutes and the informal knowledge gain taking place in the work place environment, are not only necessary, but also need to be lifelong pursuits (Murray, 2009).

In recent years, learning at work has begun to receive the same recognition of quality as conventional learning in some of the higher education institutes. Companies have established centres of learning within their own organisational structure. Human Resource (HR) managers have begun to research the direct impact, learning at work has on their business. Educationalists and HR managers, who are equally interested in learning at work, need to communicate more with each other and establish a common language which both sides can relate to. Organisations are looking for more and more flexible learning modules which take place in the work place and provide recognised qualifications. Learning and education must not be left to one organisation or educational institution. Educationalists, be they working direct for industry or for an institute, have a duty of care to '*foster the development of the whole person and foster civil society, not just simply invest in skills and knowledge required for work'* (Boud and Garrick, 1999, p.5). Employers must consider investment into educating and look at their employees as an investment, not only in present abilities but equally as an investment in the employee's future ability.

3.3 The global influences and contributing sources of knowledge gain to construction management

The growth of construction management undergraduate education in Ireland over the past 10 years is an indication of how the industry is constantly evolving. As the demand for new construction in Ireland rose, the need for more sophisticated and large scale projects also increased. Due to the close links established between the Irish higher education institutes and the CIOB, and the fact that the CIOB have established an Irish branch, education of construction managers in Ireland and perhaps the rest of Europe, tends to mirror what is happening in the United Kingdom (UK). While Ireland has a number of CIOB recognised undergraduate degrees in construction management, it lacks taught postgraduate programmes specialising in construction management. Irish construction management undergraduates tend to progress into postgraduate programmes being taught in the UK, or they undertake a research based construction

management masters or taught non-construction management related postgraduate programmes (evidence revealed in Chapter 5 survey analysis).

The UK has been delivering programmes specifically for construction management since the mid sixties. Ashworth (2009) highlights the ongoing debate among educationalists in the UK, that construction management should be taught at postgraduate level, and the discipline of building technology should be taught at undergraduate level. He confirms that leaving the discipline of construction management to be taught at postgraduate level is also favoured in the United Sates of America (USA), but because of public perception of building not being a worthy discipline of study in higher education, it is felt programmes with the word management in the title are deemed more attractive to potential undergraduate students (Ashworth, 2009).

The discipline of construction management in terms of education, research and practice has advanced globally. Murray (2009) believes that the UK and the USA were major contributors to the spread and growth of the discipline. Graduates from UK and USA programmes returned to their countries of origin in Asia, Africa, Latin America and the Middle East to become academics and researchers in the field of construction management (Langford, 2009). Since the deregulation of a tightly controlled state education system, the Arab world has seen an influx of European, American and Australian academics establish private institutes, or collaborate with existing state owned ones to introduce programmes in construction management (Dulami, 2009). In the Caribbean region, the discipline of construction management has been influenced by internal developments within the faculty of engineering in the University of the West Indies (Lewis, 2009). These developments were largely a result of changing academic philosophies within the University, and UK trends (Lewis, 2009). Serpell (2009) contends that a visit from Professor Clarke Oglesby of the University of Stanford to the University of Chile brought about their first construction management programme in 1966. Continued reading of the growth of construction management around the world, confirms the influence both the USA and the UK have had on its direction. Equally, in

the majority of cases, the discipline was introduced in school/faculties of engineering and proved to be instrumental in aiding the progression of each nation's construction industry, as the demand for building increased and became more sophisticated (Dulami, 2009).

Murray (2009) makes the argument that an '*efficient and effective construction industry requires a knowledge bank'* (p.51) to ensure there is continuous improvement. Discipline specific research with its findings being published in accepted peer review journals is seen as an integral part of contributing to this much needed 'knowledge bank'. Fitzgerald and Gunter (2008), maintain that such journals are a highly transparent method of establishing the intellectual boundaries, under the watchful eye of the construction practitioners. Gann, (2001) believes that there should be closer collaboration between higher education and industry in the carrying out of research and development in the discipline of construction management. Murray (2009) believes that as things stand presently, there is a divide, whereby academics are on one side contributing to research and development. The academics are co-authoring papers among themselves and failing to invite industry peers to contribute. This is resulting in a substantial lack of papers co-authored by academia and industry. Murray (2009) confirms that efforts are being made by organisations such as the Building Research Establishment (BRE) and the Construction Industry Research Association (CIRA) to bridge the gap between industry and academia in an effort to produce more collaborative contributions to the' knowledge bank'.

3.4 How higher education can contribute to the recovery of the construction industry

The literature review established the fact that climate change is inevitable. Rather than invoke a debate on what, why and when the cause of climate change can be attributed to, the focus was directed towards the documented agreements made by the established economies to commit to meeting reductions in the production of carbon (C02). The policies adopted by our developed economies to assist them reach their targets in the allocated time frame is the move towards environmentally friendly practices. A report

commissioned by the United Nations Environment Programme (UNEP, 2008[4]) suggests that a successful strategy to a green economy involves working out the environmental and social cost of energy and materials, in order to discourage current unsustainable patterns of production and consumption. The strategy of pricing work in terms of environmental and social costing is very much opposite to one where companies compete on value for money. Higher education can support industry, as they begin to unlearn traditional procurement pricing and relearn pricing that competes socially and environmentally. Higher education could be instrumental in supporting companies cross over into the green economy, by teaching them how to compete on quality, social and environmental cost, sustainable materials or materials produced using sustainable energy manufacturing technology and the education of a labour force with green technology skill sets.

According to the UNEP (2008), some data on green employment specific to the building sector already exists, but they tend to be small snapshots of a particular project or country, rather than a more comprehensive picture of the building sector. An example of a green/sustainable building project reported by the UNEP is the retrofitting program serving 342,000 apartments, instigated by the German Alliance for Work and the Environment in March 2006.

Over a 3 year time period the initiative created 25,000 new jobs while at the same time retaining a further 116,000 jobs. Increased levels of public-private spending resulted in an estimated 145,000 additional service jobs being created to complete this building retrofit program. As a result of their studies, the UNEP have produced table 3.1 showing future green job predictions world wide. As referred to earlier the green economy is becoming more of a reality as governments attempt to reach agreed carbon reduction targets.

[4] Green Jobs: Towards decent work in a sustainable, low-carbon world September 2008, United Nations Environment Programme

Country or Project Description Projected Jobs	Country or Project Description Projected Jobs	Country or Project Description Projected Jobs
Canada	Retrofit municipal buildings on a national scale	5,600-7,840 full-time equivalent
European Union	European Commission Study: 20 percent reduction in EU energy consumption. European Trade Union Confederation Study: 75 percent reduction of CO2 emissions in the residential building sector	1 million 1.377 million by 2050 or 2.585 million by 2030
India	Replacing traditional cook stoves with recently developed biomass cooking technologies for 9 million households	150,000
United States	Apollo Alliance Study: $89.9 billion investment in financing for green buildings, providing tax incentives, investing in research and development, and promoting new building codes and standards. U.S. Department of Energy: Standards on clothes washers, water heaters, and fluorescent lamp ballasts	827,260 120,000 through 2020

Table 3.1 (UNEP) Job Projections from Energy-Efficiency Measures in the Building Sector

The predicted jobs that are to be created in a green building economy and the retrofitting process include green designers, architects, auditors, engineers, estimators, project managers, and various jobs in the construction trades, such as plumbing, carpentry, joinery, plastering, painting and decorating, refrigeration/air-conditioning and

general construction labourers, among others. These jobs are created during the initial construction or investment periods and are likely to be local jobs, which could be especially beneficial to Ireland's current high unemployment in construction. The UNEP study goes on to state that much of what is needed to convert the building sector in to a green economical business can be done on the basis of existing technology with little or no net cost to the industry.

In Ireland, the Sustainable Energy Authority of Ireland (SEAI) state that is their mission to '*play a leading role in transforming Ireland into a society based on sustainable energy structures, technologies and practice'*. Should the Irish government, Irish society and in particular the Irish construction industry consider the SEAI proposal to develop Ireland's renewable energy sources, the future of the Irish economy and its construction industry might be in a position to secure construction workers jobs. Construction workers will need help from higher education to take the opportunity to transform their skill sets, work methods and profiles into sustainable and green technology based expertise.

The SEAI have initiated the first step by providing a *'multi annual national energy retrofit programme that will transform Ireland's building stock'*. The plan is to transform all of Ireland's building stock into *'energy positive'* buildings. The SEAI believe this can be achieved by developing new building standards and stronger building regulation. The SEAI has pledged to fulfill its role as an advisory body by encouraging the Government to play a key role in creating mandates and standards, increasing research and development funds, and providing financing incentives.

3.5 Summary

An accepted broad definition of adult education and training was explored in the hope of finding one which agrees with the construction manager's epistemological viewpoint. Consideration was given to the views of modern day accepted theorists, who interpret both formal education and informal education or training, as learning or knowledge gain and therefore warrants mutual recognition.

This led onto acknowledging how workplace learning for some higher education institutes has become an integrated and essential part in the delivery of construction management education. The continued growth of construction management education on a global scale was discussed, and acknowledgements given to the heavy influence academics from the UK and USA have had on this discipline's proliferation.

The idea of creating a knowledge bank in construction management was considered to be important in the continued evolution of this discipline. Sources of knowledge in the form of peer reviewed published papers informing all construction management practitioners of the latest research and development findings, was highlighted. The need for greater collaboration between those who work in industry and those who teach and study the discipline, was emphasised. Acknowledgment was given to some of the established institutes attempting to act as mediator, by bridging the gap to create joint academic and industry published work.

In the introduction of this thesis, a statement was made in relation to higher education playing its part in returning the construction industry back to being a growth industry. An example was given, showing how Germany instigated a pilot project to retrofit domestic dwellings to a standard that will help Germany meet its target carbon reduction. The knock-on effect of this pilot scheme demonstrated how such initiatives can stimulate the local economy and create long term sustainable jobs in construction. The companies who tendered for the retrofitting work in Germany won them on the bases of environmental rigour, and not on value for money. Industry will need assistance to adjust to the ideology of a green economy; higher education has existing

resources and global connections to be the front runner in assisting industry. The resultant research findings of the German retrofit scheme lead to the predicted job growth over the next 20-30 years in construction, in countries such as Canada, Europe and USA, as they tackle their need to reduce carbon production.

CHAPTER FOUR

RESEARCH DESIGN

4.1 Introduction

The purpose of this chapter is to provide an overview of the research design and to outline the following:

- Research Method

The procedures used to gather and analyse the data relating to the postgraduate education needs of a construction manager (Crotty, 1998).

- Research Methodology

The strategy, plan of action and design behind the choice of methods and the particular form in which the methods are employed (Crotty, 1998).

- Theoretical Perspective

The philosophical stance informing the methodology and providing a context for the process (Crotty, 1998).

- Ontology

Reality is subjective and multiple, as seen by participants in the study. The researcher uses quotes and themes in the words of the participants and provides evidence of different perspectives (Creswell, 2007).

- Axiology

The researcher acknowledges that research is value-laden and that biases are present. The researcher openly discusses values that shape the narrative, and includes their own interpretations in conjunction with those of the participants (Creswell, 2007).

- Epistemology

The theory of knowledge embedded in the theoretical perspective and thereby in the methodology (Crotty, 1998).

In this chapter, justification is provided on the choice of population for survey questionnaire. Analysis of the desk survey data and of the questionnaire survey are defined. Details of the questions within the questionnaire and the rationale for asking them are provided.

4.2 Research method

Survey research methods were employed for this research. Firstly, a desktop survey of currently available postgraduate construction management programmes in Ireland and the United Kingdom (UK) was undertaken. Cross analysis of the core data collected, established the fundamentals of what the identified programmes are offering to perspective construction management students. Secondly, a questionnaire survey was administered using an online survey tool. The choice of questionnaires over other methods of enquiry, such as structured interviews, was to ensure respondents had autonomy and could give frank and open responses. The questionnaire was designed for construction managers practising in industry, academics lecturing in construction management and professional bodies representing construction professionals. The questionnaire ensured those who wished to remain anonymous could do so. The questionnaire was made up of a mixture of structured and open-ended questions. The structured questions involved respondents choosing relevant options from a list, and the open-ended questions were designed to allow for general comments. This enabled quantitative/qualitative analysis of results and provided for deductive/inductive interpretations of the responses. The questions were carefully constructed to initiate responses about how postgraduate education for construction managers should be administered. The questions were informed by ongoing discussions during departmental future programme development planning meetings among the Department of

Construction Management academic staff at the Dublin Institute of Technology (DIT), and by personal academic reflections.

4.3 Methodology

The research attempts to assess the need for formal postgraduate education programmes in construction management. '*The most distinctive characteristic of qualitative research is its emphasis on interpretation*' (Erickson, 1986). Qualitative research uses an interpretivist approach to explain why certain actions occurred, and how these actions in turn influenced subsequent actions. In approaching this research, the researcher has identified a mixed quantitative and qualitative analysis. The findings are presented as a comparative and explorative analysis of the responses from construction managers working in industry, academics lecturing in construction management and professional bodies representing construction professionals, thereby providing a balanced perspective of the results. The conclusions are developed through a reasoned analysis of the questionnaire responses and combined with the comparative analysis of the data from the desk survey. According to Youngman (1982), presenting clear and easily understood objective research results requires the data to be interpreted using a simple percentile method of data analysis, and forming discussions around the necessary reference to the relevant literature on the subject.

4.4 Theoretical Perspective

The theoretical perspective for this thesis is based on the constructivist theory and the literature from the field of situated learning and communities of practice. The perspective centres on what is accepted as a means of knowledge gain. Individuals learn/create knowledge from interacting with themselves, society, groups and organisations. The constructivist's perspective is that new knowledge is built upon an individual's existing knowledge, as a result of that individual's interactions being localised and context specific. The process of knowing, decision making, planning and

problem solving is learning which occurs at all levels (individual, society, group and organisational). The theoretical assumptions of a constructivist are:

- That knowledge is constructed from experience,
- learning is a personal interpretation of the world,
- learning is an active process in which meaning is developed on the basis of experience,
- conceptual growth comes from the negotiation of meaning and the sharing of multiple perspectives and collaborative learning
- learning should be situated in realistic situations, with testing taken place during the task and not as a separate activity

(Driscoll, 1994).

4.4.1 Ontology

According to Lincoln and Guba (2000, cited in Cupchik, 2000), constructivist ontology maintains that meaning is generated by individuals and groups. Constructivist realism acknowledges a social world that is reflected in the natural attitude of daily life, and exists prior to and independent of constructivist analysis. Phenomena are understood as processes which traverse the physical, social and personal worlds (Cupchik, 2000). It is assumed that the constructivist approach to research involves the construction of data, and therefore is potentially subject to bias.

4.4.2 Axiology

Axiology focuses on things we value and how we value them. The main values an inquirer or researcher concentrates on are ethics and aesthetics. Ethics pertains to our moral judgement on issues such as good and bad or right and wrong (Denzin and Lincoln, 2005). Aesthetics relates to our values of art and beauty, a measure of taste (Gough, 2000). Looking at ethics from a professional viewpoint, the procedures followed throughout the information gathering and compilation of this work are guided by the DIT research ethics guidelines and the guidelines relating to a researcher's responsibilities as set out by the British Educational Research Association (BERA). The

work of this thesis is intended to achieve an award of Masters degree (MA) in higher education from the DIT Learning and Teaching Centre, and to assist higher educational institutes who offer construction management education develop a more holistic, community based and socially centred postgraduate programme in construction management.

4.5 Epistemology

Epistemology is defined as the theory of knowledge developed by experts in their field (Scruton, 1994). Constructivist theory is applied equally to learning (how people learn) and epistemology (the nature of knowledge). The constructivist epistemology was developed by theorists such as Piaget, Candy, Dewey, Rogoff, Von Glaserfeld, Vygotsy, Bruner, Boud and Illeris. The constructivist believes that knowledge is constructed as we learn. Learning is not seen as understanding the true nature of things; it is seen as a social and personal construction of meanings, resulting from day to day interactions being interpreted by the individual or group. The epistemological assumptions of a constructivist are:

- Knowledge is physically constructed by learners who are involved in active learning.
- Knowledge is symbolically constructed by learners who are making their own representations of action.
- Knowledge is socially constructed by learners who convey their meaning to others.
- Knowledge is theoretically constructed by learners who try to explain things they do not completely understand.

(Fosnot, 1996)

Constructivist teaching tends to favour learning design, such as situated learning and community of practice developed by Lave and Wenger (1991), Brown, Collins and Duguid (1989). Social interaction and collaboration are essential components of situated learning, and therefore learners become involved in community of practice (Lave and

Wenger, 1991). Other researchers who have further developed situated learning theory such as Brown et al (1989), place an emphasis on the idea of cognitive apprenticeship. This is learning which is supported in a domain that enables students to acquire, develop and use cognitive tools in an authentic activity, both in and outside of a college environment. Situated learning is related to Vygotsky notion of learning through social development.

4.6 Research design process

Yin (2003) states the important components of a research design are:

4.6.1 The questions being researched

The questions being addressed by the desk and questionnaire survey research are as follows:

- What are the perceived formal education needs at postgraduate level for construction managers in Ireland?
- How should taught postgraduate programmes for construction managers be delivered?

The desk research is an examination of the content offered through the available postgraduate programmes. The completed surveys enable the researcher to compare if this content meets industry expectations, and determine the appropriateness of DIT offering a postgraduate programme which encourages and incorporates CPD.

4.6.2 The propositions being put forward

The following are the propositions that will be investigated.

- Can current postgraduate construction management programmes match the expectations of industry in terms of innovation, general construction technology requirements and up to date professional management practice?
- What areas of construction management practice (in the individuals' opinion) should be learnt through experience and/or Continuous Professional Development programmes (CPD)?

- What are the main skills construction professionals perceive to be important for effective management of construction projects?

To design the research instruments, it is first necessary to establish the units of analysis and then decide on the most appropriate means by which each unit of analysis can be examined. There are two basic units of analysis, namely the content of identified programmes and the survey responses. However, to investigate each unit, it is necessary to break it down into further sub units.

The content and delivery to be assessed, relate to the perceived need, value and innovation. Each of these will have further sub units relating to individual specific areas of professionalism and status in industry at the time of completing survey.

4.6.3 Linking the data to the propositions

In order to relate participant responses to potential programme development, two types of data are required:

- Data from the desk based research and the assessment of content, and determining if it is still relevant for the present and future construction industry.
- Assessment of individuals survey responses and identification of their status in industry at the time of completing survey.

4.7 Validity and reliability

Before examining the questions, the validity and reliability of the data collected needs to be determined. We do this by evaluating the sample unit, analysing the desk research data and the questionnaire survey data.

A sample is a finite part of a statistical population whose properties are studied to gain information about the whole (Webster's Ninth New Collegiate Dictionary, 1985). There are two basic causes for sampling error. The first is chance, such as an error that occurs just because of bad luck. Unusual units in a population do exist, and there is always a

possibility that an abnormally large number of them could form a large part of the responses. The second is sampling bias, which is the tendency to favour the selection of units that have particular characteristics. Sampling bias is usually the result of a poor sampling plan devised by the researcher. The sampling techniques used for business and management research tend to be divided into probability and non-probability sampling (Saunders, Philip and Thornhill, 2003). With probability sampling, the chance factor for a sample population is usually known and is normally equal for each category, thereby making it possible to find the answer to research questions that require estimated statistical characteristics of a population. Saunders et al (2003) states that probability sampling is normally associated with survey type research and that non probable sampling is frequently used with case study research. With non-probability sampling, the chance factor being selected from each category is not known, thereby making it very difficult to produce statistical inferences about the characteristics of the chosen population. Hart (2005) states that '*the methodological idea of sampling is simple'* and is based on the assumption that a population made up of a theoretical list of the generalised categories will have a '*mean value*' and a *standard deviation'*.

The sample frame for this research is made up of representatives of the professional bodies as identified in the literature review, construction managers working for or with the top 100 Irish construction companies compiled by the Irish Times in August 2007, and academics lecturing in construction management in Ireland. What constitutes an appropriate sample size in survey research is still subject to debate. Much is dependant on whether or not the research is descriptive or explorative. A survey of 25% of a population in explorative research can provide valuable and reliable insights, but the same percentage can be considered low in descriptive research. In explorative research, the emphasis is placed on the experiences and the quality of the sampling unit more than large numbers of responses. Electronic mail shots were sent to the compiled list of companies via an online survey tool, and were directly targeted at personnel that held a position in construction management. The same online survey was circulated to the 7 professional bodies identified in the literature review and to the 5 Irish higher education institutes who run postgraduate and undergraduate construction management

programmes. Out of the 112 hits, the total number of respondents is 33. Table 4.1 provides a breakdown of Contractors, Engineers, Surveyors, Architects, Academics and Professional body representatives.

	Response Percent	Response Count
Main/Sub Contractor	36.4%	12
Architectural practice	3.0%	1
Engineering practice	6.1%	2
Surveying practice	18.2%	6
Public sector	3.0%	1
Academic/professional sector	27.3%	9

Table 4.1 Break down of the areas from the sample unit who responded to survey

4.8 The questionnaire design process

In the interest of protecting the respondent's identity and in an effort to prompt a more heartfelt response, an online survey was deemed to be the most appropriate and manageable means of surveying the identified sample unit. Structured interviews and telephone surveys were seen as limiting, because the researcher may have had difficulty arranging a time convenient to both parties. Survey Monkey was deemed as the most suitable vehicle to yield a high response rate, and it has the added capability to produce statistical analysis reports for each of participant's responses. A scaled questionnaire was designed, to provide an overall complete assessment of the individuals and their opinions relating to postgraduate education for construction managers. When compiling the questionnaire, the researcher was mindful of the length of time individuals could devote to its completion, and therefore set out the questions in a way that minimised the

amount of time the respondents needed to spend completing the questionnaire but maximised the amount of data the researcher needed to complete this research. The information gathered during the literature review played a major role in the preparation of the survey and analysis of the results. Gillham (2000) and Oppenheim (1992) believe that the use of questionnaires is an effective method of collecting data and is suitable when researching attitudes. Questionnaires record responses from participants and these responses are unprompted by the researcher.

In the first question, participants were asked about the main activity of their company. The purpose of this question was to find out the main areas of construction the respondents were active in. The data gathered from this question, enabled the researcher to develop a clear picture of the various construction professionals who have an interest in Construction Management postgraduate education.

The second question in the survey asked how the respondent would describe the size of their company. They were given the choices of small, medium and large which were defined by the number of employees within the company, based on the European regulation identified in the literature review. The purpose of this question was to link the responses with the literature relating to the industry, being a formation of mainly small to medium size companies.

The third question related to how the respondent described their position in the company. The main purpose of this question was to determine if the respondents still considered their management role as a function of their primary qualification, and to help identify if the respondents were owner managers, employed managers, educationalists or professional body representatives.

The fourth question related to the number of operational sites the respondents were overseeing. This question was asked so as the researcher could link the answer to the literature in relation to the number of construction professionals being promoted to

positions of responsibility in a short time period, in order for companies to meet their growing contractual demands.

Question number five in the survey asked does the company use subcontractors. The answers given, allowed the researcher correlate with the evidence from the literature review, that construction companies are employing a higher number of same discipline subcontractors to enable them complete their contractual obligations on time.

Questions six and seven were in relation to the number of years the respondent worked in the construction and industry and how long they were in their current management role. These questions were designed to confirm if there was a trend to promote relatively inexperienced allied construction professionals into managerial positions, due to the high number of contracts, companies had undertaken to complete at the same time.

Questions eight, nine, ten and eleven were in relation to the respondents' qualifications and the institutes they received same. These questions were designed to determine if the trend identified in the literature, connected, with industry appointing graduates in management positions and moving away from promoting skilled experience craftspeople into such positions. The questions were also designed to test how many of the respondents achieved formal qualifications only, professional qualifications through a professional body CPD route only and a combination of both formal and professional recognition. These questions also gave insight into the number of respondents who went on to achieve a master's degree.

Following on from question 11, question 12 was a category scale question designed to measure the respondent's attitude towards what is the most effective way for a construction manager to develop an understanding of how construction management skills contribute to the overall management of construction projects. Respondents were given the option to select formal postgraduate education or a CPD construction management programme.

Questions 13 and 14 were category scale questions designed to determine if respondents believed it is increasingly becoming a requirement for construction managers to gain postgraduate qualifications, and out of the construction managers skill set, which are most beneficial or least beneficial to construction companies.

Questions 15 and 16, respondents were asked to express their level of agreement/disagreement to a number of statements relating to the skills required to achieve effective management, and the qualities sought by employers when recruiting construction managers. These opinions enabled the researcher interpret the type of skills that could be learnt formally, and the attitude employers had to on the job/experiential learning.

Respondents were asked in question 17 and 18 about whether or not their employers support them during their postgraduate studies and what format did this support manifest itself in. These questions were designed to allow the researcher determine, if a new postgraduate construction management programme was developed as a result of the data gathered during this research process, would there be sufficient support from industry to encourage enrolment.

The final questions 19 and 20 asked respondents for any further comments or contributions they felt might be important and thanked them for taking the time to respond. Question 20 in particular, invited respondents to leave their name and contact details should the researcher wish to interview them at a later date. Question 20 also reassured respondents that the confidentiality of the responses will be respected at all times.

Before the final survey was circulated to the sample unit, a preliminary survey was sent to a select number of academics, industry and professional body representatives to ensure survey clarity. The researcher provided the above with a questionnaire feedback form; the participants completed both the preliminary questionnaire survey and the feedback forms. Slight changes for the purpose of clarity were made to the question

structure of the final survey, based on the feed back and the interpretations of the preliminary survey. The final survey instrument was approved by Mr Lloyd Scott thesis supervisor Faculty of Engineering and Built Environment at the Dublin Institute of Technology.

4.9 Data Analysis

Triangulation of the desktop survey data, the questionnaire survey data and the literature review were used to link the findings together and for the purpose of validating and checking the reliability of the data collected. Triangulation of methods confirmed if any key items were omitted during the data collection stage, and also assisted in reducing the error of bias which might have been unintentionally introduced by the researcher during data collection or analysis.

4.10 Conclusion

Position statements from the researcher relating to the following were established:

- Research method – Survey Research
- Research Methodology – Qualitative, Inductive and Interpretive
- Theoretical Perspective – Constructivist and Situated Learning
- Ontology – Realism that the socials world is reflected in everyday interactions
- Axiology – Ethics and Aesthetics are being guided by DIT policy
- Epistemology – Constructivist, Knowledge being Constructed as we actively learn.

An outline of the chosen research process is provided. The overarching questions are identified and linked to the propositions forwarded. Boundaries of this study are established, and a finite sample unit suitable to explorative research is identified. A breakdown of the numbers from each of the targets construction disciplines is provided and linked to the relevant literature.

The question design process is outlined and acknowledgement given to the stakeholders involved, in providing feedback during the preliminary questionnaire design phase.

CHAPTER FIVE

SURVEY FINDINGS AND ANALYSIS

5.1 Introduction

This chapter is a presentation of the survey findings. The findings provide a synopsis of the educational background at postgraduate level in Ireland and the UK. It presents the data from the desk survey and constructs meaning from the data presented

5.2 Questionnaire survey findings: part 1

Figure 5.1 shows that 34% of the companies in industry who completed this survey manage between 10 and 20 sites concurrently.

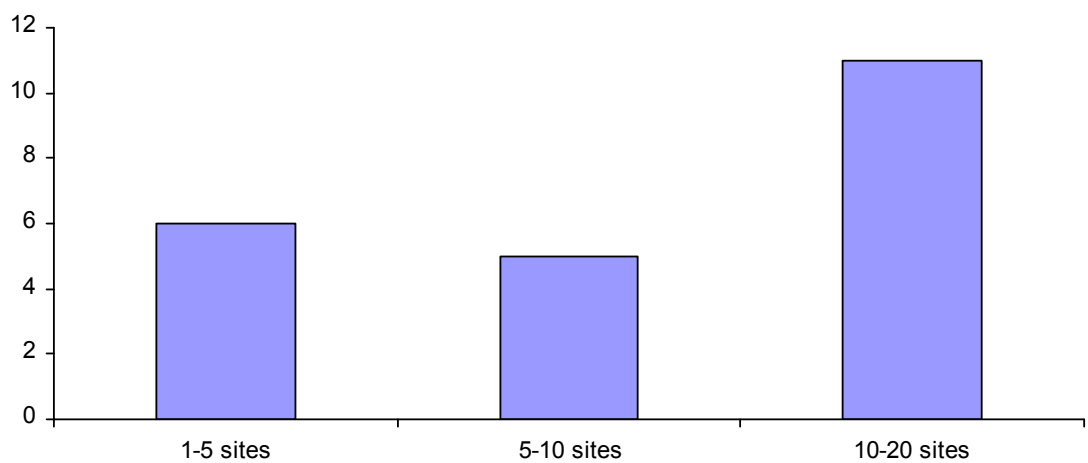

Figure 5.1: Typical number of sites one construction company runs concurrently

This supports the assumption that construction managers employed by these companies need to be of professional standing. The literature review highlighted the accepted qualities of a professional construction managers required abilities such as leadership, team building, ability to manage organisational resources, acceptance of responsibilities and being responsible for others. As construction managers find themselves in charge of

more and more sites, the need to develop the know how in using technology that keeps them in contact with the rest of their team regardless of their geographical location and the need to embrace technology which will keep their company flexible and more competitive becomes more and more a priority.

5.2.1. Responses relating to the use of subcontractors

69% of construction individuals surveyed have sub-contractors reporting to them as illustrated in figure 5.2.

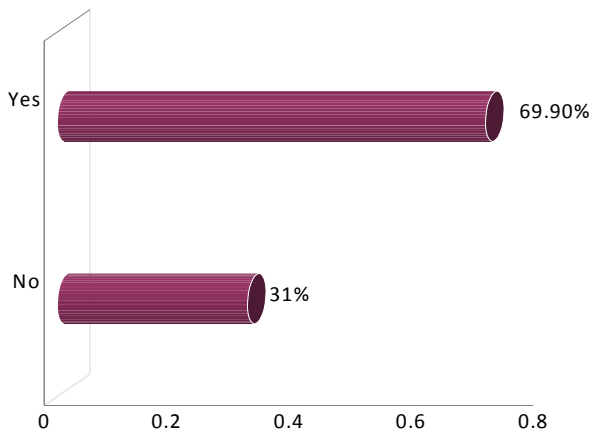

Figure 5.2: Indicates the number of participants who use contractors on a regular basis.

The high response relating to the hiring of sub-contractors on a regular basis is in keeping with the evidence uncovered during the literature review. This relates to a number of small to medium size companies employing more than 20 people, being the majority of the estimated 6000 construction companies registered in Ireland at the time this survey was administered.

5.2.2. Responses towards the statement around increasing company profile

The number of respondents who agree or strongly agree with the statement that having a construction management postgraduate qualification directly enhances the companies profile is highlighted in figure 5.3.

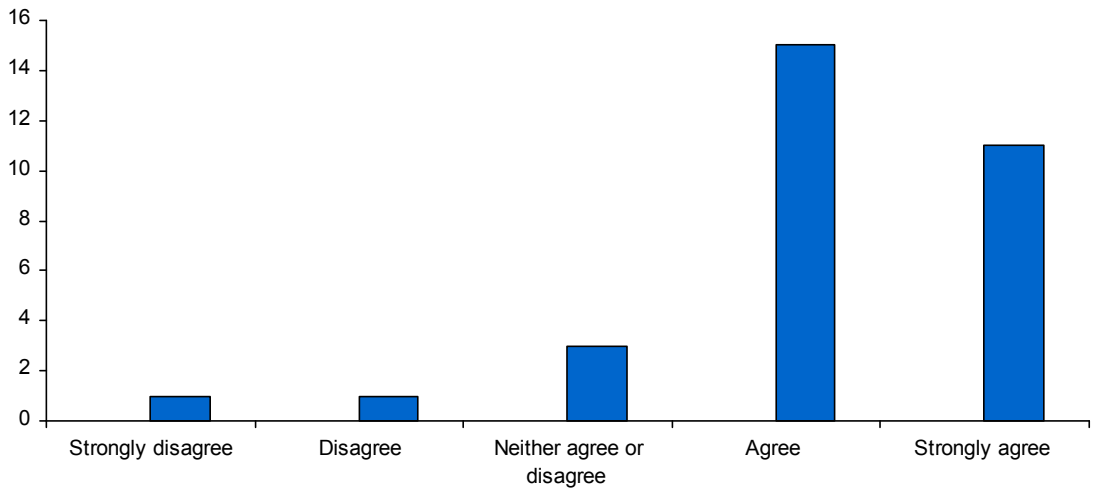

Figure 5.3 Responses to statement that construction managers with a postgraduate construction management qualification enhance the company's profile.

With the literature revealing that out of the mainly small to medium size construction companies operating on regional bases, it is estimated that no one company has more than 3% of the Irish market share. Increasing the company profile to help gain competitive advantage, will feature more prominently as markets begin to tighten and competition begins to increase from companies looking beyond their regional bases.

5.2.3. What is the size of the company?

According to the 2006 Davis Langdon PKS report discussed in Chapter two, 42% of total Irish construction during that period was undertaken by contracting companies employing more than 20 people. Table 5.1 relates to the number of industry respondents who work for small, medium and large companies.

	Response Percent	**Response Count**
Large company with 251 + employees	17%	3
Medium size company with 51-250 employees	33%	6
Small size company with 10-50 employees	50%	9

Table 5.1 Respondents based on size of Company

The response figures correlate with the literature evidence that the Irish construction industry is made up of a large number of small to medium sized companies, with an estimated 12-15% out of an estimated 6000 companies employing 20 or more people (Davis Langdon PKS, 2006).

5.2.4. What learning method is the most effective way of increasing knowledge gain in construction management?

It has been established that Continual Professional Development (CPD) criteria to achieve and maintain membership of construction related chartered institutes plays an important role in construction. Table 5.2 reflects that the majority of respondents favour a mixture of CPD combined with a formal postgraduate education route, when seeking to develop their managerial skills in construction.

	CPD Programmes	**Construction Management Postgraduate**
Allied construction professionals develop sound construction management ideas by engaging in education/training through:	58.1% (18)	51.6% (16)

Table 5.2 Participants were asked: Which is the most effective way for a construction professional to develop sound construction management ideas when engaging in construction management education/training?

This is further evidence of the professional approach construction managers have towards their discipline. The response figures reveal that construction managers are committed to maintaining competence and advancing their knowledge of the construction process on continued basis. 58.1% of respondents believe that construction managers with a primary degree in a non-management construction related discipline develop an understanding of how construction management skills contribute to the overall effective management of construction projects through CPD, while a very close 51.6% believe this to be the case through formal postgraduate education.

5.2.5. How many years of experience have you in construction?

The importance of figure 5.4 is that it demonstrates 3.8% of respondents have 25 plus years of experience working in construction while a staggering 30.8% have only been working in industry for 5-10 years and the highest percentage of 38.5% only having 1-5 years experience in construction.

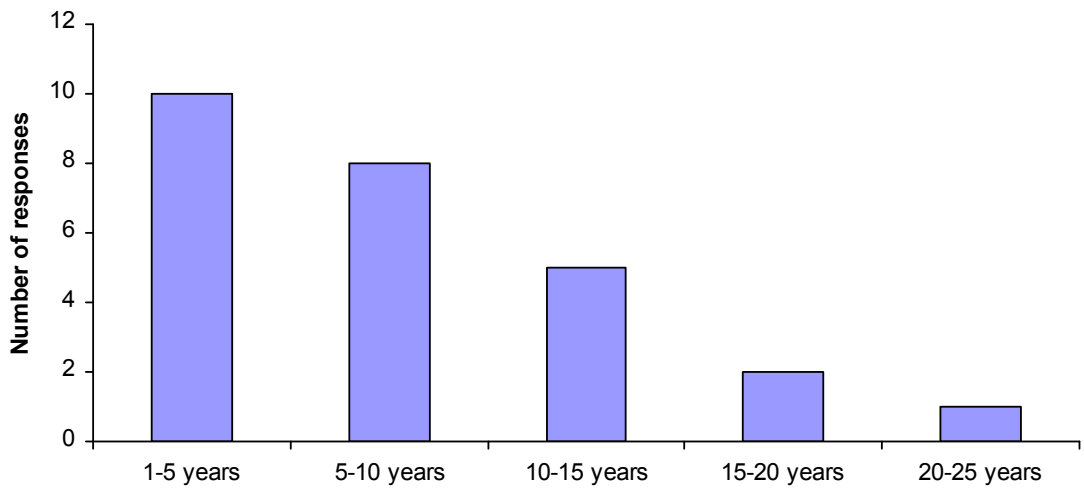

Figure 5.4 Indicates the number of years the respondents have been working in the construction industry

These responses add weight to the argument that the increase in demand for projects to be completed brought about, an increase in individuals who showed initiative being elevated from position of skilled employee or graduate, straight to foreman or junior management, from foreman/junior manger to contracts manager from contracts manager to construction manger, in a relatively short period of time.

5.2.6 What is your current level of responsibility?

Figure 5.5 provides further evidence of rapid promotion into positions of responsibility based on market demand and not as was traditional, the experience of the individual.

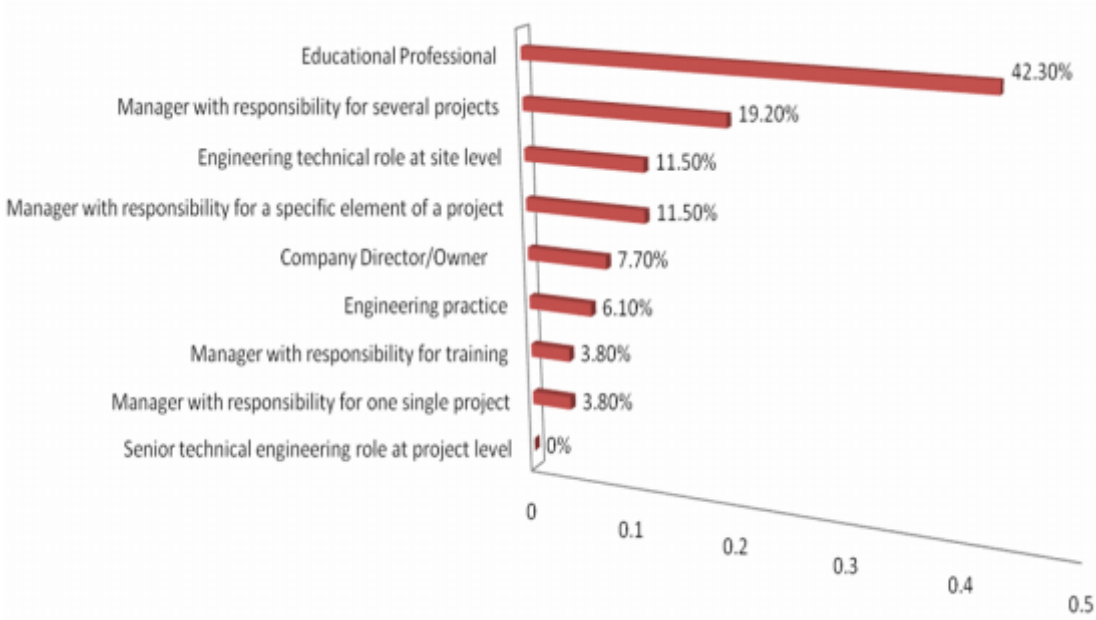

Figure 5.5 Reflects the levels of professional responsibilities the survey respondents have within the irish construction industry.

Schexnayder and Mayo (2004) contend that mangers can often progress from a trade background with many years of experience. During the time of this survey, some of the respondents combined managerial and construction experience as low as 1-5 years.

5.2.7. How many years have you held a position of management responsibility

The target people of this survey were construction managers working in industry, personnel representing professional bodies and construction management academics. Figure 5.6 shows that 58.1% of respondents in positions of management responsibility have between 1-5 years construction experience, 3.2% have 1-20 years while only 9.7% have 20-25 years experience.

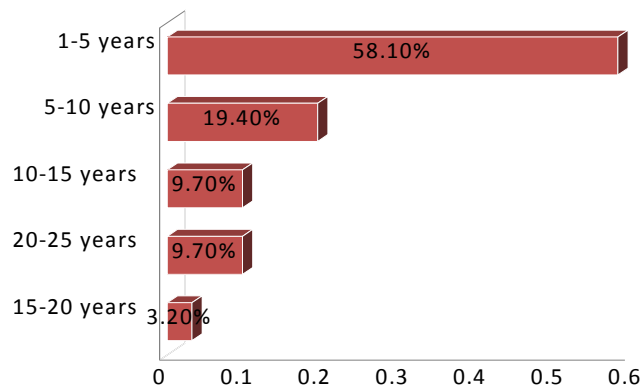

Figure 5.6. The numbers of years the respondents have been employed in their management positions

The high number of professionals in the 1-5 and 5-10 year categories reflects that a high number of construction professionals were not working in construction during Ireland's last recession period, and could therefore have been unaware of the negative effects that building just for profit can have on communities in the long term.

5.3 Educational background

5.3.1 What is your highest qualification?

Following on from the evidence of the length of time a large percentage of respondents have been employed in a management position of responsibility, it is important to consider the level of formal education and CPD qualifications.

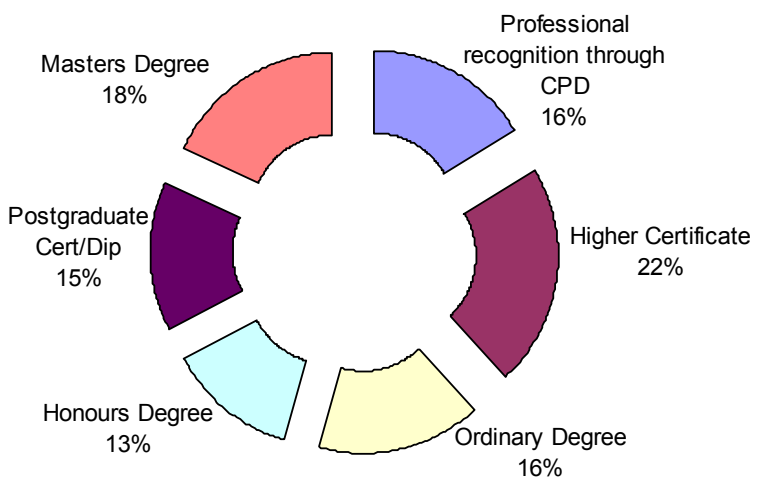

Figure 5.7 The highest qualification achieved by respondents at the time of the survey.

Studying the data in Figure 5.7, 22% of respondents when asked about the highest qualification obtained to date, ticked the box referring to a Level 6 Higher Certificate qualification while 16% of respondents have either a recognised CPD qualification or a Level 7 ordinary degree in a construction related subject.

5.3.3 Which construction discipline to achieve this award in?

Following on from the evidence which highlights how long the respondents have been employed in a management position of responsibility, it is important to consider the level of formal education and CPD qualifications.

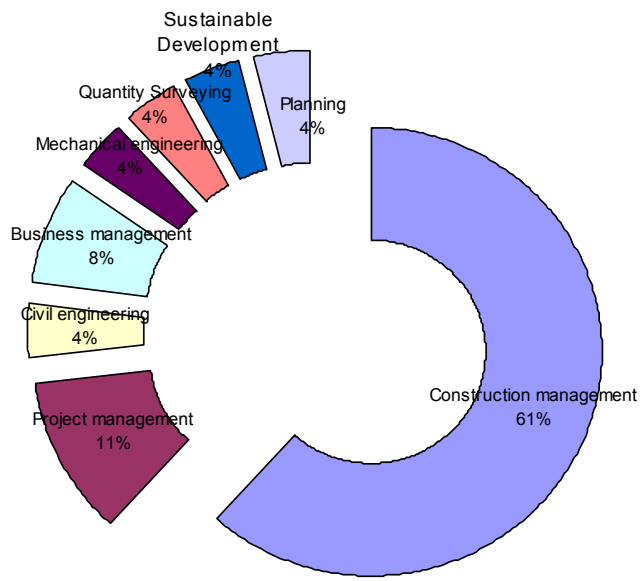

Figure 5.8 The construction related disciplines the respondents are qualified in

The survey went on to identify which of the construction related disciplines respondents achieved their highest qualification. Figure 5.8 summarises into percentage terms, the construction related disciplines each of the respondents have achieved a qualification in. 61% of the respondents have pursued qualifications in construction management which spans from a higher certificate, ordinary degree, and honours degree to masters in construction management. The next largest group of 11% are qualified project managers, leaving 8% qualifying in business management.

Gould and Joyce (2002) have identified the changing trend of hiring undergraduates straight from construction management or engineering programs in preference to promoting a skilled craftsperson with a high number of years and experience in

construction. In the USA, Bilbo, Fetters, Burt and Avant (2000) identified that graduates of construction management undergraduate programmes enter positions with multiple job titles and duties. The survey data relating to the low number of years the respondents have worked in industry, coupled with the high number who have gained an undergraduate degree in construction management indicates Ireland has followed this USA trend. Grunderson, Schroeder and Holland (2002) discuss how these undergraduates are offered entry level positions of estimator, site/scheduling/office/project engineer and project/construction manager.

5.3.4 The number of respondents with a postgraduate qualification in academia

Further analysis of the survey data reveals that 16% with a master's in construction management are employed in the education/training sector, leaving only 2% of the respondents from industry having achieved a master's degree.

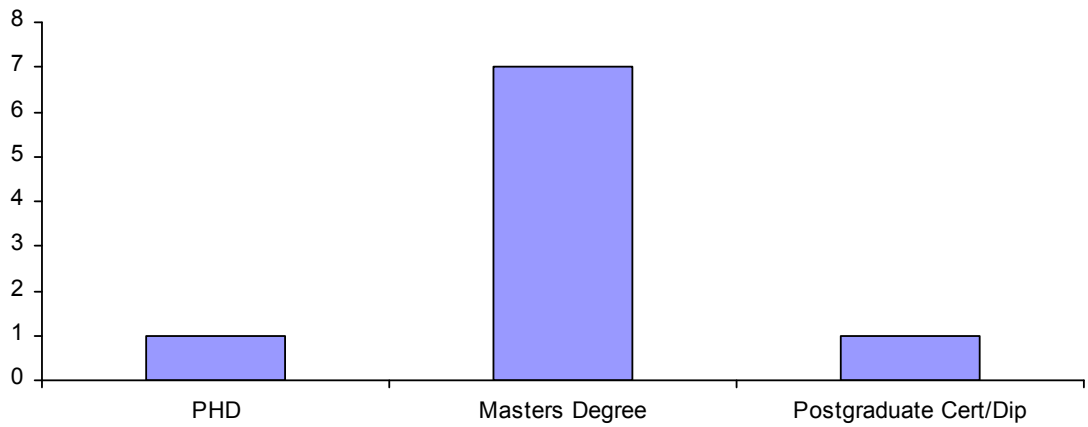

Figure 5.9 Reflects the highest qualification of the education/training sector respondents

The reasons for such a low number of industry employed with a master's degrees in construction management needs further analysis, and therefore a comparative analysis of existing master's degree programmes on offer against the survey responses directly relating to preferred methods of postgraduate education, must be completed.

5.4 Findings: desk top survey

This research was designed to assess and provide an analysis of what the Irish and UK educational institutes are currently offering as postgraduate management education in construction management. The programmes outlined in this review are based on information obtained from the websites of those institutes within Ireland and the UK who offer taught postgraduate education to construction managers. The data should therefore be viewed as indicative only, as it is too erroneous for this particular piece of research to view the data as a precise measure of pedagogy.

The desk survey has identified two higher education institutes in Ireland offering one or more taught postgraduate qualification for construction managers. For the purpose of analysis, the programmes have been grouped together on the basis that they are competing in the same market and share programmes that share similar characteristics.

5.4.1 Taught Postgraduate Programmes in Ireland for Construction Managers

Name of Higher Education Institute	Title of the award	Summary of Modules taught	Method of Delivery
Waterford Institute of Technology (WIT)	MSc International Construction Management	International Studies & Human Resource Mgm, Business and Construction Law, Mgm and Marketing, Economics and Finance, Strategic Mgm, Mgm of Projects Mgm of Technology, Research Methodology & Dissertation or Industrial Project	Blended Learning
	MSc Construction Project Management	Mgm Studies, Mgm of Projects 1 Economics, Finance, Mgm of Information & Communication Technology Construction Law Strategic Mgm Human Resource Mgm & Ind Relations Mgm of Projects 2 Research Methodology Dissertation or Industrial Project	Taught Classroom with remote technology based assistance
Trinity College Dublin (TCD)	PgD Construction Law and Contracts Administration	Construction Law, Introduction to the Irish Legal System, The Irish Litigation Process, EU Law and Private International Law, Statutory Duties and Construction Projects, Dispute Resolution.	Classroom Based
	PgD Applied Building Repair and Conservation	The built heritage legalisation and economics. Research documentation, building surveying and recording. Building stone, Ceramics, Metals, Timber and Mudwall. Building Limes and Cement, Concrete. Construction Technology and Project Management, Managing Case Study. Structural Damage and Repairs to Masonry Fabrics and Building Elements, Structural Case Study. Research Thesis	Class room and laboratory

Table 5.3 Subject/modules which a construction professional will study as a participant of Waterford IT and Trinity College Postgraduate Programmes in construction

Within Ireland, Waterford Institute of Technology (WIT) in collaboration with Nottingham Trent University (UK) and Fachochschule Karlsruhe (Germany) offer a taught MSc in Construction Management. WIT also offers independently a taught MSc in Construction Project Management. Trinity College Dublin (TCD) offer taught postgraduate diplomas (PgD) in construction law and contracts administration and also in applied building repair and conservation, while the Dublin Institute of Technology (DIT), Galway Mayo Institute of Technology (GMIT) and University Limerick (UL) offer masters by research (MSc) in construction. Table 5.3 lists the common core modules being taught in WIT and TCD.

5.4.2 Subjects/Modules Common to all Programmes in Ireland

The common subjects/modules offered by the Irish institutes are set out in table 5.4. The only variations between TCD and WIT in terms of subject content, is that the programmes on offer from Trinity have been narrowed into specific disciplines of construction law and building conservation.

Name of Common Module being Taught on Programme	Name of Institute who Offers Module on Programme
Human Resource Management	TCD & WIT
Business & Construction Law	TCD & WIT
Management & Marketing	TCD & WIT
Economics & Finance	TCD & WIT
Strategic Management	TCD & WIT
Management of Projects	TCD & WIT
Management of Technology	TCD & WIT
Research Methodology	TCD & WIT
Dissertation	TCD & WIT
Industrial Project	TCD & WIT
Communication Technology	TCD & WIT
Industrial Relations	TCD & WIT
Introduction to the Irish Legal System	TCD & WIT
The Irish Litigation Process	TCD & WIT
EU Law & Private International Law	TCD & WIT
Statutory Duties	TCD & WIT
Construction Projects	TCD & WIT
Dispute Resolution	TCD & WIT

Table 5.4 Modules that are offered by TCD and WIT on their postgraduate programmes for construction managers

The remaining findings from the questionnaire survey presented further on in this chapter, enables one to conclude that the subject matter of the programmes identified in table 5.3 meet with the needs of industry in relation to producing graduates who have the ability to exploit the economic potential.

5.4.3 Taught Postgraduate Programmes in the UK for Construction Managers

Table 5.5 identifies the remaining higher education institutes of the desk research. Rather than provide the full subject listing offered by each programme as in table 5.3, Table 5.5 highlights the modules that are unique to each institute's programme.

Name of Higher Education Institute	Title of the award	Summary of Modules Unique to each Institutes Construction Management Programme
Northumbria University	PgC, PgD & MSc in Construction Project Mgm	Partnership & Collaborative Working, Project Sustainability
Glasgow Caledonian University	PgC, PgD/MSc in Construction Mgm	Project & Development Risk, Environmental and impact assessment
	MSc International Project Mgm	Integration and scope management International Cooperate Social Responsibility
University of Glamorgan	PgC, PgD & MSc in Construction Project Mgm	Problem Based Learning Assignments
University of Central Lancashire	PgC, PgD, MSc in Construction Law & Dispute Resolution	Tortuous Issues, Environmental law,
	MSc Const Project Mgm	Project Team & Leadership Development, Quality management Systems, Waste Disposal.
University of Portsmouth	MSc Construction Project Mgm	Geotechnology, management of Traffic, Shoreline management, Ground Investigation & assessment, Ground Water Hydrology, Ground Engineering,
Heriot-Watt University	MSc Const Mgm (project Mgm)	Microeconomics & the Built Environment, Macroeconomics finance & the Built Environment,
Kingston University	PgD/MSc Construction Mgm	Conditions of Contract,
	PgD/MSc Const Mgm & Const Law	Further Legal Obligations
Liverpool John Moore's University	MSc Const Mgm	Strategy & Environmental, Human & organisational behaviour,

London South Bank University	PgD/MSc Const Project Mgm	People & Organisational management
Napier University	MSc Const Project Mgm	Production management, Property Asset management
	MSc Property & Const Mgm	Property Development
Nottingham Trent University	MSc Const Mgm	International Studies & Human Resource management Management of Technology
	MSc Project Mgm (Const)	Project Initiation and Appraisal Value and Cost
Sheffield Hallam University	MSc Const Mgm	Project administration
	MSc Project Mgm (Const)	Contract procurement
University of Salford	MSc/PgD Const Mgm	Industry Project Workplace Problem
	MSc/PgD Project Mgm in Const	Culture and people
	MSC/LLM/PgD/PgC Const Law and Practice	Environmental Impact of Construction Roles and Responsibilities of Construction Professionals
University of Ulster	PgC/PgD/MSc Const and project Mgm	Property investment and development Project Leadership
University of Bath	MSc/PgD/CPD International Const Mgm	Decision Making and Problem Solving

Table 5.5 Higher Education Institutes offering Postgraduate Construction Management programmes and specialist subjects highlighted

Careful consideration of table 5.5 leads one to conclude that the UK has a wide variety of construction management specific postgraduate programmes on offer. Attached (Appendix 1) is a completed summary of the findings from the desk research survey. From this data summary (Appendix 1), the researcher has interpreted that the commonly taught modules such as human resource management, business and construction law, economics, finance, project management information and communication technology, health and safety management and applied research methods meet industry expectations in terms of general construction management practice. In order to support this

assessment, the remaining data from the questionnaire survey is presented in section 5.5. Further analysis of this summary data provides evidence that these programs are taught solely by the higher education institutes through classroom and laboratory learning or blended learning.

5.5 Questionnaire Survey findings: part 2

5.5.1 State your highest qualification and the name of the institute it was awarded by?

Table 5.6 illustrates the respondent academics highest qualification, the construction related discipline and the institute it was awarded by

Name of Higher Education Institute	Title of the award	Number of survey respondents with award
University of Salford	MSc/PgD Project Management in Construction	2
University of Geneva	MSc in Geology	1
Dublin Institute of Technology	MSc in Planning and Development	1
Not Given	MSc in Business and Entrepreneurship	1
	MSc in Sustainable Development	1
Trinity College Dublin	MSc in Building Conservation	1
University of Ulster	PgC/PgD/MSc Construction and Project Management	1
University of Bath	MSc Construction Management	1

Table 5.6 The respondent academic postgraduate qualification details

Three of the academic respondents out of a total of nine academics have been awarded a Masters Degree in the discipline of construction management. The fact that five academics who lecture and/or carry out research in construction management have a masters qualification in a non construction management discipline, further adds to the complexity for the discipline of construction management.

In relation to the remaining non-academic respondents as presented earlier, only 2% have achieved a postgraduate degree (refer to Figs. 5.7 & 5.8).

5.5.2 Which is the most effective way (CPD or Postgraduate education in construction management) for a construction professional to?

- *Develop an understanding of how construction management skills contribute to the overall management of construction projects?*

	CPD Programmes	**Construction Management Postgraduate**
Construction professionals acquire a breadth of knowledge about the skills and contributions of other construction professions through:	68.8% (22)	43.8% (14)

Table 5.7 Respondents believe CPD interaction with other professionals helps them gain a more informed understanding of each others disciplines

68.8% of respondents as illustrated in Table 5.7, believe CPD programmes are the most appropriate method for construction professionals to acquire a breadth of knowledge about the skills and contributions of other construction professions.

An example of where CPD might help construction managers develop a greater understanding is in the area of planning. Construction professionals employed in the planning offices of local government throughout the country, are construction professionals who get the opportunity to interact with other construction professionals at the initial stage of a planning application and when there has been a clear breach of planning laws. Due to the often very different needs of construction professionals, a negative relationship can often develop between those processing planning permission and those seeking permission.

- *Learn to design an organisational structure appropriate to the needs of a particular project more effectively through (CPD or postgraduate education)*

Table 5.8 reflects how 56.7% of respondents believe that allied construction professionals best learn how to design an organisational structure appropriate to the needs of a particular project through CPD.

	CPD Programmes	**Construction Management Postgraduate**
Construction professionals learn to design an organisational structure appropriate to the needs of a particular project, more effectively through:	56.7% (17)	50.0% (15)

Table 5.8 Response to how construction professionals best learn organisational structure for specific projects

However, a very close 50% of respondents believe that to know how to design an organisational structure appropriate to the needs of a particular project is best learnt through formal education.

- *Learning to handle effectively the demands that the construction process can place on themselves and industry clients is achieved through (CPD or postgraduate education in construction management)*

The question in Table 5.9 is specifically about the demands the construction process has on their personal responsibilities and their responsibility to the client.

	CPD Programmes	**Construction Management Postgraduate**
A more positive approach towards the education of construction professionals in relation to the demands that the construction process can place on themselves, their clients and the public interest is best achieved through:	50.0% (15)	70.0% (21)

Table 5.9 Response in relation to where one should go to learn how to deal with the associated demands and responsibilities of a construction manager

70% of respondents would prefer to avail of postgraduate education in construction management, to gain knowledge on how to handle in an efficient and effective manner, their personal responsibilities and their responsibility to the client.

- *Learn to respond to clients needs both effectively and satisfactorily when conventional approaches do not suit, through (CPD or postgraduate education in construction management)*

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The question posed in table 5.10 relates to communicating with clients who have indicated that they understand the design and construction plan upon commencement of the project, only to question the proceedings at various intervals, simply because they can only fully understand the design during construction and suddenly discover the near finished product is not what they understood it to be originally

	CPD Programmes	**Construction Management Postgraduate**
Allied construction professionals learn to respond to clients needs both effectively and satisfactorily when conventional approaches do not suit, through:	56.7% (17)	46.7% (14)

Table 5.10 Which form of education best enables construction professionals to learn to respond to clients needs effectively and satisfactorily

56.7% believe the best method for a manger to learn how to deal with a client effectively and satisfactorily is by attending a CPD programme.

5.5.3 Do you believe that it is increasingly becoming a requirement for construction professionals to have postgraduate construction management qualifications?

87.5% said yes when asked if they believed there is an increasing requirement for construction professionals to achieve a postgraduate qualification in construction management. Figure 5.10 clearly highlights that 12% do not agree that it is increasingly becoming a requirement for construction professionals to have a postgraduate qualification in construction management.

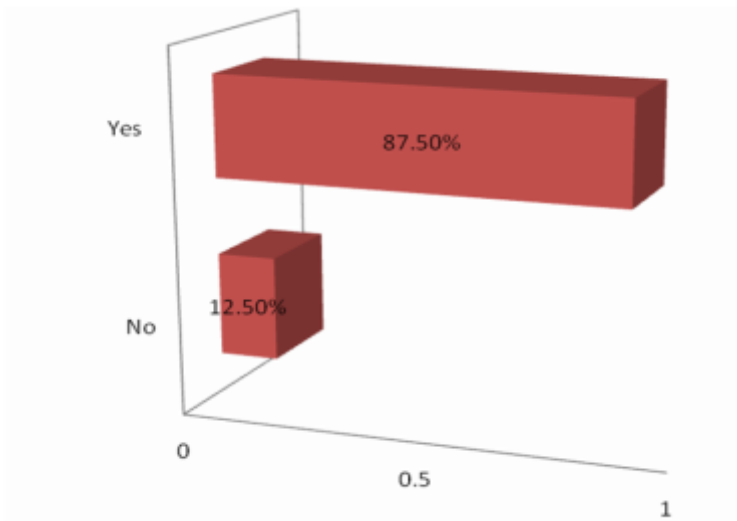


Figure 5.10 Response from survey respondents relating to the need for post graduate education in construction management

The supporting evidence for why such a high number of respondents said yes to this question is borne out in the following research findings.

5.5.4 Please tick in order of preference the skills which indicate to you, are of benefit to a construction management company who employ professionals with a postgraduate construction management qualification

The category scale questions directly related to the area of interpersonal skills development at postgraduate level, that are of most benefit to the company. The skills acquired during a postgraduate programme in construction management were identified through modules/subjects revealed in the desk survey and presented in Tables 5.3 and 5.4.

	Highly Beneficial	Beneficial	Some Benefit	No Benefit
Specialist management knowledge	60.6% (20)	33.3% (11)	6.1% (2)	0.0% (0)
More mature	27.3% (9)	45.5% (15)	27.3% (9)	0.0% (0)
They are up to date in terms of Knowledge practice	45.5% (15)	54.5% (18)	0.0% (0)	0.0% (0)
An ability to critically analysis	39.4% (13)	54.5% (18)	6.1% (2)	0.0% (0)
An ability for networking	18.2% (6)	63.6% (21)	18.2% (6)	0.0% (0)
Ability to Develop systems that meet with clients demands	57.6% (19)	36.4% (12)	3.0% (1)	3.0% (1)
Future potential	58.1% (18)	35.5% (11)	6.5% (2)	0.0% (0)

Table 5.11 Responses to the benefits that the skills gained at postgraduate level can bring to a company

60.6% of respondents believe that those who complete postgraduate construction management, gain specialist management knowledge that is highly beneficial for a construction company. 18.2% believed developing an ability to network was highly beneficial to a company, and exactly the same amount 18.2 % believed it to be of some

benefit. 3% of respondents did not see the ability to develop systems that meet with the client's demands as having any benefit for the company.

5.5.5 Please rate the skills you consider as important for effective management.

Respondents were asked to agree or disagree with strongly worded statements regarding what skills were needed to implement effective management.

	Least desirable	**Desirable**	**Highly desirable**
Communication skills (ability to write/debate in a clear coherent manner, good presentation skills)	6.7% (1)	73.3% (11)	20.0% (3)
Project management skills (Goal setting, time management, database skills)	13.6% (3)	31.8% (7)	54.5% (12)
Personal skills (willingness to learn, creativity flexibility, open mind, motivated, ability to work independently)	35.7% (10)	21.4% (6)	42.9% (12)

Table 5.12 Effective management skills

73% of respondents believed communication skills are desirable for effective management. 35.7% felt that personal skills such as willingness to learn, creativity and motivation are least desirable skills that contribute to effective management.

5.5.6 What are the qualities sought by employers when recruiting construction professionals as managers.

Respondents were asked to assess the extent to which they agreed or disagreed, with a number of statements relating to the qualities a potential employer sought in a construction manager.

	Strongly disagree (5)	**Disagree (4)**	**Neither agree or disagree (3)**	**Agree (2)**	**Strongly agree (1)**
Personality of the person is more important than their level of education in construction	6.5% (2)	35.5% (11)	35.5% (11)	19.4% (6)	3.2% (1)
Willingness to continue with long term education and short term CPD training is a quality an employer looks for in a construction manager	3.3% (1)	3.3% (1)	26.7% (8)	43.3% (13)	23.3% (7)
Construction professionals with postgraduate qualifications in construction management are good for the company profile	3.2% (1)	3.2% (1)	9.7% (3)	48.4% (15)	35.5% (11)
Construction professionals with management responsibilities develop a better understanding of management knowledge/skills through postgraduate construction management programs	0.0% (0)	0.0% (0)	25.8% (8)	54.8% (17)	19.4% (6)
Construction professionals with management responsibilities and who have years of industry experience are more suited to the construction environment than those professionals with postgraduate construction management qualifications but fewer years of experience	6.5% (2)	12.9% (4)	22.6% (7)	35.5% (11)	22.6% (7)
Professionals with postgraduate qualifications often demand higher salaries than their	0.0% (0)	13.3% (4)	10.0% (3)	50.0% (15)	26.7% (8)

industry experienced peers					
Those with both industry experience and postgraduate management qualifications are increasingly being recognised as essential for developing expertise in management within the company	0.0% (0)	0.0% (0)	16.1% (5)	29.0% (9)	54.8% (17)
The increase in sophistication of modern construction processes requires a higher level of management skill	0.0% (0)	10.0% (3)	10.0% (3)	50.0% (15)	30.0% (9)

Table 5.13 Qualities in a construction manager sought after by employers

35% disagree with the statement that personality is a quality employers seek when recruiting construction managers and exactly the same amount of respondents (35%) neither agree or disagree with the statement. 3.3% of respondents do not agree, that a willingness to continue with long term education and short term CPD is an aptitude sought by potential employers. The highest number 6.8% to disagree, related to the statement which maintained industry experienced construction managers with no postgraduate qualifications are more suited to a postgraduate with little or no hands on industry experience.

5.5.6 Does your company support construction professionals who are participating on a postgraduate construction management programme?

Figure 5.11 highlights that 81.3% receive or would receive support from their employer when participating on a postgraduate programme in construction management.

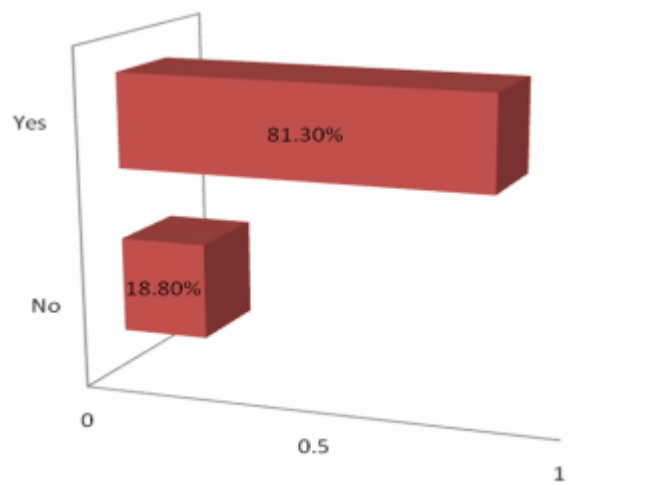


Figure 5.11 Response to question relating to company support in order to continue study

5.5.7 Please indicate the means by which support is provided

Figure 5.12 highlights the type of support provided to those respondents who answered yes to the above question

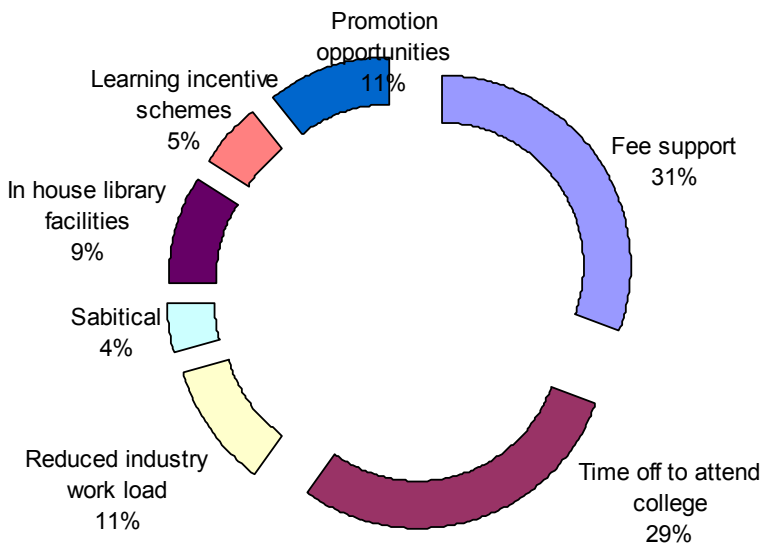


Figure 5.12 Forms of support from companies when participating on a postgraduate programme

29% and 31% are given time off work to attend lecturers and fee support towards programme cost. 0% are given the opportunity to work from home. This seems to be unusual in today's world of technological advances, and possibly could merit further investigation at a future date.

5.6 Conclusion

The questionnaire research findings were presented in two halves. The first half presented the findings that provided the background of the respondents without revealing their identity. Details such as the type of construction activity (academia, professional body or industry) the individual was mainly involved in. It presented the type and level of qualifications awarded to them.

The findings of the desk top survey was presented in the middle of the questionnaire presentations to allow for ease of analysis and guiding the reader during the discussions in Chapter six. The second half of the questionnaire dealt with the perceived abilities and skills required by construction managers and their employers. Presenting the desk survey in the middle of the questionnaire survey findings, helps in the cross referencing of what the construction stakeholder perceive to be important and what is actually available to meet this demand.

CHAPTER SIX

DISCUSSION OF THE RESEARCH FINDINGS

6.1 Introduction

This chapter is an inductive discussion in favour of the argument for the development of a new postgraduate in construction management in Ireland. Taking general truths from the data presented in Chapter five and drawing from the literature review will provide deductive support to the argument for the development of a construction management programme which incorporates situated learning at the core of its pedagogy.

6.2 Continuous Professional Development integrated into formal knowledge gain

The literature review revealed the challenges construction professionals face into the future and considered the effect of focusing on both a knowledge economy and a green economy. It illustrated how professional bodies and industry place great emphasis on the importance of CPD. The literature also unveiled that professional bodies are actively engaged in the research around the development and delivery of a CPD framework.

The data from the questionnaire survey highlighted in table 5.7, demonstrates that learning through CPD or formal education is a personal choice. The underlining factor for choosing one route over another is probably down to earlier experiences in formal education settings. Learning is mental as well practical (Dewey 1957, 1990; Biesta, 1995). CPD is seen as more practical way of learning, and in most cases CPD learning takes place in a working environment. Learning at work involves anticipation of the future based on accumulation of experiences (Beckett and Hager, 2002). The data from the desk top survey (Appendix 1) reveals that the common programme delivery mode for construction management postgraduate education in the identified institutes is either classroom based, laboratory based, web based or a combination of all three (Blended). There is no evidence in the desk research data that CPD learning is being encouraged by any of the higher education institutes offering construction management. 58.1% of

respondents prefer the route of CPD (informal setting) for developing sound construction management ideas. 51.6% prefer the route of postgraduate construction management programmes (formal) to develop sound construction management ideas. The establishment of a postgraduate programme which integrates the formal with the informal will cater for the needs of both sides, while at the same time subject the participants to multiple sources and perceptions of knowledge.

According to the literature, there is a belief that the discipline of construction management can span across multiple construction professions and still remain distinct from each of them. There is an acceptance therefore that as construction managers it is important to have a broad knowledge of the contributions other construction professions make to a project. Langford (2009) provides a definition of a discipline as a *'branch of learning or scholarly instruction'* (p.1). He suggests that *'scholarly active'* is not only a *'formal transition of knowledge'* but that is equally a *'socialisation into the values and ways of thought of a discipline'* concluding that a discipline is then *'a point in the development of thinking'*. The argument being, that this point of thinking can start off at craft level before developing into a profession and finally moving on into a discipline. We have established from the literature that the trend is for new entrants into the discipline of construction management to gain knowledge of the built environment in a formal setting, before entering into the real world to learn the practical elements of the built environment. The old way was for new entrants to construction management to work their way up through a craft, before entering the formal setting to gain knowledge of construction management. Table 5.7 provides evidence from the questionnaire survey data that 68.8% of the surveyed respondents believe the best way to gain knowledge of how other professions contribute to the overall construction of a project is through a programme of CPD. The inference being, the loss of '*socialisation into the values and ways of thought of a discipline'* (Fellows, 2009 p.37) as the trend of appointing new undergraduates of construction management straight into positions of management continues. Integrating a suite of CPD modules into a formal learning programme at postgraduate level may be one way of ensuring the social values of the built environment are maintained for future generations of construction managers.

One of the many important components of ensuring a construction project operates efficiently is the determination of the functions of all stakeholders participating in the project. The structure of any organisation is the pattern of relationships between roles in an organisation and its different parts (Mullins, 1993, Mabey, Salaman and Storey, 2001). Construction managers apply organisational structure for every construction project. Learning how to design and implement a structural design requires both formal and practical knowledge gain. The respondents in the survey questionnaire are divided in deciding, if learning how to design organisational structure appropriate to the needs of a particular site, is more effective through CPD or a construction management postgraduate programme. Table 5.8 illustrates how 56.7% are in favour of a CPD route while 50% are in favour of learning on a construction management postgraduate programme. An identified core module across all of the identified programmes in the desk survey data is management studies. This evidence shows the opportunity to gain knowledge in the design of organisational structure is being provided at postgraduate level. The proposal is that the integration of CPD into formal management studies will promote the abilities of construction managers to design and implement more effective structural design organisational plans on every construction project.

The demands a construction process places on individual construction managers, their clients and the public interests are often very high. Construction managers need to learn what these demands are likely to be and what steps they need to take to deal with them effectively. Desk survey data provides evidence that the identified programmes provide this opportunity through the delivery of core modules such as management of projects, management, industrial relations, resource management and sustainability. The data gathered, tends to suggest that these modules are delivered formally or by instruction/lecturing via classroom, web, laboratory or blended learning. The evidence does not highlight the use of CPD as a means of imparting knowledge to the participants. Table 5.9 is evidence that 70% of respondents to the questionnaire survey agree that learning about the demands that the construction process can place on themselves, their clients and the public are best taught through a postgraduate construction management programme. However, 50% believe CPD is the best place,

thereby further adding to the proposal of integrating CPD into postgraduate education for construction managers.

6.3 New framework for postgraduate programme in Construction Management

Building on the opinion that education, in whatever format, is too important to be left to one organisation or group and summating from the data emerging out of the questionnaire survey table 6.1 is a suggested framework for a new postgraduate programme in construction management that should be introduced for Ireland's construction managers.

Possible Modules Taught Through Formal Education	**Possible Delivery Methods**	**Higher Education ←(HE) Professional Body (PB)→**	**Possible Modules Taught Through Professional body CPD**	**Possible Delivery Methods**
Construction, Business and Contracts Law	Classroom based and case study research	←HE PB→	Human Resource Management	Blended Learning with F2F 1 day work shops
Finance Management	Classroom based with case study research	←HE PB→	Construction Economics	Blended Learning with F2F workshops and attendance of related seminars
Partnership and Collaborative Working	Community based project with blended and problem based learning	←HE PB→	Managing the Construction Process	Blended Learning with F2F workshops and scheduled visits by professional body supervisor to students place of work
Environmental	Classroom based with case study research	←HE PB→	Construction Organisation and Project Practice	Work Based Learning, students produce a portfolio of

				learning as evidence
Corporate Versus Social Responsibility	Problem Based Learning and Case Study Research	←HE PB→	Value Management, purchasing and cost control	Related Seminars, students to produce a procedures manual
Management of Technology	Controlled workshop/laboratory experiments	←HE PB→	Marketing	Related seminars
Research Methodology	Classroom Based Lecturers	←HE PB→	Industrial Project	Development of a portfolio/manual under supervision of professional body supervisor
Research Dissertation	Under the supervision of an academic	←HE PB→	Infrastructure Development	Related Seminars with key note speakers from other European cities
Quality Assurance Management Procedures	Classroom based lecturers with case study research	←HE PB→	Team and leadership development	Work place learning under supervision of professional body representative
Project Management Tools and Techniques	Classroom based lecturers with continuous assessment project	←HE PB→	Ground investigation and assessment	Work place learning with case study research

Table 6.1 Framework for new Postgraduate Programme in Construction Management

This research reveals an opportunity for higher education to create a postgraduate programme in collaboration with the professional bodies, which ensures its participants develop their intellectual skills grounded in a broad base knowledge underpinned by situated learning at the core of its pedagogy. This mixed CPD and formal educational postgraduate programme will need to be developed in a way that affords the higher

educational institutes the luxury to develop students minds and mental powers of speech, communication, reasoning and analysis, creativity and imagination and moral discernment, and empowers the professional bodies to deliver the technical and professional development learning outcome driven subjects through a series of well planned and timely CPD programmes of study.

The literature combined with the desktop survey and questionnaire survey confirms construction professionalism as having a distinct body of knowledge (which must be gained through a combination of postgraduate formal, CPD, experiential and community practice based learning), mutual recognition, established regulation to membership and a high standard of ethics in relation to providing service to the public. The questionnaire survey uncovered that the level of education each of the respondents have achieved is supported by the literature review, evidence which further strengthens the argument for a mixed approach to postgraduate education.

6.4 Conclusion

Chapter six discussed the evidence supporting the need for continuous professional development. Data from the literature review was cross referenced with the data from the questionnaire survey, to support the inductive argument for the development of a new postgraduate programme for construction managers. Part of this cross referencing confirmed that the construction management knowledge is gained through social interactions across all of the built environment professions and crafts.

Finally, a framework for a new postgraduate programme in construction management was presented. This framework clearly identified possible modules which need to become the collective responsibility of both the higher education institutes and the professional bodies.

CHAPTER SEVEN

CONCLUSIONS, RECOMMENDATIONS AND REFLECTIONS

7.1 Conclusion

The aim of this research was to assess the postgraduate education needs of the construction manager. Presentation of the desk research and the questionnaire survey responses highlighted how the current formal education postgraduate programmes in construction management have high levels of technical content, and are focused on technical learning outcomes. The desk research illustrated how the suite of postgraduate construction management programmes available in Ireland and UK are very similar in content and delivery, with only slight differences in subject content identified.

This research discussed how the professional bodies and industry kept up to date with the advancing technology by virtue of the fact that they are at the cold face of these technological advances. The research data revealed that a greater number of undergraduate students found direct employment in management, thereby loosing out on experiencing hands on construction process from the ground up.

In the beginning, this research set out to assess the postgraduate construction management education needs and to identify if the programmes on offer matched industry's expectations. The programmes identified in the desk top survey offer modules which are rich in innovation, general construction technology requirements and up to date professional management practice. The path of discovery led to a greater focus being placed on the question of what can these programmes offer through formal learning that cannot be gained through informal learning (CPD).

This research collected the responses from industry, academics and professional body representatives and asked how construction practice is best learnt. The data collected, revealed that the respondents indicated a need for a mixed formal and informal CPD approach to postgraduate education in construction management. Areas such as learning to respond efficiently and effectively to clients' needs when conventional methods are

deemed unsuitable, acquiring a breadth of knowledge of the skills and contributions of built environment professionals/crafts and learning to positively deal with the demands that the construction process can place on individuals are best learnt through a managed programme of CPD. On the other hand, areas such as management education, design of an organisational structure and learning to become a more effective and efficient manager are best learnt through formal postgraduate education programmes. This research clearly identifies the main skills the construction professionals perceive to be important for effective management. The core modules such as communication, project management, motivation, ability to critically analysis, ability to develop or adapt management systems meet with the demands of clients. Personal skills such as willingness to learn and flexibility, are perceived as highly desirable skills for a construction manager. The desk top research identified that WIT offers the only taught postgraduate programme which addresses the formal education needs of a construction manager. Failing this, individuals have the choice of completing masters in construction management by research, specialising in a non construction management profession such as construction law or building conservation or travelling abroad to the UK to complete one of the many available construction management programmes. The questionnaire survey received an 87.5% yes response to the question that asked, if there is a need for postgraduate education in construction management. Triangulation of the literature, the questionnaire survey data and the desktop survey data led to the development of a framework for the type of postgraduate education programme in construction management that should be put in place.

7.2 Recommendations

- The DIT should develop a postgraduate education in construction management because the evidence indicates there is a demand, and no other higher education institute in the Dublin area offers a programme that meets the specific need of a construction manager.

- Further research into the experiences of postgraduate students in construction management should be conducted, to help maximise the potential of all postgraduate programmes in construction management.
- A pilot programme incorporating mixed delivery similar to the framework suggested in table 6.1 should be implemented for an initial short (one semester) time period. This pilot should involve representatives of professional bodies, higher education academics and a small cohort of students. The pilot programme will need to be monitored closely, and falling out of this monitoring, a quality assured best practice model must be developed to maintain consistent delivery of education and training at a high level for all future developed or re-evaluated postgraduate construction management programmes.

7.3 Reflections

Integrating mixed models of delivery into formal education is crucial for future expansion of education, and funding for research in construction management. Working with professional bodies with a unified purpose will give the higher education institutes higher recognition and access to funding which will prove invaluable. If the DIT wishes to offer industry a taught masters in construction management or any of the built environment professions, it must strongly consider that the long term sustainable future of this programme will depend on radically different content to what is currently offered.

The literature review confirmed the present difficulties of Ireland's construction industry; it also revealed the growth potential in the short, medium and long term future. The Irish economy has outgrown its industrial based economy and has evolved into a knowledge economy. For construction professionals to flourish in a knowledge economy, they need access now more than ever before to a balanced and flexible form of education that will enable them to adapt to the changing construction needs of a global economy.

The construction industry went through a period of radical change during the course of this research. The recommendations and development of a postgraduate framework have come at a time when industry needs direction. The implementation of the suggested framework needs to be introduced on a phased basis if it is to survive long-term and help the industry recover. Introducing it as a knee-jerk reaction to an already existing crisis may deny the framework and the industry their ability to reach full potential. In the words of the Flanagan (2007) former CIOB President:

> The construction manager is rarely given the spotlight, and almost never in the spirit of congratulations. Not only does this affect public perception, it does little to inspire our future leaders, or indeed our community of practice.
> (Foreword to a CIOB report on construction leaders)

REFERENCE LIST

Ashworth, A (2009) Developments in Construction Education in the UK, In Langford, D A and Hughes, WP (eds) *Building a Discipline: The Story of Construction Management,* Association of Researchers in Construction Management (ACROM), University of Reading, Reading.

Aston , D and Snug, J (2002) *Supporting Workplace Learning for High Performance Working,* Geneva International Labour Office, Geneva.

Atkin, B (2009) Future of Construction Management, In Langford, D A and Hughes, WP (eds) *Building a Discipline: The Story of Construction Management,* Association of Researchers in Construction Management (ACROM), University of Reading, Reading.

Bartlett, S, Burton, D and Peim, N (2001) *Introduction to Education Studies,* Sage, London.

Bateson, G B (1972) *The Logical Categories of Learning and Communication: Steps to an Ecology of Mind,* University Press, Chicago.

Beckett, D and Hager, P (2002) *Life, Work and Learning: Practice in Postmodernity,* Routledge, London.

Berlin Communiqué 2003, Communiqué of the Conference of Ministers responsible for Higher Education, Berlin 19 September 2003, *Realising the European Higher Education Area*.
http://www.bologna-berlin2003.de/pdf/Communique1.pdf **[Accessed 30th September 2007]**

Bilbo, D, Fetters, T, Burt, R and Avant, J (2000) A Study of Supply and Demand for Construction Graduates*, Journal of Education*, 5(1), 78-79.

Bologna Process (2004) *A Framework for Qualifications of the European Higher Education Area: Bologna Working Group on Qualifications Frameworks*, Ministry of Science Technology and Innovation, Copenhagen.

Boud, D and Garrick, J (1999) Understanding of Workplace Learning*,* In Boud, D. and Garrick, J. (eds) *Understanding Learning at Work*, Routledge, London.

Boyt, T E, Lusch, R F and Naylor, G (2001) The Role of Professionalism in Determining Job Satisfaction in Professional Services: a Study of Marketing Researchers, *Journal of Service Research*, 3(4), 321-330.

Browell, S (2000) Staff Development and Professional Education: a Cooperative Model, *Journal of Workplace Learning*, 12(2), 57-65.

Brown, J S, Collins, A and Duguid, S (1989) Situated Cognition and the Culture of Learning, *Educational Researcher*, 18(1), 32-42.
Buehl, M M and Alexander, P A (2001) Beliefs About Academic Knowledge, *Educational Psychology Review*, 13, 385-418.

Business & Leadership (2010)
http://www.businessandleadership.com/leadership/news/article/22187/ **[Accessed 16th June 2010]**

Central Statistics Office Ireland
http://www.cso.ie/statistics/construction.htm **[Accessed 20th February 2009].**

Chartered Institute of Builders
http://www.ciob.org.uk/membership **[Accessed 08th August 2008]**

Condie, R and Livingston, K (2007) Blending Online Learning with Traditional Approaches: Changing Practices, *British Journal of Educational Technology*, 38(2), 337-348.

Creswell, J W (2007) *Qualitative Inquiry and Research Design: Choosing among Five Traditions,* 2nd ed, Sage, CA.

Crotty, M (1998) *The Foundations of Social Research*, Sage Publications, London.

Cupchik, G (2001) *Constructivist Realism: An Ontology that Encompasses Positivist and Constructivist Approaches to the Social Sciences* FQS 2(1).
http://www.qualitative-research.net/fqs/ **[Accessed 16th June 2010].**

Dainty, A R, Qin, J and Carrillo, P (2005) HRM Strategies for Promoting Knowledge Sharing within Construction Project Organisations: a Case Study, In Kazi, A S (ed) *Knowledge Management in the Construction Industry: A Socio-Technical Perspective*, 18-33, Idea Group Publishing, London.

Davey, C, Powell, J, Cooper, I and Powell J (2004) Innovation, Construction SMEs and Action Learning, *Engineering Construction and Architectural Management*, 11(4), 230-237.

Davis Langdon PKS (2006) *Irish Construction Industry: Annual Review 2006*. http://www.dlpks.ie **[Accessed 01st March 2009]**

Day, C (1999) *Developing Teachers: the Challenges of Lifelong Learning*, Falmer, London.

Denzin, N K and Lincoln, Y (eds) (2000) *Handbook of Qualitative Research*, Sage Publications Inc., London.

Department of Education and Science and Department of Enterprise, Trade and Employment (2002) *Report of the Taskforce on Lifelong Learning: October 2002,* The Stationery Store Office, Dublin.

DKM Economic Consultants (2010) *Construction Industry Indicators: Issue 20, April 2010*, Department of the Environment, Heritage and Local Government, Dublin.

DKM Economic Consultants (2009) *Construction Industry Indicators: Issue 18, September 2009*, Department of Environment Heritage and Local Government, Dublin.

DKM Economic Consultants (2007) *Construction Industry Indicators: Issue 11, November 2007*, Department of Environment Heritage and Local Government, Dublin

Doyle, H (2000) *Learning for Life: White Paper on Adult Education*, Department of Education and Science, Dublin.

Dulami, M (2009) The Arab World*,* In Langford, D A and Hughes, WP (eds) *Building a Discipline: The Story of Construction Management,* Association of Researchers in Construction Management (ACROM), University of Reading, Reading.

Driscoll, M P (1994) *Psychology of Learning for Instruction*, Allyn and Bacon, Boston.

Egbu, C and Robinson, H (2005) Construction as a Knowledge-Based Industry*,* In Anumba, C, Egbu, C and Carrillo, P (eds) *Knowledge Management in Construction*, Blackwell Publishing, Oxford.

Eisenstadt, M and Vincent, T (2000) *The Knowledge Web: Learning and Collaborating on the Net,* 2nd ed, Kogan Page Ltd, London.

Engestrom, Y (2004) The New Generation of Expertise: Seven Thesis, In Rainbird, H. et al (eds) *Workplace Learning in Context*, Routledge, London and New York.

Engestrom, Y (2001) Expansive Learning at Work: Toward an Activity Theoretical Reonceptualization, *Journal of Education and Work*, 14(1), 131-15

Engestrom, Y (1994) *Training for Change: New Approach to Instruction and Learning in Working Life*, International Labour Office, Geneva.

Engestrom, Y (1991) Non Scolae Sed Vitae Discimus: Toward Overcoming Encapsulation of School Learning, *Learning and Instruction*, 1, 243-259.

Erickson, F (1986) Qualitative Methods in Research on Teaching, In Wittrock, M (ed) *Handbook of Research on Teaching,* Macmillan, New York.

EU Recommendation 2003/361/EC (2005) Official Journal L124 of 20-05-2003, concerning the definition of micro, small and medium-sized enterprises.

Evolving a Portal for Lifelong Learning for Construction Professionals the Journal of Construction Innovation, based on the research funding provided by Socrates, Minerva. http//www.camprof.com/euscccip/home/htp **[Accessed 2nd June 2009]**

Fallows, S and Steven, C (2000) *Integrating Key Skills in Higher Education,* Kogan Page Ltd, London.

Fellows, R (2009) Institutions Supporting the Discipline, In Langford, D A and Hughes, WP (eds) *Building a Discipline: The Story of Construction Management,* Association of Researchers in Construction Management (ACROM), University of Reading, Reading.

Fitzpatrick Associates, Davis Langdon Consultancy and Talbot Associates (2003) *Business Case for an Applied Construction Innovation Centre: May 2003*, Forum for the Construction Industry, Department of Environment, Heritage and Local Government, Dublin.

Fitzpatrick Associates (2002) *Report prepared for the National Development Plan and Community Support Framework (NDP/CSF) Evaluation Unit July 2002*, Department of Enterprise Trade and Employment, Dublin.

Fitgerald, T and Gunter, H M (2008) Educational Administration and History Part 2, *Academic Journals and the contributions of Journals of Educational Admistration and History* 40(1), 23-23.

Flanagan, R. (2007) Foreword in Collier, C (ed) *Construction Leaders,* Chartered Institute of Building, Ascot.

Fosnot, C (1996) *Constructivism: Theory,Perspectives, and Practice,* Teachers College Press, New York.

Freidson, E (2001) *Professionalism, the Third Logic: On the Practice of Knowledge*, The University of Chicago Press, Chicago.

Fullan, M and Hargreaves, A (1992) Teacher Development and Educational Change, In M Fullan, M and Hargreaves, A (eds) *Teacher development and Educational Change,* RoutledgeFalmer, London.

Gage, N and Berliner, D (1998) *Educational Psychology*, 6th ed, Houghton Mifflin, Boston.

Gallagher, M (2000) The challenges facing higher education research training, In Kiley, M and Mullins, G (eds) *Quality in Postgraduate Research: Making Ends Meet*,

Proceedings of the 2000 Quality in Postgraduate Research Conference, Adelaide, April 13-14, Advisory Centre for University Education, University of Adelaide, Adelaide.

Gann, D M (2001) Putting Academic Ideas into Practice; Technological Process and Absorptive Capacity of Construction Organisations, *Construction Management and Economics*, 19, 321-330.

Gardner, H (1993) *Multiple Intelligences*, Basic Books, New York.

Gillham, B (2000) *Developing a Questionnaire,* Real World Research Continum, London

Gough, N (2000) *Methodologies under the Microscope,* Paper presented at Deakin University Postgraduate Association (DUPA) research conference, Australia.

Gould, F E and Joyce, N E (2002) *Construction Project Management,* Professional edition*,* Prentice Hall, New Jersey.

Grunderson, D, Schroeder, H and Holland, H R (2002) Needs Assessment a Construction Management Bachelor of Science Programme in Alaska*, Journal of Construction Education*, 7(2), 86-89.

Hager, P (2004) The Conceptualisation and Measurement of Learning at Work, In Rainbird, H et al (eds) (2004) *Workplace Learning in Context,* Routledge, London and New York.

Hager, P (1999) Finding a Good Theory of Workplace Learning, *In Boud, D and Garrick, J (eds) Understanding Learning at Work,* Routledge, London.

Hart, C (2005) *Doing your Masters Dissertation: Realising your potential as a Social Scientist,* Sage Publications Ltd, London.

Hassan, P F, Griffith, A and Stephenson, P (2005) An Empirical Study of the Training Needs of Site Managers Within the UK Construction Industry, In Khosrowshahi, F (ed) *21st Annual ARCOM Conference*, 7-9 September 2005, SOAS, University of London, *Association of Researchers in Construction Management*, 1, 95-104.

Helsby, G (1995) Teachers' Construction of Professionalism in England in the 1990s, *Journal of Education for Teaching*, 21(3), 317-332

Higher Education and Training Awards Council Ireland (2005) *European Area for Higher Education: Bologna Process Bergen Communiqué,* HETAC, Dublin.

Higher Education and Training Awards Council Ireland (2003) *European Area for Higher Education: Bologna Process Berlin Communiqué,* HETAC, Dublin.

Hofer, B K and Pintrich, P R (eds) (2002) *Personal Epistemology*, Erlbaum, Mahwah, New Jersey.

Hoyle, E (2001) Teaching: Prestige, Status and Esteem, *Educational Management & Administration*, 29 (2), 139-152.

Hoyle, E and Wallace, M (2005) *Educational Leadership: Ambiguity, Professionals and Managerialism*, Sage, London.

Irish Business and Employers Confederation (2000), *National Training Survey*, IBEC, Dublin.

Illeris, K (2004) *The Three Dimensions of Learning,* Niace Publications, Leicester.

Institute of Professional Development
http://www.trainingzone.co.uk/icpd **[Accessed 6th September 2008]**

Irish Universities Association (2005) *Reform of 3rd Level and Creation of 4th Level Ireland: Securing Competitive Advantage in the 21st Century: a Framework Proposal Submitted by the Irish Universities Association, October 2005,* Irish Universities Association, Dublin
http://www.iua.ie/document/Reformed3rdlevelandCreation3thlevelIrelandProposal-IUAoctober2005_000pdf **[Accessed 30th September 2006].**

Kelly, K (2005) Innovation in the Building Industry, In Sweetman, M. (ed) The Engineers Journal, *Journal of the Institution of Engineers of Ireland*, 59(2), 83-85.

Langford, D A and Hughes, W P (eds) (2009) *Building a Discipline: the Story of Construction Management*, Association of Researchers in Construction Management (ACROM), University of Reading, Reading.

Lave, J and Wenger, E (1991) *Situated Learning: Legitimate Peripheral Participation* Cambridge University Press, New York.

Lewis, M (2009) Caribbean Region*,* In Langford, D A and Hughes, WP (eds) *Building a Discipline: The Story of Construction Management,* Association of Researchers in Construction Management (ACROM), University of Reading, Reading.

Lynch, K (1997) A Profile of Mature Students in Higher Education and an Analysis of Equality Issues*, Proceedings of the Mature Students in Higher Education Conference held at University College Dublin, January 1997*.

Mabey, C, Salaman, G and Storey, J (2001) Organisational Structuring and Restructuring*,* In Salaman, G (eds) *Understanding Business Organisation.* Routledge, London.

Malin, N (ed) (2000) *Professionalism, Boundaries and the Workplace*, Routledge, London.

Matthews, P (1999) Workplace Learning: Developing a Holistic Approach, *The Learning Organisation*, 6(1), 18-29.

Meister, J C (1998) *Corporate Universities*, Mc Grath-Hill, New York.

Merricks, L (2001) 'The emerging idea', In: Jarvis Peter *The Age of Learning Education and Knowledge Society*, Kogan Page Ltd, London.

Mullins, L J (1993) *Management and Organisational Behaviour,* 3rd ed, Pitman Publishing, London.

Müller, S, Rebmann, K and Liebsch E (2008) *Trainers' Beliefs About Knowledge and Learning: a Pilot Study*, European Journal of Vocational Training, 45, 2008/3, 90-108. http://www.cedefop.europa.eu/EN/Files/45-en.pdf **[Accessed 29th May 2010]**

Murray, M (2009) Journal Contributions to the Discipline, In Langford, D A and Hughes, WP (eds) *Building a Discipline: The Story of Construction Management,* Association of Researchers in Construction Management (ACROM), University of Reading, Reading.

Oppenheim, A N (1992) *Questionnaire Design, Interviewing and Attitude Measurement,* Continuum, London.

Patton, M Q (1990) *Qualitative Evaluation and Research Methods,* Sage Publications, London.

Raiden, A and Dainty, A (2006) Human Resource development (HRD) in Construction Organizations: an Example of a 'Chaordic' Learning Organization? *The Learning Organisation*, 13(1), 63-79.

Ravenscroft, A (2001) Designing E-learning Interactions in the 21st Century: Revisiting and Rethinking the Role of Theory, *European Journal of Education*, 36 (2), 133-156.

Reece, I and Walker, S (2003) *Teaching, Training and Learning: Practical Guide,* 5th ed, Business Education, Sunderland.

Reeve, F and Gallacher, J (1999) *How are the Discourses of Work-based Learning Influencing Practice, Research Work and Learning,* A first international conference*,* 10th-12th September 1999, Trinity and All Saints College, University of Leeds.

Roche, F & Tansey, P (1992) *Industrial Training in Ireland: a Study Prepared for the Industrial Policy Review Group*, Stationery Office, Dublin.

Rutledge, K (2000) *Social Learning Theory,* http://teachnet.edb.edu/~lynda.abbott/Social. html **[Accessed 12th December 2009]**

Salant, P and D A Dillman (1994) *How to Conduct Your Own Survey*, John Wiley & Sons, New York.

Saunders, M, Lewis, P and Thornhill, A. (2003) *Research Methods for Business Students,* 3rd ed, Prentice Hall and Pearsons Education Ltd, Harlow.

Schexnayder, C J and Mayo, R E (2004) *Construction Management Fundamentals,* McGraw-Hill, New York.

Schommer, M (1994) An Emerging Conceptualization of Epistemological Beliefs and Their Role in Learning, In Garner, R and Alexander, P (eds) *Beliefs About Text And Instruction With Text*, Hillsdale, New Jersey, Erlbaum.

Scruton, R (1994) *Modern Philosophy,* Sinclair Stevensons, London.

Senge, P (1991) *The Fifth Discipline: the Art and Practice of the Learning Organisation,* Doubleday, New York.

Serpell, A (2009) *Chile and South America,* In Langford, D A and Hughes, WP (eds) *Building a Discipline: The Story of Construction Management,* Association of Researchers in Construction Management (ACROM), University of Reading, Reading.

Skills and Labour Market Research Unit (2003) *The Skills Monitoring Report*: *The Construction Industry 2003-2010, Number 1*, *June 2003*, Expert Group of Future Skills Needs (EGFSN), Dublin.

Skills and Labour Market Research Unit (2006) *The Skills Monitoring Report*, *Number 6* Expert Group of Future Skills Needs (EGFSN), Dublin.

Stones, R (1996) *Sociological Reasoning: Towards a Post-modern Sociology,* Macmillan, London.

Sustainable Energy Authority Ireland (2010) *Strategic Plan 2010-2015,* http//www.seai.ie **[Accessed 4th May 2010]**.

Tam, M (2000) Constructivism, Instructional design, and Technology: Implications for Transforming Distance Learning, *Educational Technology & Society*, 3 (2), 50-60.

Tansey, P (2003) *The Training Imperative: 2002-2003 FÁS Labour Market Update*, Tansey Webster Stewart & Company, Dublin.

The Society of Chartered Surveyors (1996) *Guidance Notes for: Continuing Professional Development,* The Society of Chartered Surveyors, Dublin 2.

The EU Lisbon Summit 23-24 March (2000), *Employment, Economic Reforms and Social Cohesion - towards a Europe based on innovation and knowledge,* Lisbon.

Thomas, E J (1995) Developing Continuing Education and Training in European universities, *Journal of European Industrial Training*, 19(4), 11-16.

Trotman-Dickenson, D I (1988) Learning and Teaching Problems in Part-time Higher Education, *Higher Education Review,* 20(2), 47-59.

Ulster Bank (2010) Construction PMI Report (ROI) 14th April 2010 http//www.ulsterbank.ie **[Accessed 16th June 2010]**

United Nations Environment Programme (2008) Green Jobs: Towards Decent Work in a Sustainable, Low-Carbon World, Worldwatch Institute, Washington D.C.

Webster's Ninth New Collegiate Dictionary (1985), 9th ed, Merriam-Webster Inc., Springfield.

Wenger, E (1998) Communities of Practice: Learning as a Social System, *Systems Thinker*, 9(5).
http://www.co-i-l.com/coil/knowledge-garden/cop/lss.shtml **[Accessed 16th June 2010]**.

Yin, R K (2003) *Case Study Research: Design and methods,* 3rd ed, Sage Publications, California.

Youngman, M B (1982) *Presenting Research Results,* Rediguide 25, TRC-Rediguides Ltd, Oxford.

BIBLIOGRAPHY

Academic Quality Assurance Committee (2004) Report of sub-group in relation to

Access, Transfer and Progression.

Arksey, H, Marchant, I and Simmill, C (1994) *Juggling for a Degree: Mature Students' Experience of University Life*, Unit for Innovation in Higher Education, University of Lancaster, Lancaster.

Aronson, J (1992) *The Interface of Family Therapy and a Juvenile Arbitration and Mediation Program.* Unpublished doctoral dissertation, Nova Southeastern University, Fort Lauderdale, FL.

Ahern, B (2005) *Ard Fheis Address: Proceedings of the Fianna Fáil Ard Fheis held at City West Dublin 21st October 2005*, Fianna Fail, Dublin.

Bell, J (2005) *Doing your Research Project: A Guide for First-Time Researchers in Education, Health and Social Science*, 4th ed, Open University Press, Buckingham.

Benner, P (1985) Quality of Life: A Phenomenological Perspective on Explanation, Prediction, and Understanding in Nursing Science, *Advances in Nursing Science, 8*(1), 1-14.

Berger, R and Patchner, M (1988) *Implementing the Research Plan: A Guide for the Helping Professions*, Sage, Newbury Park, CA.

Biggs, J (1999) *Teaching for Quality Learning at University*, The Society of Research into Higher Education, 2nd ed, SHRE and Open University Press, Buckingham.

British Educational Research Association (2004) *Revised Ethical Guidelines for Educational Research 2004,* British Educational Research Association, Southwell, Notts.

Cohen, L Manion, L and Morrisson, K (200) *Research methods in Education*, 5th ed, Routledge Falmer, London.

Delamount, S and Hamilton, D (1976) Classroom Research: A Critique and new Approach, In Stubbs, M and & Dealmounts, S (eds), *Exploration in Classroom Observation*, John Wiley and Sons, London.

Dublin Institute of Technology (2002) *Strategic Plan for the Department of Construction Management and Technology*, Bolton Street, Dublin

Dublin Institute of Technology (2001) *Faculty of the Built Environment Interim Strategic Plan*, Bolton Street, Dublin.

Dublin Institute of Technology (2000) *Strategic Plan: A Vision for DIT's Development 2000-2015*, Angier Street, Dublin.

Eisner, E (1885) *Learning and Teaching the Ways of Knowing*, University of Chicago Press, Chicago.

Erickson, F (1986) Qualitative Methods in Research on Teaching. In Wittrock, M (ed) *Handbook of Research on Teaching*, Macmillan, New York.

Foddy, W (1994) *Constructing Questions for Interviews and Questionnaires*, Cambridge University Press, Cambridge

Foras Áiseanna Saothair (2006) *Study of Project Management Skills in the Irish Construction Industry*, Brooker Consulting, Dublin.

Geetz, C (1983) *Local Knowledge: Further Essay in Interpretative Anthropology*, Basic Books, New York.

George, J and Cowan, J (1999) A *Handbook of Techniques for Formative Evaluation*, Kogan Page, London.

Harvey, L (2000) New Realities: The Relationship Between Higher Education and Employment, *Teritary Education and Management*, 6(1), 3-17.

Haselgrove, S (ed) (1994) *The Student Experience*, Buckingham, SRHE/Open University Press. Buckingham.

Leininger, M M (1985) Ethnography and Ethno nursing: Models and Modes of Qualitative Data Analysis, In Leininger, M M (ed) *Qualitative research methods in nursing*,Grune & Stratton, Orlando.

Mc Connell, D (2000) *Implementing Computer Supported Cooperative Learning*, 2nd ed, Kogan Page Ltd, London.

National Qualifications Authority of Ireland (2003) Policy on Access, Transfer and Progression, National Qualifications Authority of Ireland, Dublin.

Picciano, A G (2004) *Educational Research Primer*, Continuum, London

Polanyi, M (1962) *Personal Knowledge: Towards a Post Critical Philosophy*, University of Chicago Press, Chicago.

Pring, R (2000) *Philosophy of Educational Research*, Continuum, London

Robson, C (1993) *Real World Research: A Resource for Social Scientists and Practitioner Researchers*, Blackwell, Oxford.

Rumble, G (2001) *The Cost and Economics of Open and Distance Learning*, Kogan Page, London.

Sammons, P (1989) Ethical Issues in Statistical Work, In Burgess, R, *The Ethics of Educational Research*, Falmer Press, London.

Schwandt, T (2004) Three Epistemological Stances for Qualitative Inquiry, In N. Savin-Baden, M and Wilkie, K (eds) *Challenging Research in Problem Based Learning*, The Society of Research into Higher Education, Open University Press, Berkshire.

Smith, J and Naylor, R (2001) Dropping out of University: A Statistical Analysis of the Probability of Withdrawal for UK University Students, *Journal of the Royal Statistical Society Series A (Statistics in society),* 164(2), 389-405.

Stake, R (1985) *The Art of Case Studies*, Sage Publications Inc., California.

Taylor, S J and Bogdan, R (1984) *Introduction to Qualitative Research Methods*: *The Search for Meanings*, John Wiley & Sons, New York.

Travers, M (2001) *Qualitative Research Through Case Study*, Sage Publications, London.

Yorke, M (1999) *Leaving Early: Undergraduate Non-Completion in Higher Education*, Falmer Press, London.

Appendix I: Summary of Postgraduate Construction Management Programmes Desk Research Findings

Name of Higher Education Institute	Title of the award	Summary of Modules taught	Method of Delivery
Waterford Institute of Technology	MSc International Construction Management	International Studies & Human Resource Mgm, Business and Construction Law, Mgm and Marketing, Economics and Finance, Strategic Mgm, Mgm of Projects Mgm of Technology, Research Methodology & Dissertation or Industrial Project	Blended Learning
	MSc Construction Project Management	Mgm Studies, Mgm of Projects 1 Economics, Finance, Mgm of Information & Communication Technology Construction Law Strategic Mgm Human Resource Mgm & Ind Relations Mgm of Projects 2 Research Methodology Dissertation or Industrial Project	Taught Classroom with remote technology based assistance
Trinity College Dublin	PgD Construction Law and Contracts Administration	Construction Law, Introduction to the Irish Legal System, The Irish Litigation Process, EU Law and Private International Law, Statutory Duties and Construction Projects, Dispute Resolution.	Classroom Based
	PgD Applied Building Repair and Conservation	The built heritage legalisation and economics. Research documentation, building surveying and recording. Building stone, Ceramics, Metals, Timber and Mudwall. Building Limes and Cement, Concrete. Construction Technology and Project Management, Managing Case Study. Structural Damage and Repairs to Masonry Fabrics and Building Elements, Structural Case Study. Research Thesis	Class room and laboratory
Northumbria University	PgC, PgD & MSc in Construction Project Mgm	Project Mgm (process and People), Resource Mgm (Human & Financial), Change Mgm (Business & Org), Decision making (Risk & Value Mgm), Partnership & Collaborative Working), Project Sustainability, Applied Research Methods, Project information Systems, Law & Contract Strategy, Project Mgm Dissertation.	Taught Modules and an original research based dissertation
Glasgow Caledonian University	PgC, PgD/MSc in Construction Mgm	Complete a total of 8 modules, the three core modules are as follows: Research Methods, Construction Org & Project Practice, Dissertation. Students choose 5 elective modules from the following: Mgm of H&S in	Taught Modules with the option of Blended learning for

		Construction, Dispute Resolution, Value Management, Const Project Finance, Project Mgm, Mgm of People in Const, Const Markets & Procurement, Strategic Mgm in Const properties, Managing the Const process, Project & Development Risk, Strategic Facilities Mgm, Contract Admin, Environmental and impact assessment	the More experienced Construction Professional
Glasgow Caledonian University	MSc International Project Mgm	**Complete a total of 8 modules, the three core modules are as follows:** Research Methods, Integration and scope Mgm, Project Mgm, Dissertation. **Students choose 5 elective modules from the following**: International Dispute Const resolution, International Cooperate Social Responsibility, Construction Organisations and Project Practices, Value Mgm, International Construction & Infrastructure development, International Const Project Finance, Strategic Mgm in Const Property, Managing the Const Process, Project & Development Risk, Construction markets & Procurement, Contract Administration.	Web Based Learning
University of Glamorgan	PgD & MSc in Construction Project Mgm	Business Operations, Financial Mgm for Construction & Real Estate, Applied research methods, Project Planning & Control, Asset & Facilities Mgm, Construction Law & practice, MSc Dissertation.	Taught Modules with Some PBL assignments
University of Central Lancashire	PgC, PgD, MSc in Construction Law & Dispute Resolution	Legal Skills, Contractual Issues, European Construction Law, Tortious Issues, Environmental law, Dispute Resolution, Research Methods, Dissertation.	Taught Modules using Blended Learning through Web CT
University of Central Lancashire	MSc Const Project Mgm	**Complete the core modules as follows**: Project Team & Leadership Development, Quality Mgm Systems, Risk Assessment & Mgm, Research Methods, Dissertation **The Elective Modules as Follows:** Project Mgm, Project cost analysis & appraisal, Expenditure planning control, Construction Law, Aspects of the Env & Safety, Health & Safety, Waste Disposal.	Taught Modules Classroom Based
University of Portsmouth	MSc Construction Project Mgm	**Complete the core modules as follows:** Projects and the law, Property Economics and Finance, Project Mgm,	Taught Modules Classroom

		Project Mgm Tools & Techniques, Strategic Mgm in Const, Research Methods, Independent Project. **Elective Modules as Follows:** Geotechnology, General Mgm in Const, Adv Structural Analysis & Design, Env Mgm, Mgm of Traffic, Project Mgm Software, Const Materials Eng, Shoreline Mgm, Life cycle of Structures, Ground Investigation & assessment, Ground Water Hydrology, Ground Engineering, Waste Disposal & Remediation.	Based
Heriot-Watt University	MSc Const Mgm (project Mgm)	**Complete the core modules as follows:** Project Mgm Theory & Practice, Project Mgm Strategic issues, **Elective Modules as Follows:** Mgm & Org of People, Corporate Strategy, Contracts & procurement, Microeconomics & the Built Env, Macroeconomics finance & the Built Env, Value & Risk Mgm, Const Financial Mgm, Project Mgm Case Study	Taught Modules Classroom based
Kingston University	PgD/MSc Construction Mgm	**Complete the core modules as follows:** Accounting syst, Conditions of Contract, Const Org, Est Purchasing & Cost Control, Information Systems, Legal Obligations, Project & Risk Mgm, Quality & Safety Mgm, Research Thesis. **Elective Modules as Follows:** European Module	Taught Modules Classroom based
Kingston University	PgD/MSc Const Mgm & Const Law	Conditions of Contract4, Construction Law5, Construction Organisation6, Dispute Resolution, Estimating, Purchasing and Cost Control7, Further Legal Obligations8, Legal Obligations9, Project and Risk Management10 Research Thesis11	Taught Modules Classroom based
Liverpool John Moore's University	MSc Const Mgm	Strategy & Env, Human & org behaviour, Risk & value Mgm, Process & Info Mgm, Research Methods, Supply Chain Mgm, Total project mgm, Dissertation.	Taught Modules Classroom Based
London South Bank University	PgD/MSc Const Project Mgm	Corporate & Project finance, Const Mgm Science, Project Evaluation, People & Org Mgm, Construction Law, Procurement & Mgm of Const, Org of	Taught Modules Classroom based

		Firm.	
Napier University	MSc Const Project Mgm	Mgm, Procurement mgm, Project Mgm. Project Appraisal & Finance, Project Strategy, Production mgm, Research Skills, Project Risk Mgm, Property Asset Mgm, Dissertation.	Taught Modules Classroom & Distance learning
Napier University	MSc Property & Const Mgm	**Complete the core modules as follows:** Mgm, Law & Admin, Economics, Procurement Strategy, Production Mgm, Research Skills, Dissertation. **Elective Modules as Follows:** Property Asset Mgm, Project Mgm, Property & Const E-Commerce, Property Development.	Taught Modules Classroom & Distance Learning
Nottingham Trent University	MSc Project Mgm (Const)	Project Initiation and Appraisal, Corporate Procurement Strategy, Design, Value and Cost, Organisational Behaviour, Project Design and Development Control, Contract Law and Dispute Management, Project Control Including Health and Safety, Procurement Strategy and Rise Management, Research Methods, Postgraduate Dissertation	Taught Modules Classroom based
Nottingham Trent University	MSc Const Mgm	International Studies & Human Resource Mgm, Business and Construction Law, Mgm and Marketing, Economics and Finance, Strategic Mgm, Mgm of Projects Mgm of Technology, Research Methodology & Dissertation or Industrial Project	Taught Classroom based
Sheffield Hallam University	MSc Const Mgm	Project Initiation and Appraisal, Corporate Procurement Strategy, Design, Value and Cost, Organisational Behaviour, Project Design and Development Control, Contract Law and Dispute Management, Project Control Including Health and Safety, Procurement Strategy and Rise Management, Research Methods, Postgraduate Dissertation	Taught Modules Classroom based
Sheffield Hallam University	MSc Project Mgm (Const)	finance and law, principles of management, construction management, information technology, construction economics, contract procurement , project administration, information technology, dissertation	Taught Modules Classroom based
University of Bath	MSc International Const Mgm	Management in Construction, Economics in Construction, Construction Law, Managing Human Resources, Pre-Contract Management, Strategy in Construction, Project Management Techniques, Property	Distance Learning

		Development Appraisal, Env Mgm in Const, Design & Info Mgm, Dissertation	
University of Bath	MSc/PgD/CPD International Const Mgm	Project Mgm, Legal & Governance, Process Mgm, Collaborative design & Engineering, Integration & orientation, Perpetration for Thesis, Thesis Plus six Specialist Elective Modules.	
University of West England	PgC/PgD/MSc Const Project Mgm	Construction Project Mgm Principles, Built Envir Info Mgm, Construction Operations Mgm, Finance for Mgm, Const Procurement Mgm, Const Project Mgm Practice, Research for Policy and Practice, Organisational Analysis and Change, Dissertation	Taught Modules Classroom based
University of Salford	MSc/PgD Const Mgm	Finance and law, principles of management, fundamentals of project management, project management practice, construction economics, contract procurement, project administration, research workshop, dissertation	Taught Modules Classroom based
University of Salford	MSC/LLM/PgD/PgC Const Law and Practice	Management in Construction, Economics in Construction, Construction Law, Managing Human Resources, Pre-Contract Management, Strategy in Construction, Project Management Techniques, Property Development Appraisal, Env Mgm in Const, Design & Info Mgm, Dissertation	Distance Learning
University of Ulster	PgC/PgD/MSc Const and project Mgm	Construction Project Mgm Principles, Built Envir Info Mgm, Construction Operations Mgm, Finance for Mgm, Const Procurement Mgm, Const Project Mgm Practice, Research for Policy and Practice, Organisational Analysis and Change, Dissertation	Taught Modules Classroom based
TU Delft University of Technology	MSc Const Mgm & Engineering	Project Mgm, Legal & Governance, Process Mgm, Collaborative design & Engineering, Integration & orientation, Perpetration for Thesis, Thesis Plus six Specialist Elective Modules.	Taught Modules Classroom based

Appendix II: Summary of Top Construction Company Desk Research Findings

Name	Employees	Activity
ABM Construction	70	Construction company
Acheson & Glover	400	Building Materials Supply
Albany Homes / Trident Homes	2	House Builders Contractors
Andrews Construction	150	Building Contractors
Ascon - Rohcon	2020	Building Contracting & Civil Engineering
Ballymore Properties	140	Building Contractors
Banagher Concrete	250	Precast Concrete Manufacturer
Bennett Construction	200	Construction & Property Development
Bowen Group	650	Building & Civil Engineering
Brooks Group	480	Builders & Timber Merchants
Carroll Joinery	130	Joinery Manufacturer
Castlepark Construction	20	Building & Civil Engineering
Cedar Building Co	70	Building & Civil Engineering
Chieftain Group	200	Construction & Development
Cleary & Doyle Group	300	Construction/DIY/Concrete Block Manufacture
Clonmel Enterprises	130	Civil Engineering Contractors
Coffey Construction	380	Building & Civil Engineering
Collen Group	121	Building Contractors
Concast Group	150	Building/Concrete Products Manufacturer
Condron Concrete	160	Concrete Products Manufacture & Distribution

G & T Crampton Group	250	Building Contractor
CRH	54000	Building Materials Suppliers
Danniger	350	Residential & Commercial Construction
DPL Group	327	Builders Merchants/ Bathroom Suites
Duggan Brothers (Contractors)	200	Building/Civil Engineering
Durkan New Homes Ireland	150	Housing Developers
Dwyer Nolan Developments	50	Building Contractors
Ellen Construction	100	Construction
P Elliott & Co	250	Building/Civil Engineering
Fajon Construction	50	Construction Company
M Fitzgibbon (Builders)	100	Construction Company
John Fleming Construction	300	Building/Civil Engineers
Galway Plant & Tool Hire	150	Machinery & Equipment Hire/Supply
Gama Construction (Ireland)	1000	Construction
Gannon Homes	10	Property/Land Developer
Gem Group	20	Building Company
Glenman Corporation	60	Building Contractor
Grafton Group	4000	Builders Merchant/DIY Retailer
Green Property	20	Property Investment/Development
Gypsum Industries	330	Plasterboard Manufacturer
Harcourt Developments	200	Property Developers
Healy Brothers	60	Concrete Products Manufacturer
Heatmerchants	520	Plumbing/Ceramic Tile Retail &

		Distribution
PJ Hegarty & Sons	700	Building/Civil Engineering Contractors
Heiton Group	830	Steel/Timber/Builders Providers/DIY
Hollioake	24	Construction company
Howley Civil Engineering	360	Civil Engineers
IJM Timber Engineering T/A EcoBuilt	130	Timber Frame Manufacturers
Irish Cement	425	Cement Manufacturers
John Paul Group	420	Building & Civil Engineering Contractors
Jons Civil Engineering	164	Civil Engineers/ Consultants
Kelland Homes	35	Builders
Kenny Developments & Co	30	Property Development
Kentz Group	5000	Electrical/ Mechanical Engineering Consultant
Kentech	1100	Electrical & Mechanical Engineering
Kingspan Group	3200	Building Products Manufacturers
Kingscroft Developments	67	Property Developers
Lagan Group	1370	Road Surfacing/Road Maintenance
Laing O'Rourke	400	Construction
Liffey Developments	75	Civil Engineering Contractors
Michael Lynch	150	Construction/Civil Engineering
Manor Park Homebuilders	120	Builders
Maplewood	40	Building Contractors
Masonite Ireland	300	Manufacturers of Door Facings
Brian McCarthy Building	230	Building & Civil Engineering Contractors

Contractors		
McCabe Builders	170	Building Contractors
McGarrell Reilly Contractors	30	Building Contractors/Management
McInerney Holdings	700	Construction/Property Development
James McMahon Group	462	Wholesale Timber/Builders Merchants
Michael McNamara & Co	500	Building Contractors
Menolly Homes	20	Builders
SM Morris	145	Civil Engineers
Dan Morrissey Ireland	140	Concrete Products Manufacturer
Murnane & O'Shea	250	Building Contractors
Murphy International	230	Civil Engineers
William Neville & Sons Construction	50	Building Contractors
NTR	1200	Roads, Waste Management, Broadband Internet
O'Brien & O'Flynn	51	Construction Company
O'Callaghan Properties	175	Property Company
O'Flynn Construction	125	Building Contractors
TJ O'Mahony & Sons	70	Builders Providers
O'Malley Construction	312	Civil Engineering/Construction/Development
Park Developments (Dublin)	150	Building Company
Patton Group	405	Retail, Office & Interior Fit Outs

Pierse Contracting	700	Building-Engineering Contractor
Qualceram Shires	900	Bathroom Suite Manufacture/Distribution
Readymix	350	Concrete Product Manufacturer
JJ Rhattigan & Co	185	Builders Suppliers
Roadbridge	800	Civil Engineering
Robert Quinn & Sons	0	Building Contractors
RPS Group	925	Consultant Engineers/Planning & Design Cons
SIAC Construction	1500	Civil Engineering/Commercial Building
Sicon/ John Sisk	2306	Construction
Sierra Communications	260	Telecommunications/ Civil Engineering
SIG Ireland	208	Specialist Distributor to Construction Industry
SMC Group	282	Building & Civil Engineers
Sorensen Civil Engineering	102	Civil Engineering & Construction
John F Supple	115	Building and Civil Engineering Contractors
TBD Building Contractors	72	Building Contractors
Techrete Holdings	300	Precast Concrete Cladding Manufacturer
Tegral Holdings	367	Roofing/Cladding Products Manufacturer
Treasury Holdings	50	Property Development
Twangbrook	108	Home Developers
Uniform Construction	100	Building & Civil Engineering
PJ Walls	300	Construction
Whelan's Limestone	170	Limestone Quarrying

Quarries		
John A Wood	390	Building Products Manufacturer

III: Initial Survey Questionnaire and Feed Back form

Questionnaire on the Postgraduate Education needs of Construction Industry Managers.

This questionnaire relates to the Postgraduate educational needs of a Construction Manager. The survey is intended to gather information about what the opinions of the **employers** of construction managers are towards their employees who wish to continue with further education and how useful the knowledge gained on existing postgraduate programmes is for the day to day activities of industry.

Q1 Please tick the boxes which relate to your main area of business.

Building Contractor ☐ Civil Engineering Contractor ☐

Construction/Project Management Consultants ☐ Other ☐ _____

Q2a
How many Construction managers do you employ currently?

0 ☐ 1-5 ☐ 6-10 ☐ a number greater than 10 _____

Not Applicable ☐

Q2b
If answer to 1a above is, not applicable, how do you manage and run your construction sites?

Q3

Please tick the boxes indicating the categories of employees within your company?

Direct labour ☐ Number _____ Construction Managers ☐ Number _____

Project Managers ☐ Number ____ Estimator's ☐ Number _____

Buyer's ☐ Number _____ Finance/Accounts ☐ Number _____

Quantity Surveyor ☐ Number ___ Civil Engineers ☐ Number ____

Mechanical/Services Engineers ☐ Number _____ Skilled Craft Workers ☐ ___

Other ☐ _____

Q4 (a)

How often do you use sub-contractors?

Very often (on every site) ☐ Often (only for specialised works) ☐

Never (we always use our own employees) ☐

Q4 (b)

Give a brief explanation why you (do) **or** (do not) use sub contractors?

Q5
What do you consider are important qualities when recruiting a Construction Manager? Please respond by circling one of the numbers on the five point scale. A five indicates that you strongly agree while a one indicates that you strongly disagree.

	Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
The personality of the person over their amount of education	5	4	3	2	1
Their willingness to continue with long term education and short term CPD training	5	4	3	2	1
Construction Managers with postgraduate qualifications are good for company image	5	4	3	2	1
Construction Managers develop a better understanding of management knowledge/skills through postgraduate programs	5	4	3	2	1
Construction Managers with minimum qualifications and years of industry experience are more suited to the construction environment	5	4	3	2	1
Those with postgraduate qualifications often demand higher salaries than their industry experience peers	5	4	3	2	1
Those with both industry experience and postgraduate qualifications are increasingly been recognised as essential for developing expertise in management	5	4	3	2	1
The increase in the sophistication of modern constructions sites requires a higher level of					

management	5	4	3	2	1

Q6
Please tick the boxes which indicate to you the benefits to a company who employ managers with postgraduate qualifications.

Specialist Knowledge ☐ More mature ☐ Their knowledge is up to date ☐

Ability to critically analyse ☐ Networking abilities ☐ Development of systems ☐

Future potential ☐ Other _____

Q7 (a)
How many of your current employees have obtained a Postgraduate Certificate/Diploma or Masters Degree?

1-10 ☐ 11-25 ☐ Greater than 25 ☐ N/A_____

Q7 (b)
Please indicate the disciplines in which these employees have gained their Postgraduate qualifications.

Construction Management ☐ Project Management ☐ Civil Engineering ☐

Financial ☐ Business ☐ Mechanical Engineering ☐ Other _____

Q8
Do you believe that it is becoming more and more of a job requirement for Construction Managers to have a Postgraduate Qualifications?
If yes, why?

If no, why?

Q9
What are the skills you require your managers to gain from participating on a Postgraduate Construction Management programme?

Communication skills (ability to write/debate in a clear coherent manner, good presentation skills) ☐

Project management Skills (Goal setting, time management, systems development, database skills) ☐

Personal skills (willingness to learn, creativity, flexibility, open mind, motivated, ability to work independently) ☐

Ability to integrate information from a wide variety of sources ☐

The ability to delegate ☐

Creative problem solving and research skills (original thinking, up to date knowledge, critical analysis) ☐

Other (please state) ☐

Q10
Do you think research within the field of construction management is important?

If yes, why?

If no, why?

Q11
Are there any further comments you wish to contribute?

Thank you for taking the time to complete this survey. Your input is of great importance to this research. You may be assured that the **confidentially of your response will be respected at all times.**

Please return completed questionnaire by email to (garrett.keenaghan@dit.ie) or by post (stamped addressed envelope enclosed).

If you have any questions or queries, please do not hesitate to contact me by email.

Garrett Keenaghan PgD, PgC, E.Tech, MIRI
Assistant Head
Dept of Construction Management
Dublin Institute of Technology
Bolton Street
Dublin 1

Please indicate if you are willing to be contacted at a future date for a follow up short interview on the above topic.

I am happy to be contacted at a future date to further participate with this research ☐

Name_____

Contact details

_____
_____
_____
_____
_____

Sample Questionnaire's feed back form

Form (a) response to questionnaire designed for employers responses.

Q1 Please summarise your interpretation of this question.

Please provide your opinion on the suitability of this question.

Q2 Please summarise your interpretation of this question.

Please provide your opinion on the suitability of this question.

Q3 Please summarise your interpretation of this question.

Please provide your opinion on the suitability of this question.

Q4 Please summarise your interpretation of this question.

Please provide your opinion on the suitability of this question.

Q5 Please summarise your interpretation of this question.

Please provide your opinion on the suitability of this question.

Q6 Please summarise your interpretation of this question.

Please provide your opinion on the suitability of this question.

Q7 Please summarise your interpretation of this question.

Please provide your opinion on the suitability of this question.

Q8 Please summarise your interpretation of this question.

Please provide your opinion on the suitability of this question.

Q9 Please summarise your interpretation of this question.

Please provide your opinion on the suitability of this question.

Q10 Please summarise your interpretation of this question.

Please provide your opinion on the suitability of this question.

IV Final Questionnaire Survey

Postgraduate Education needs of Construction Industry Professionals

This questionnaire relates to the Postgraduate educational needs of a construction professionals with management responsibilities. The survey is intended to gather information about the opinions concerning the postgraduate educational needs of the construction professional who have assumed a role as construction manager and who wish to continue with further education.

1. Which of the following best describes the main activity of your company?

- ○ Subcontractor
- ○ Architectural practice
- ○ Engineering practice
- ○ Surveying practice
- ○ Public sector
- ○ Academic/Training sector
- ○ Industry/Professional representative Body

Other (please specify)

2. Which of the following best describes the size of your company/organisation?

- ☐ Large company with 251 + employees
- ☐ Medium size company with 51-250 employees
- ☐ Small size company with 10-50 employees

Other (please specify)

3. Which of the following options best describe your job title?

- ☐ Company Director/Owner
- ☐ Manager with responsibility for several projects
- ☐ Manager with responsibility for one single project
- ☐ Manager with responsibility for a specific element of a project
- ☐ Senior technical engineering role at project level

- [ ] Engineering technical role at site level
- [ ] Manager with responsibility for training
- [ ] Educational Professional

Other (please specify)

4. What are the average number of operational sites your company has at any given contract cycle?

- [ ] 1-5
- [ ] 5-10
- [ ] 10-20
- [ ] N/A

Other (please specify)

5. Does your company use sub-contractors?

- ○ Yes
- ○ No

Please provide brief explanation for your answer above. (if yes please indicate who sub-contractors directly report to within your company).

6. How long have you worked in the construction industry?

- ○ 1-5 years
- ○ 5-10 years
- ○ 10-15 years
- ○ 15-20 years
- ○ 20-25 years

Other (please specify)

7. How many years of experience do you have in your current role?

- 1-5 years
- 5-10 years
- 10-15 years
- 15-20 years
- 20-25 years

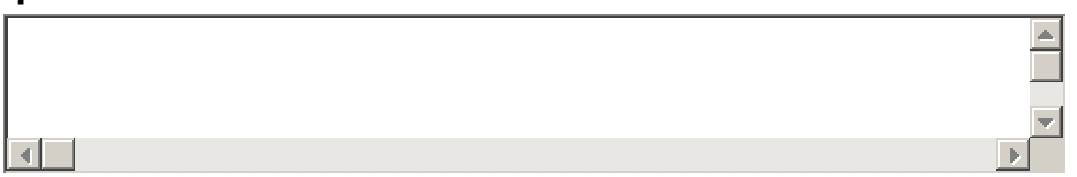
Other (please specify)

8. Please indicate your educational/training background.

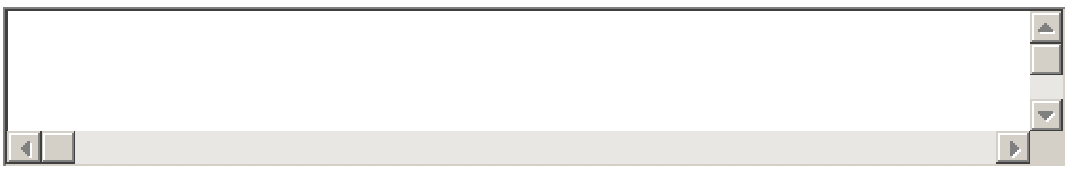
- Professional recognition through continuous Professional Development
- National/Higher Certificate
- Diploma/Ordinary Degree
- Honours Degree
- Postgraduate Cert/Diploma
- Masters Degree

Other (please specify)

9. Please state your highest and/or most recently awarded qualification.



10. Please give the name of the Institute/Professional Body who awarded you the stated qualification above.



11. Please indicate the discipline in which you have achieved your highest qualification.

- ☐ Construction management
- ☐ Project management
- ☐ Civil engineering
- ☐ Financial management
- ☐ Business management
- ☐ Mechanical engineering

Other (please specify)

12. Please indicate which of the following in your opinion, is the most effective way for a construction professional to develop an understanding of how construction management skills contribute to the overall management of construction projects.

	Continuous Professional Development Management Programmes	**Postgraduate Education in Construction Management**
Construction professionals with specialist primary qualifications (engineering, architecture ect) will develop sound construction management ideas by engaging in construction management education/training through:		
Construction professionals with specialist primary qualifications acquire a breadth of knowledge about the skills and contributions of other professions through:		

Construction professionals with specialists primary qualifications learn to design an organisational structure appropriate to the needs of a particular project, more effectively through:		
A more positive approach towards the education of construction professionals in relation to the demands that the construction process can place on themselves and industry's clients is best achieved through:		
Construction professionals with specialist qualifications learn to respond to clients needs both effectively and satisfactorily when conventional approaches do not suit, through:		

13. Do you believe that it is increasingly becoming a requirement for construction professionals to have postgraduate construction management qualifications?

- Yes
- No

Please provide a brief explanation for your answer

14. Please tick in order of preference the skills which indicate to you, the benefits a company who employ professionals with postgraduate construction management qualifications, gain.

	Highly Beneficial	Beneficial	Some Benefit	No Benefit
Specialist management knowledge				
More mature				

They are up to date in terms of Knowledge practice				
An ability to critically analysis				
An ability for networking				
Ability to Develop systems that meet with clients demands				
Future potential				

Other (please specify)

15. Please rate from the following, the skills you feel are necessary to achieve effective management of a construction project.

	Least desirable	Desirable	Highly desirable
Communication skills (ability to write/debate in a clear coherent manner, good presentation skills)			
Project management skills (Goal setting, time management, database skills)			
Personal skills (willingness to learn, creativity flexibility, open mind, motivated, ability to work independently)			

Other (please specify)

16. Below are a number of statements relating to the qualities sought by employers when recruiting construction professionals as managers. Please assess the extent to which you agree or disagree ticking one of the numbers on the five point scale.

	Strongly disagree (5)	**Disagree (4)**	**Neither agree or disagree (3)**	**Agree (2)**	**Strongly agree (1)**
Personality of the person is more important than their level of education in construction					
Willingness to continue with long term education and short term CPD training is a quality an employer looks for in a construction manager					
Construction professionals with postgraduate qualifications in construction management are good for the company profile					
Construction professionals with management responsibilities develop a better understanding of management knowledge/skills through postgraduate construction management programs					

Construction professionals with management responsibilities and who have years of industry experience are more suited to the construction environment than those professionals with postgraduate construction management qualifications but fewer years of experience					
Professionals with postgraduate qualifications often demand higher salaries than their industry experience peers					
Those with both industry experience and postgraduate management qualifications are increasingly being recognised as essential for developing expertise in management within the company					
The increase in sophistication of modern construction processes requires a higher level of management skill					

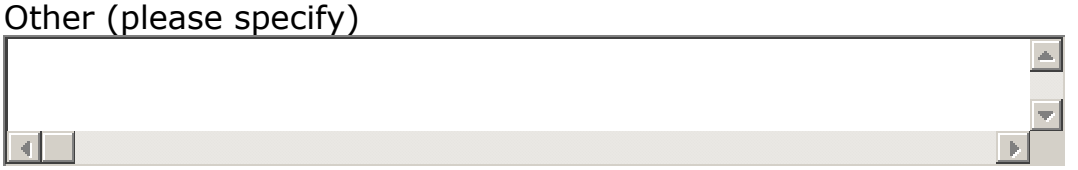
17. Does your company support construction professionals who are participating on a postgraduate construction management programme?

- ○ Yes
- ○ No

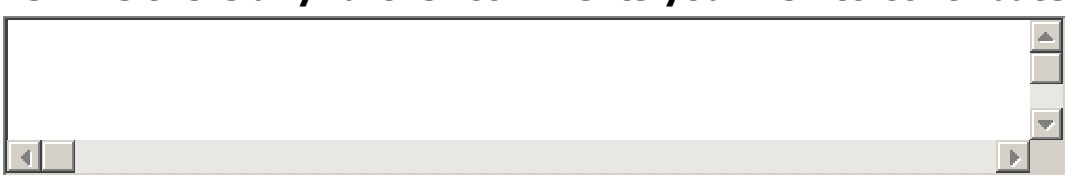
18. If you have answered yes above please indicate the means by which support is provided

- ☐ Full/partial fee support
- ☐ Time off to attend tutorials/lecturers
- ☐ Reduced industry work load
- ☐ Work from home option
- ☐ Sabbatical leave paid/unpaid
- ☐ In house library facilities
- ☐ Learning incentive schemes
- ☐ Promotion opportunities

Other (please specify)



19. Are there any further comments you wish to contribute?



20. Thank you for taking the time to complete this survey. Please remember to click on the 'Submit' button below before exiting this site.

Please indicate by providing your name and contact details, if you are willing to be contacted at a later date for a follow up short interview on the above topic. Please be assured that the confidentiality of your response will be respected at all times.