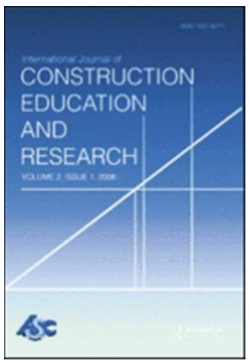

Research preparedness in undergraduate property and construction curriculum: the student experience

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Research preparedness in the undergraduate property and construction curriculum: the student experience

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This study investigates the student experience of undergraduate research in order to develop a "research preparedness framework" that can be applied to the development of undergraduate curriculum design within a case study organisation. This research utilises built environment students from a Higher Education Institution in the UK. The study adopts a multi-method qualitative design using focus groups with various student cohorts, including Building Surveying, Real Estate Management and Quantity Surveying, followed by face-to-face interviews with industry representatives. This study highlights a discrepancy between student's research preparedness and their understanding of its importance and perceived impact. It establishes areas for improvement within the curriculum to enhance students' research preparedness throughout their undergraduate career. There are numerous benefits for students from being involved in research, such as developing a critical mind-set through the appraisal, collection, analysis and interpretation of complex information. However, students often do not see the tangible benefit of developing research skills to help them succeed and differentiate once they make their transition from higher education to employment. This study provides intriguing findings for anyone involved in property and construction curriculum across the globe, and will also appeal to any institution where students are undertaking research activities/projects.

Keywords: Property and construction education; Research Preparedness; Curriculum Development

Introduction

Research and scholarship are increasingly being viewed as key to the future prosperity and development of nations (Kehm 2007). Brew (2007) highlights that research is central to professional life in the twenty-first century, and not just for those pursuing an academic career. Undergraduate research experiences are proposed as one way of seeking to adequately prepare students to tackle the heightened levels of complexity and uncertainty that face the twenty-first century workforce (Barnett and Coate 2005; Brew 2006). Accordingly there is growing interest and practice internationally in engaging undergraduate students in research.

There are numerous benefits associated with undergraduate research experiences. Involvement in undergraduate research can help students develop and enhance several skills (such skills are discussed later in the literature) which are acknowledged to be essential to professional life in the twenty-first century and for operating in our knowledge based economy (Brew, 2007; Davis *et al.*, 2006). Despite this, it has been suggested that students entering employment appear to lack the necessary skills to conduct research efficiently (Morely, 2003, cited by Shaw *et al*., 2013). Bangera and Brownell (2014) postulate that students (particularly first-generation students and their families) may be unaware of the benefits associated with undergraduate research. Students may not see the tangible benefit of developing research skills in order to help them succeed and differentiate themselves once they make their transition from higher education to employment. It is even possible that some students may not fully understand what research is (Madan and Teige, 2013). One potential reason for this in the UK higher education context is that the pinnacle of involvement in undergraduate research usually, and often solely, occurs during a final year

dissertation project. Consequently there is a debate regarding students' research preparedness. 'Research preparedness' refers to how prepared students believe they are to perform research (Shaw *et al.,* 2013); this may be both during their studies and in the transition to employment.

Accordingly it is felt there may be an opportunity for universities to influence the students' research experiences by better explaining and supporting research skills, and demonstrating how such skills can support their future careers. This research utilises property and construction students from a UK Higher Education Institution (HEI) as an instrumental case study (Yin, 2004). The aim of the research is to investigate the student experience of undertaking research during their degree programme. This will ultimately allow a "research preparedness framework" to be developed that can effectively be applied to the development (or revalidation) of undergraduate curriculum design within the case study organisation.

Origins of undergraduate research

Research can be defined as "a process of steps used to collect and analyze information to increase our understanding of a topic or issue" (Creswell, 2008, p.3). This paper focuses specifically on undergraduate research in higher education. While the meaning of 'undergraduate research' is context-specific and varies across and within institutions (Kruger, 2015), it is often defined as an inquiry or investigation conducted by an undergraduate student that makes an original or creative contribution to the discipline (Hansel, 2012; Wenzel, 1997). However, there have been calls for broader and more inclusive definitions that work across institutional and disciplinary boundaries and facilitate the integration of teaching and research (Beckman and Hensel 2009). Zimbardi and Myatt's (2014) definition of undergraduate research is adopted in this paper, which includes experiences where undergraduate students are *actively* engaged with the research content, or processes and problems, of their discipline.

The term undergraduate research and its integration into the curriculum are borne out of US practice which started by providing research opportunities for selected students in selected institutions (Healey and Jenkins, 2009). In 1978 the Council on Undergraduate Research was founded in the US to support undergraduate research in undergraduate institutions, highlighting that research is a highly important learning strategy (Hansel, 2012). The Boyer Commission was later established in 1998 by a review board in the US which highlighted a need for further research experiences to be integrated into undergraduate research programmes. The Boyer Commission (1998) recommended that all universities should offer research based learning. They emphasised that science and social science students should be involved in basic research skills right from the beginning of their studies and humanities students should be accustomed to working with primary materials (ibid). This postulation has also been highlighted by the National Science Foundation (2003) in the US. Internationally this has created strong interest from departments, institutions and national systems in adapting North American conceptions of undergraduate research (Healey and Jenkins, 2009).

Undergraduate research experiences are becoming more widespread across the globe. There are now a growing number of approaches to engaging undergraduates in research within different countries and across a range of disciplines (Brew, 2013; Zimbardi and Myatt, 2014). Many undergraduate research initiatives focus on developing US style undergraduate research programmes which are traditionally for selected students and may be outside of the formal

curriculum (Healey and Jenkins, 2009), while other initiatives develop related curricula that support student learning through and about research (Jenkins and Healey, 2010). For example, undergraduate research may include development of summer research programmes, programmes abroad, undergraduate research learning communities, or embedding research experiences across the curriculum and in final year dissertations or capstone projects (Campbell and Schnedier-Rebozo, 2014; Falconer and Hocomb, 2008; Healey and Jenkins, 2009; Kaul and Pratt, 2010; Lee and Loton, 2015; Pukkila *et al*., 2013).

In the UK, undergraduate research has traditionally taken on a different form from that in the US. The UK places most emphasis on the final-year dissertation (or honours project) which is undertaken by the majority of students on many degree programmes (Healey and Jenkins, 2009; Healey *et al.,* 2013). Formal undergraduate dissertations are less common elsewhere. In the rest of Europe this practice is variable, but the UK is quite distinguished from Australasia and Canada where only a small proportion of undergraduate students (commonly 10-20%) undertake an honours project, as it often involves an additional year of study (Healey *et al.,* 2013).

The traditional dissertation has been under pressure in the UK, partly because of its lack of perceived relevance to future careers and owing to the lack of preparedness of some students to undertake it (Booth and Harrington, 2003; Price and Feehily, 2004). This lack of preparedness may be because of the emphasis on the final year project. It has been suggested that students desire research experiences early on (when they start university) and this can influence students to continue with research (Griffith and Kaya, 2013). Consequently, integrating research earlier on in undergraduate courses may have beneficial outcomes for both students and universities. Further critique is that the form of the UK dissertation is generally only read by the student and academic markers and does not include dissemination (Healey and Jenkins, 2009). The Boyer Commission (1998, p.24) argued that "dissemination of results is an essential and integral part of the research process".

Cross-Atlantic comparison seems to suggest that UK institutions could be more imaginative and consider developing alternative forms or research experiences (Healey and Jenkins, 2009). This emphasises the need to focus on how research experiences could be better incorporated into undergraduate courses/curricula in the UK.

The benefits of undergraduate research experiences

There is much literature highlighting the positive effects of undergraduate research experiences for students. Brew (2013) suggests that undergraduate research is often seen as a way of radically transforming students' higher education experience. This is due to the positive effects that undergraduate research experiences can have on student learning and attitude, as well as their career choices.

The integration of research experiences into undergraduate courses can enhance students' skills in various respects, which aids learning throughout their degree (Hansel, 2012; Hunter *et al.,* 2007). For example, students are said to gain technical, interpersonal, analytical, synthesis, and independent learning skills as a result of undergraduate research experiences (Ishiyarna, 2002; Landrum and Nelsen, 2002). Undergraduate research is also said to help shift students away from

being passive recipients of knowledge and, instead, towards active seekers and producers of knowledge (Kruger, 2015). Such skills can assist students in lifelong learning and professional development (Cutler 2008; Waite and Davis 2006).

Portillo (2012) found that undergraduate research experiences help students learn key course concepts, improve their writing and social skills, and ability to synthesise and present data academically. In addition to developing research skills, Lindo *et al.* (2013) found that research experiences can improve student confidence and attitudes towards research.

Ward *et al*. (n.d.) found that students who undertook a specific 10 week research skills course identified an increase in technical ability, communication skills, ability to work independently and insight into career possibilities. However, Wood (2003) noted that adding specific internships for students would be unattainable for many institutions, for example due to financial cost. Although, Wood (2003) believes that transforming lectures into more research orientated structures would have similar outcomes to internship. This is supported by Pantoya *et al*. (2013) who demonstrated that a few well-structured lessons allowing for research experiences can quickly equip students with the necessary skills to conduct research.

The skills gained from undergraduate research experiences may also affect students' future intentions. A qualitative review of science technology engineering and maths (STEM) and non-STEM students' feelings towards research found that the research experience influenced decisions about further education or career opportunities (Adedokun, 2012). It was found that students, particularly those from STEM subjects, had increased awareness of career options and enhanced professional credentials to help them in future opportunities (ibid). The research experiences not only provided more work based skills, it also increased their awareness of roles and opportunities that were available to them. Through further examination, Adedokun (2012) found that the factors that facilitated this were the opportunities for networking, but more interestingly it was also observed that students felt increased confidence to conduct research. This is also supported by a body of research conducted in the medical field (Murdoch-Eaton *et al*., 2010; Vujaklija Brajković *et al.,* 2010). The opportunity for undergraduate research experiences is important for students in various disciplines in order to identify and enhance future prospects and intentions. The gains from undergraduate research programmes could be seen as part of the 'professional socialisation' into science careers (Hunter *et al*., 2007). Therefore, by providing students with undergraduate research experiences, universities could support students to be more adapted to the world of work.

The implementation of undergraduate research experiences increases student confidence to conduct future research (Adedokun, 2012; Lindo *et al.,* 2013). Pajares (2003) suggests that students' confidence and perception of their abilities have an important relationship with their aptitude in research, and eventually what they do with the skills attained. For students to undertake research efficiently they must have the confidence to conduct research, which may be enhanced by undergraduate research experiences. Bandura (1986) defined self-efficacy beliefs as "people's judgment of their capabilities to organize and execute courses of action required to attain designated types of performances" (p. 391, cited by Adedokun *et al*., 2013). Thus, research self-efficacy in undergraduate students is the students' perception and confidence to be able to conduct research. Shaw *et al*. (2013) found that research self-efficacy was a key indicator of a student's interest and ability in conducting this research. Consequently, integrating

undergraduate research experiences into courses should help students develop increased confidence in undertaking research tasks.

Research experiences have also been found to have a positive impact on student retention rates and attracting new students (Adedokun and Burgess, 2011). This could be due to an increase in student satisfaction on their course (Waymet, 2008) as they are gaining necessary skills through research experiences. Therefore this suggests that, not only do students benefit as individuals, but the overall course and university may benefit from student involvement in undergraduate research experiences.

Following a review of the Boyer commission, Wood (2003) identified that learning should be more inquiry based and teaching should be adapted to support more research related experiences, consequently suggesting a format for change. Attaining improvements in research skills can only effectively be achieved through the restructuring of research and teaching and changing how programmes are constructed (Horden, 2013; Sgroi and Ryniker, 2006). Auchincloss *et al*. (2014) identified many aspects of students' undergraduate research experiences that could be enhanced, for example research skills, motivation and self-efficacy. To successfully enhance students' research experiences it appears there are areas that educators could improve.

It is clear that there are wide ranging benefits to students associated with involvement in undergraduate research experiences; the various skills which can be attained from such experiences are seen to be advantageous to students both within academia and later in their professional careers. However, if students are not involved in research experiences early on in their studies it may hamper their desire and ability to conduct research effectively, their understanding and awareness of the benefits and relevance of research skills, and motivation to continue with research.

Towards research preparedness

Despite literature identifying the link between undergraduate research experiences and research, it does not explain how research experiences specifically support students. Shaw *et al*. (2013) developed a concept of 'research preparedness'; the aim of the research was to explore how prepared students were to carry out research in the future. This was established through investigating students' experience of research across a range of courses. The factors that were identified that effected students' research experiences were as follows (ibid):

- research self-efficacy: a students perceived ability to carry out research tasks
- learning motivation: the learning approach towards the research project
- research environment: sense of belonging, including relationships and use of resources
- orientation towards research: understanding and feelings of the research

The research can therefore be used to identify what needs to be implemented in order to increase students' research preparedness. Overall Shaw *et al*. (2013) found that students who undertook a fourth year research project felt more prepared to conduct research. This is supported by Oliveira *et al*. (2014) who found that students suggested the implementation of research in the curriculum

facilitates research preparedness. Shaw *et al.* (2013) also identified that self-efficacy was the strongest determinate of 'research preparedness'. This suggests that, although having the right skills taught and equipment available are important, it is primarily when students feel confident to conduct research that they feel prepared. This is reflected in research by Adedokun (2013) which theorised that research career aspiration is a long term goal, while research self-efficacy is a medium term goal, and research skills is a short term goal for practitioners. For institutions, this should highlight the factors that need to be identified to increase students' knowledge of research. By increasing their research experiences and skills, their research self-efficacy can be increased. This may consequently improve career aspirations in the future and broaden the field that the students eventually go into.

Although there is a body of pedagogic research highlighting the importance of experiencing undergraduate research, there is little research within the area of research preparedness. Whilst Shaw *et al.* (2013) conducted research on a fourth year cohort, it has been recommended in many reports that research experiences should be focussed upon first and second year students as well (National Science Foundation, 2003; Brew, 2003 as cited in Shaw *et al*., 2013). This is because, as previously highlighted, final year undergraduates in the UK (and some other counties) must generally undertake a specific research task as part of their degree qualification, but this is not offered to the first and second year students. Therefore, exploring students' research preparedness in all undergraduate years is imperative for future research development.

Context of property and construction disciplines

There is limited research on how students in different disciplines experience research (Healey and Jenkins (2009). Literature concerned with students' research experiences and preparedness to conduct research is also limited within the property and construction field. Property and construction is primarily a vocational and industry-focused discipline (Mulliner and Tucker, 2015). In such vocational and professional subjects there is some debate among academics about the relevance of students undertaking research, which is partly shaped by some students in such disciplines questioning the importance of research to their future careers (Healey and Jenkin, 2009). Accreditation requirements in such subjects can also restrict the time for students to engage in forms of inquiry-based learning (ibid). Yet, research highlights that for students in these subject disciplines, undergraduate research experiences can have a significant impact on career aspirations (Adedokun, 2012). Moreover, Healey and Jenkins (2009) stress that there needs to be greater attention paid to research in disciplines other than science, technology, engineering and medical disciplines. For this reason this research aims to understand students' research preparedness in all levels of undergraduate study in property and construction programmes.

To incorporate research experiences into courses, Wood (2003) established several reforms that could be implemented;

- Identify what does and does not work currently within the teaching a learning strategies
- Encourage reform incrementally, start early on with first year courses
- Bring in outside knowledge on how to transform courses
- Start the discussion of reform in- house with students

From the above it can be seen that it is important to identify elements of a course's current content that does work in enhancing student's research skills, but it is also important to identify what does not work in order to enable staff to restructure the course efficiently. Wood (2003) suggested that discussing reform with students would be beneficial; this could enhance the efficiency of the reform by identifying specifically what would increase students' research preparedness.

From the research it can be established that it is important and beneficial for students to conduct research. But why is research itself an important concept? Wood (2003) identified that it is important to start a dialogue between outside sources who can highlight key undergraduate research skills that should be enhanced and encouraged through the course. Therefore, part of this research also aims to establish why research is important in employment from the perspective of employers themselves.

Methodology

The study adopted a multi-method qualitative design using both focus groups and interviews (Barbour, 2007). Semi-structured focus groups were conducted with student cohorts from various property and construction programmes within one instrumental case study HEI. Subsequently, semi-structured interviews were conducted with industry representatives (employers). A qualitative approach was adopted in order to explore and unearth the complexity behind student and employer feelings towards research preparedness.

In order to explore this issue in sufficient depth, a case study strategy of inquiry was chosen. According to Proverbs and Gameson (2008), case study research appears to be relevant to industries made up of different organisation and business types. Therefore, case study research naturally lends itself to higher education research due to the complex nature and structures of HEIs and the diversity of institutions and student profiles within the industry. According to Bryman and Bell (2015) a case study can be a single organisation, location, person, or event. Creswell (2013) states that 'case study research involves the study of an issue explored through one or more cases within a bounded system' (i.e. a setting, a concept). Hence, the findings from a case then allow generalisations to be made about an overarching theory or concept. This can be explained further by identifying different types of case study (Stake, 1995):

- Intrinsic – findings are developed based only on the case in question, without attempting to generalise the findings of build theories;
- Instrumental – case is examined to provide insight into an issue with the view of generalising the findings, i.e., a case is studied in depth, but the focus or issue is something else;
- Collective – a number of cases are used to investigate a general phenomenon.

Yin (2003) makes the distinction between using 'single-and-multiple case designs'. A rationale for using a single, or instrumental, case study is that it can be used as a 'representative' or 'typical' case in order to capture an everyday or commonplace situation (ibid). For example, Yin (2003) notes that it could refer to a manufacturing firm that is believed to be typical of many other manufacturing firms in the same industry. Hence for the purposes of this study, an

instrumental case study was used in the form of a HEI in the UK that is typical or representative of other UK HEIs.

The proposed concept has been developed using existing research in the area of research preparedness in higher education. One of the most significant sources is Shaw *et al.* (2013) who presented a theoretical framework consisting of four critical factors that are influential in the level of research preparedness amongst undergraduate students; their learning motivation, research orientation, research self-efficacy and research environment. Shaw *et al.* (2013) focused on understanding the level of research preparedness of students transitioning from undergraduate to postgraduate education. This study adapts the existing framework proposed by Shaw *et al.* (2013) but for the purposes of understanding research preparedness during the transition from first year through to final year of undergraduate study (and in preparation for students to successfully complete their final year dissertation). It also adapts the framework to emphasise the transition into future employment in the property and construction industry (Figure 1).

Insert Figure 1 here

Phase 1

The first phase of the research involved the focus groups with undergraduate students in the case study organisation. The focus group questions sought to identify and understand how prepared students feel to conduct research. Questions were asked in the four main areas of interest: support required, perceived ability to carry out research tasks, understanding and feelings towards research and transfer of research skills, but also allowing for flexibility in this framework to explore areas in depth (Corbin and Strauss, 2008). The focus groups took approximately 30 minutes each to complete. Nine focus groups were conducted in total, three in each academic year of an undergraduate degree programme (first year, second year, and final year) (see Table 1). As recommended, the focus group aimed to contain six to ten participants (Onwuegbuzie *et al*., 2009). The exception was focus group one which contained five participants, though this is still considered to be within the acceptable range (Bryman, 2016). The focus groups consisted of students from real estate management, building surveying and quantity surveying undergraduate degree programmes, representing a range of subjects within the chosen case study organisation.

Insert Table 1 here

The focus groups were recorded using an audiotape and an assistant focus group moderator was utilised to take notes and identify any key themes (Traynor, 2015). To ensure quality data, participants were asked to speak clearly and listen to others responses so opinions could be expressed freely. The participants were advised that the focus groups were a discussion of ideas and the moderator would be there only to facilitate discussion (Sim, 1998). Although questions were to be asked by the moderator, the participants were made aware that discussion should be between themselves.

Phase 2

The second phase of the research consisted of interviews with employers in order to obtain opinions on how research preparedness contributes to employability and the work environment, as well as supplementing the student data obtained from phase one. Interviews were considered appropriate to provide this insight (Brinkmann and Kvale, 2005). The employer interviews consisted of eight participants from the property and construction industry. To ensure there was an adequate cross-section of employers, the participants were from a range of industry backgrounds including property and surveying, construction and facilities/maintenance (see Table 2). This provided an opportunity to explore how research can be used in different business sectors and to obtain varied perspectives on the role of research in the workplace. The interviews were constructed in a semi-structured style to allow the employers to expand on their perceptions of research preparedness, but to also allow enquiry about specific areas (Gillham, 2005). The questions consisted of items such as "*What qualities can an employee who has knowledge of research skills bring to an organisation?"* The interviews were conducted both over the phone and face-to-face to increase the participation rate.

Insert Table 2 here

Findings

Phase 1- student focus groups

The qualitative focus group data was analysed thematically using QSR NVivo 10 software. A thematic qualitative approach was adopted as it is a widely used and reliable method of analysis, is highly flexible and is therefore highly useful for its descriptive outcomes (Braun and Clarke, 2006). A systematic coding process was undertaken by highlighting key passages of text and thematising them into a hierarchy of high, mid and lower level themes. However, the analysis of focus groups is different to that of other qualitative analysis as the interactions between individuals must be considered (Kitzinger and Barbour, 2001). Therefore, all mention of codes should be accounted for, whether an individual or groups mentions a specific code (ibid).

High level themes

The high level themes that emerged from the focus group discussion with students regarding their understanding of research preparedness were; '*support required'*, *'understanding and feelings towards research'*, '*perceived ability to carry out research tasks'* and '*transfer of research skills'*. Within these high level themes several middle level themes were identified (see Figure 2).

Insert Figure 2 here

Figure 2 illustrates that students were most at ease when discussing the support required on the course, with 314 references to this. Most notably students discussed 'what support would help research abilities' (with 139 references), far more than 'what support do you receive' (with only 64 references). This suggests that students can identify what support they need to develop their research preparedness, but perhaps they do not receive as much help as is required.

It is also notable that students found the high level theme 'perceived ability to carry out research tasks' more difficult to discuss than other areas; there were only 86 references overall discussing the two topics of 'confidence to conduct research' and 'research abilities that are lacking'. The transfer of research skills was also discussed a limited number of times with 121 references. The middle level theme 'benefits of research' was only discussed 33 times suggesting that students were generally unable to identify the benefits associated with research. However, the 'motivation to conduct research' was discussed more often with 79 responses, highlighting that students are aware of motivations to conduct research, such as achieving a better degree grade.

Although the high level theme 'understanding and feelings towards research' was referenced 187 times, when looking at the middle level themes it is evident that the discussion of 'what skills to be an effective researcher' was referenced only 26 times. 'Activities and feeling that effect research' was discussed to a greater degree with 71 references. This suggests that, although students discuss their feeling towards research, they find it difficult to actually identify what being an effective researcher is.

High level theme 1: Support required

The first high level theme that was discussed in the focus groups was 'supported required' in order to feel prepared to conduct research. Within this high level theme, four middle level themes emerged: 'what support would help research abilities', 'what support do you receive', 'research tools' and 'environmental facilities'. The themes are noted in Figure 3 along with the low level themes discussed.

Insert Figure 3 here

When asked what support was required for research, participants noted that they currently received support in the form of the "library" (FG 1) or 'they can ask for help'. Students noted that if they "went to a lecturer they would help" (FG 6) and in the library there is "a lecture specifically set up…on the research processes within the library"(FG 3). However, it was noted that more could be done to help students' research abilities; students discussed the opportunity for "research more specific to the career" (FG 4) and basic research skills such as "how to access journals"(FG 5). Although there was a split opinion on the facilities offered (some students said the environment was good while others suggested it required improvement), students did note that research tools were important. Unsurprisingly 'google' was mentioned various times but so

too was the ability to conduct journal article searches. Students discussed the "university databases that they tend to use" (FG 1) for example "Planning portal is good for building surveyors" (FG 1) and "the ones the university provide like the ISERV and CIS"(FG 2).

When discussing the support offered from the course, Figure 3 illustrates that first year students were good at discussing the support they received, but they were not quite as able to discuss what support could further their research abilities. Students from second year and third year were better able to discuss what could be done to improve the support on the course. Furthermore, discussion on 'further support required' was more extensive than on the 'support currently received'. Therefore, this highlights that students feel that more could be offed to support their feelings of research preparedness.

High level theme 2: Understanding and feelings towards research

Several low level themes were discussed in regards to students' perceptions of what research is and the skills required to be an effective researcher (Figure 4). As can be seen in Figure 4, 'organisation' ("planning in advance and adapting your plans" (FG 3)) was found to be particularly important. Students also discussed that "you need confidence as well to be able to go and interview people or like a questionnaire" (FG 6). Therefore, to be an effective researcher, you have to have the confidence to research. It seems that having these abilities would make students more prepared to conduct research.

Insert Figure 4 here

Another factor that may affect students' research preparedness is activities and feelings effecting research. Students noted that their situation effects their feelings towards research, for example students suggested that "you have to be in a good mood to start off researching" (FG 1) and also "time of day… it's worse late at night" (FG 1). Most notably, students discussed the need to be interested in the work. A student emphasised that "if I find it boring then I do put it off to the last minute" (FG 2), consequently affecting the students' ability to effectively complete the task "because you are just cramming it all in" (FG 2).

It is also interesting to highlight that students from second and final years discussed the importance of being interested in the work, but first year students overwhelmingly discussed the importance of wanting to do it (Figure 4). These students said "I wouldn't say I enjoy research I'd say it's something you've just got to do" (FG 4) and that taking part in research activities occurs "whether you can be bothered or not" (FG 7). Perhaps engaging the students in research activities from first year and by making them more interesting would support students' feelings of research preparedness.

High level theme 3: Transfer of research skills

Figure 5 displays the low level themes for 'transfer of research skills'; these consist of the 'motivation to conduct research' and the 'benefits of research'. One benefit of research that students noted is satisfying "you're personal interest" (FG 6). It also helps "to find a solution" (FG 7) and to understand "how to do something better" (FG 7). Furthermore, most discussed was the contribution to knowledge, "to produce theory" (FG 3) and "to further knowledge" (FG 6) by "coming to conclusions using that information" (FG 4). While students could identify some benefits of research, this was a very limited discussion by all year groups (Figure 5) in comparison to the plethora of benefits highlighted in the literature.

Insert Figure 5 here

Within the middle level theme around the 'motivation to conduct research', both intrinsic and extrinsic values were discussed. Students referenced several factors such as 'increase knowledge', "job opportunities" (FG 1) and "getting a good degree" (FG 3). Students noted that research skills were important in their course, with one suggesting "I think everyone does it to get like a 2:1 or a first" (FG 2). They also felt they were important for career opportunities, with one student highlighting that "if you want to become a successful building surveyor…you would want to research" (FG 1). Students also noted that intrinsic factors were important in their motivation to conduct research. Students, in regards to their own knowledge, noted that "it's a really important point of research, to expand your knowledge" (FG 2) for "your own interests" (FG 1). This suggests that students do understand, to a certain extent, that research preparedness can benefit this, although this was a limited area of discussion. Students may therefore gain from increasing their understanding of the benefits associated with research, which may subsequently enhance their motivation to conduct research and improve research preparedness.

Figure 5 illustrates that students from final year were far better at identifying the benefits of research, whereas first year and second year students referenced this far less. Final year students also discussed their motivation to research more in terms of future opportunities, such as "money" (FG 2), "job opportunities" (FG 1) and "getting a good degree" (FG 3). This is in contrast to factors discussed by first year and second year students, such as "enjoyment" (FG 2) and "interest" (FG 6).

High level theme 4: Perceived ability to carry out research tasks

An important area that was discussed in regards to students' research preparedness was the high level theme of 'perceived ability to carry out research tasks'. Within this two middle level themes were discussed: the students' 'research abilities that were lacking' and their 'confidence to conduct research'. Though the discussion on this was limited, some interesting themes were discussed. Students firstly feel that their ability to interpret information is lacking, for example one stressed that "a lot of the time if you want to find out on how to do something, for example Building Information Modelling, it is really complicated and you don't understand it because the words are so complicated" (FG 1). Additionally it was noted that "it's really hard to find the right

information" (FG 3). This highlights that students may not feel fully able to conduct research tasks, therefore indicating that their research preparedness may be lacking.

When students discussed their confidence to conduct research (Figure 6) they stressed that they either had 'low confidence' or that their 'past experiences have increased their confidence'. This suggests that providing students with research activities increases their feelings of confidence, which the authors highlight as important for students. When discussing the process of research, students highlighted that "we've touched on a bit of the journal articles in our coursework but we haven't got that much work on that so I wouldn't be that confident on that" (FG 2) and "I think a lot of us would be limited to google" (FG 1). Through this particular part of the discussion there was a general feeling that students had low confidence about aspects of research. However, students did suggest that having previous experience conducting research tasks helped with their confidence, with one final year student stating that "I don't think I knew how to do academic research properly before this year, I think the dissertations taught me how to actually do it; it's changed my view of research completely" (FG 3). Therefore, before the final year, final year the students felt that they had little understanding of research skills. As noted previously, providing students with research activities from the start/first year of their courses is important.

Insert Figure 6 here

Figure 6 illustrates that, although most students regarded their confidence as low, students in second year in particular appeared to have a lower perceived ability to conduct research. Thus, whilst they noted that past experiences increased their confidence, this does not necessarily appear to have an effect on their overall level of confidence. This indicates that more attention may need to be given to students in second year, by providing more research activities in order to increase research preparedness.

Phase 2- Employer interviews

In phase 2 of the research interviews were conducted with employers to identify how research preparedness is used in the work environment.

While there were several points discussed in the employer interviews about the benefits of research preparedness (Figure 7), three main high level themes emerged from the discussions: the *'importance of research skills for property and construction professionals'*, the '*qualities employees with research knowledge'* and '*research in job roles and tasks'*.

The first theme was 'the importance of research skills'; the professionals highlighted factors such as industry development and developing job roles. Therefore, being prepared to conduct research is seen as beneficial for property and construction professionals. The second theme discussed was 'research in job roles and tasks', in which employers discussed where research is utilised,

such as understanding the market and the benefit it has for the customer. Finally the employers discussed the benefit of students being research prepared by considering the qualities of employees with research knowledge; this produced themes such as 'prepared to conduct research tasks straight away' and being 'able to handle information'.

Insert Figure 7 here

Three areas emerged from the employer interviews which highlight the importance of research preparedness for students. Firstly a theme that was discussed in the interviews was that research skills are important for students at every stage of their career. Research preparedness is important for students initially because "it can assist them in getting a job" (I 2). Research preparedness is also crucial "if you are looking to get higher, you know progress a bit more up the tree as such the career ladder, then it's very important" (I 6).

Another theme that emerged from the interviews was that having research skills provides students with the ability to show 'added value' to an employer and to the market place. Research preparedness "demonstrates that the candidate is able to try new things and actually bring different qualities to the role" (I 7) and "additional skills" (I 7). Showing an employer that the student has "the ability to hit the ground running is important, certainly from my perspective on the management side" (I 4).

The final theme that emerged was that research skills are currently becoming more important as the industry is developing; participants suggested that "there is a lot of research that is going on at the moment" (I 3), advancements are being made and "nothing stands still" (I 8). Therefore, being prepared to conduct research is important to keep up with the demands of the industry. Elements such as "interactive technology will take off…it is cutting edge of a lot of work and research is a fundamentally at the core of that" (I 3).

Overall the findings from the employers highlight that research preparedness, knowing how to conduct research, is beneficial and important for students entering the workplace. Participants stressed that "you need to understand where the market is at the moment, supply and demand, and the factors affecting that" (I 3) and "you need to be able to take information in quickly, interpret it and output and especially what you learn in university is how to do that very efficiently is very important" (I 5).

The findings of phase one (students focus groups) and phase two (employer interviews) of the qualitative analysis highlight that there is a discrepancy between student perceptions about research preparedness and the requirement to be prepared for research in potential careers. The research has explored students' feelings and awareness of research preparedness and identifies

specific areas of concern in the development of engaging research projects/curricula. This has consequently been supported by gaining an understanding of research roles and projects to be prepared for post- University.

Conclusions

The qualitative research undertaken within this study produced some intriguing results. It is believed that there are few studies in this area which have focused in such depth on an instrumental case study. The results show that students within the case study appear to have a better understanding of what research is, as opposed to the transfer of research skills. A key identifier moving forward for the case study is to better "journey-map" the benefits and progression of research skills to students, as they move through their academic career, and inevitably into their professional career.

Another key finding was that, although most students regarded their confidence to be low in their ability to carry out research, students in second year (of a degree programme) appeared to have a lower perceived ability to conduct research in comparison to first and final year students. Again, this emphasises the needed to create a more prolonged mapping of student progression and development towards research. The earlier on in their studies that students obtain research skills and knowledge, the easier they will find it to progress throughout their programme.

It was also noted by student participants that research was a difficult topic for them to discuss, other than the support required, which is why the focus groups were relatively short. This is reflected within the discussion as the analysis echoed the limited amounts of awareness that students had surrounding their research preparedness.

It was no surprise therefore, based on these key findings, that students showed great awareness of areas that they required further support in. This will be a notable action for the case study in their curriculum design towards research and the resources available to students to undertake research tasks.

From an employer perspective, the overall finding was that research skills are important for students at every stage of their career; therefore, students' awareness of research abilities is important. This message needs to firmly cement in a curriculum to ensure that the key findings from students, regarding their lack of understanding of how to transfer research skills, is addressed. Employers also emphasised that having research skills gives you the ability to show 'added value' to your employer and to the market place. Demonstrating this to students and perhaps involving employers in research activities in-class would enhance students' appetites to engage in research activities. Finally, and arguably most pertinently, employers emphasised that research skills are becoming more important now as the industry is developing. The property and construction industry is undergoing great changes and developments in society, technology and economy. Key initiatives acting as catalysts here is the growth of Building Information Modelling, and the prolonged after-care and operational awareness of construction professionals to consider a more holistic approach to building construction that covers the whole-life-cycle of buildings. Students are at the heart of this development, and their ability to be prepared for research will no doubt stimulate the industry's future growth and prosperity.

This research demonstrates the importance of undergraduate research preparedness, for students to not only progress with their higher education learning experiences, but also for graduate careers. It is therefore important to consider the curriculum within Built Environment programmes. It is recommended therefore, based on this research, that curriculums be enhanced to incorporate more tasks, resources and support for the development of research skills. Additionally, making students aware of the role and importance that research preparedness can have in their academic and graduate careers. This research enhances the theory surrounding research preparedness developed by Shaw *et al.* (2013), as it explores the construct through qualitative data collection. This research identified elements that students perceive as important for their preparedness to conduct research and themes were identified that highlight the importance of research to students' career prospects. Research preparedness appears to be highly reliant on the confidence on the student and should therefore be an integral part of the development of degree programmes.

Considering these recommendations, curriculum enhancements have been developed at the case study HEI as a consequence to these findings. In the validation process of new undergraduate curriculums two notable additions were made:

- Introduction of a new first year (level 4) module "Academic and Digital Literacy" which helps students understand basic research and literature searching skills from early on in the degree programme;
- Introduction of a new second year (level 5) module "research methods" to help prepare for a wider independent research project/dissertation in the final year of the degree.

The ethos of this curriculum enhancement was to embed a 'gradual learning journey' for students to develop their research preparedness during their undergraduate years, as opposed to the attention being solely on the final year dissertation/research project. Therefore recommendations for further curriculum designs would to embed research preparedness tasks and projects throughout the undergraduate learning journey. By providing a gradual learning journey students will be able to develop their research skills progressively to enable them to confidently demonstrate their research preparedness in their graduate careers. Furthermore, Built environment programmes should endeavour to emphasis the important of research tasks to develop students' personal awareness of the role research plays within a professional environment.

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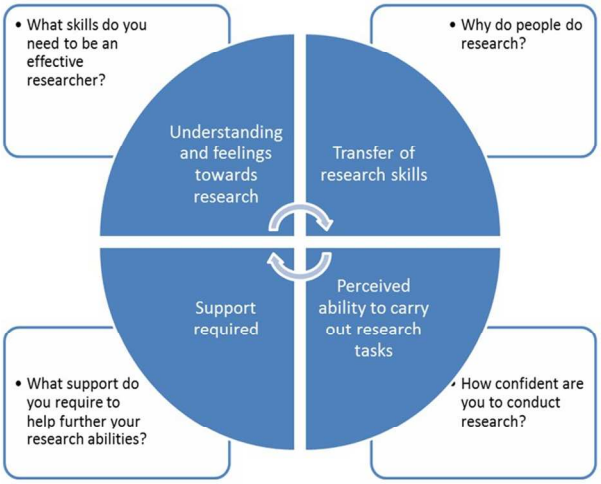

Figure 1. Proposed model of research preparedness (adapted from Shaw et al. (2013)
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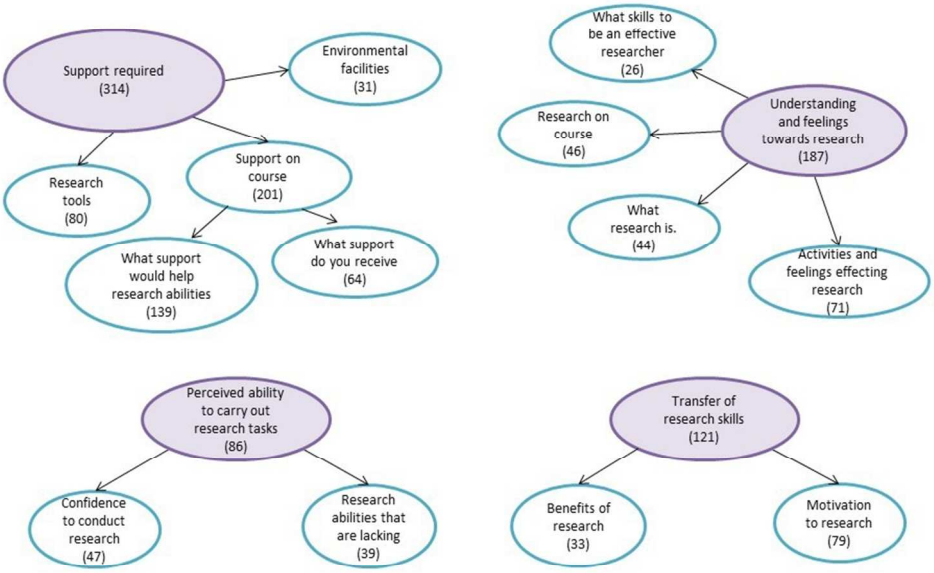

Figure 2. High and middle level themes emerging from student focus groups
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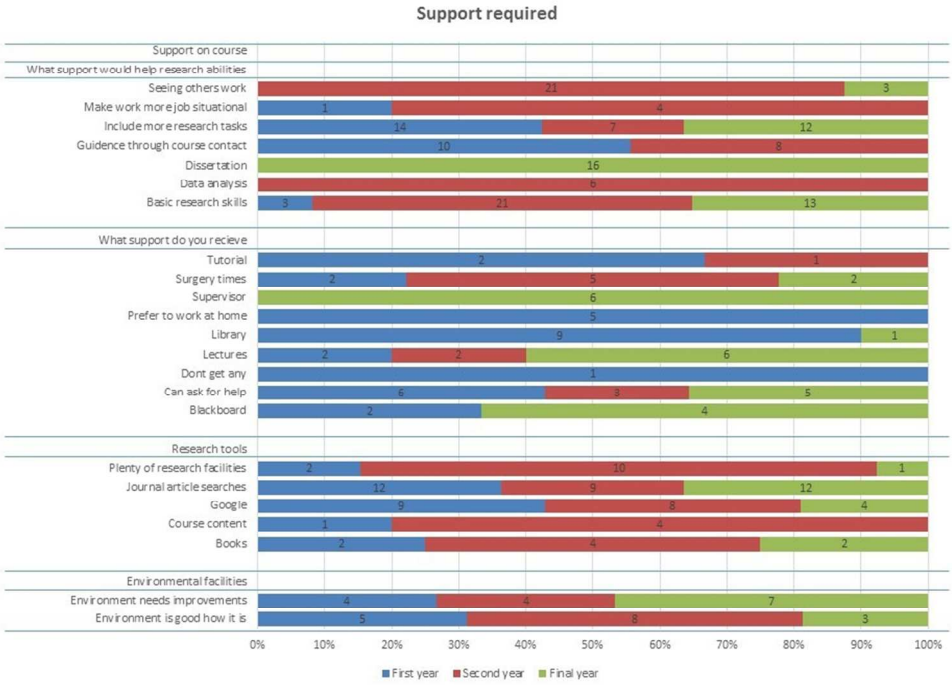

Figure 3. Themes for support required
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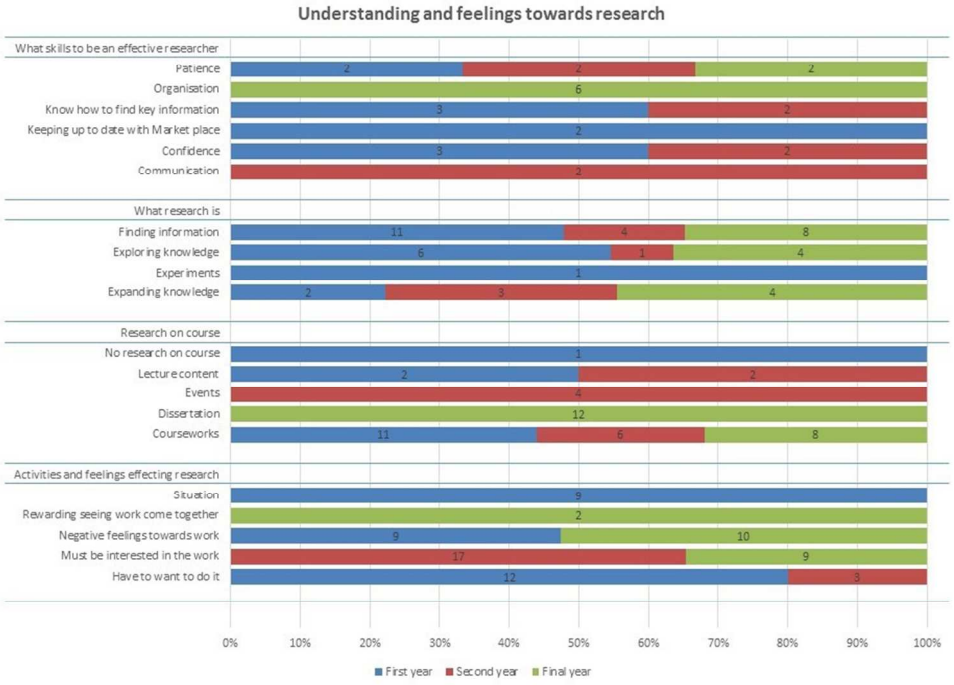

Figure 4. Themes for understanding and feelings towards research
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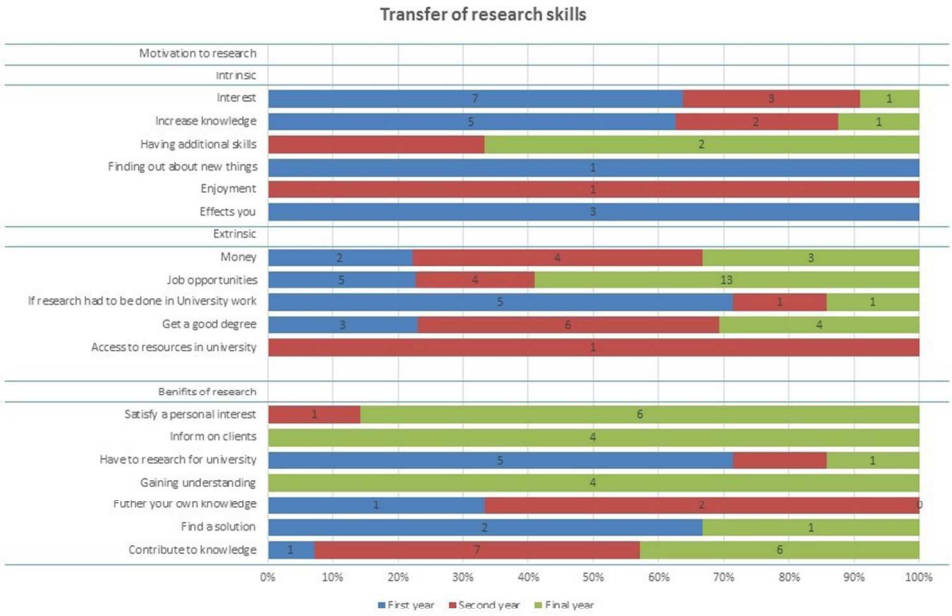

Figure 5. Themes for transfer of research skills
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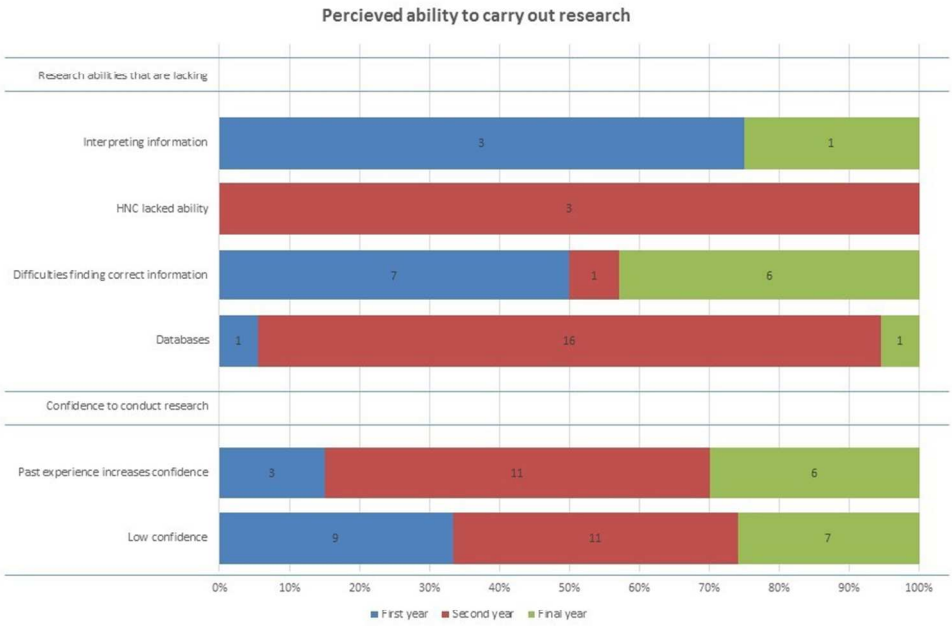

Figure 6. Themes for perceived ability to carry out research tasks
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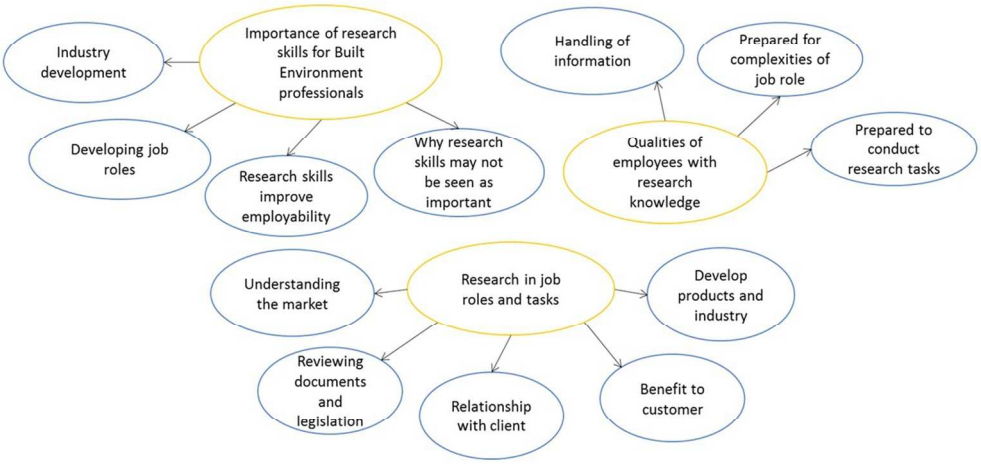

Figure 7. Themes for employer interviews
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Focus group	Student Cohort	Year of study	No. of students
FG 1	Building Surveying	1st Year	5
FG 2	Building Surveying	2nd Year	7
FG 3	Building Surveying	3rd (Final) Year	8
FG 4	Real Estate Management	1st Year	8
FG 5	Real Estate Management	2nd Year	10
FG 6	Real Estate Management	3rd (Final) Year	7
FG 7	Quantity Surveying	1st Year	9
FG 8	Quantity Surveying	2nd Year	9
FG 9	Quantity Surveying	3rd (Final) Year	6

Table 1: Composition of student focus groups
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Interview	Industry Background of Employer
1	Estates Manager
2	Surveyor
3	Surveyor
4	Facilities Manager
5	Facilities Manager
6	Construction Services
7	Construction Project Management
8	Building Company

Table 2: Employer Interviews
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