ENHANCING ASSESSMENT TO PREPARE UNDERGRADUATES AS EFFECTIVE BUILT ENVIRONMENT INDUSTRY PRACTITIONERS

Meeting the needs of industry is one function of higher education and preparing students for employment in industry is a central goal of professionally recognised undergraduate built environment courses. Assessment is a key influence on the learning activities students undertake. Designing assessment to be authentic to professional practice can support students' preparation and development for industry through the simulation of real world experiences. There is a considerable amount of literature regarding authentic assessment, yet most literature in this field does not specifically address the needs of construction undergraduates. To evaluate the efficacy of authentic assessment to support students learning and preparation for industry, an action research project was undertaken in a UK university. This paper reports part of that project, where an assessment brief was modified to enhance authenticity in a practice-based subject. Following this modification to assessment design, data concerning students' perception of the modified assessment was gathered from a focus group of students. Findings suggest that the authentic assessment was perceived by students as an improved experience which better supported their development of real world knowledge and skills.

INTRODUCTION

Providing skilled graduates as effective industry practitioners and thereby contributing to a healthy economy is one important function of higher education (Leitch 2006). Knowledge and skills developed in higher education help graduates to make an important contribution to creating such a healthy economy (Smith et al. 2012). The current economic and political environment means that effective higher education is all the more significant to help the UK maintain its global competitiveness. However, literature identifies that across the higher education sector, built environment students often lack adequate practice-based competencies and that graduates skills often fall short of employers' expectations (Quarterman 2017). The Chartered Institute of Building reported that 34% of construction employers considered graduates did not have appropriate skills for industry (Rawlins and Marasini 2011). Further, there was some concern that traditional approaches to teaching meant that built environment graduates were not adequately prepared with appropriate employability skills (Chan and Sher 2014). By 2019, there was also concern surrounding a shortages in a number of construction occupations, including professional areas, and in many instances this was anticipated to be a position which could deteriorate following the UKs departure from the European Union (CIOB 2019). Together, these highlight the need to ensure that construction graduates are able to respond to the challenges facing industry; in short, that they are developed as effective industry practitioners.

Developing students' employability skills as well as developing their industry specific knowledge and skills is recognised as an important dimension of higher education, and professional bodies play an important role in helping institutions maintain the currency and relevance of their courses for the benefit of industry and the economy (Green 2015). In short, enhancing graduates work-readiness would help to meet employers' needs more effectively, preparing students for industry as effective practitioners. This paper reports part of a doctoral study which examines the use of authentic assessment in order to provide an enhanced learning experience, helping to better prepare students as industry practitioners.

Assessment is arguably the most important part of the undergraduate learning experience, and is the focus of students' learning activities in formal learning environments (Bodman 2007). This is important because assessment should, in addition to developing students' theoretical knowledge, contribute to their preparation for employment in industry as effective practitioners.

The well-established courses at the Higher Education Institution in this research incorporate five built environment disciplines, including construction management. It must be noted that students on these courses have expressed, through the National Student Survey, a high degree of satisfaction with the learning experience provided. All built environment courses at this institution retain their accreditation and employers continue to support their employees to undertake those courses. This suggests that the courses continue to meet the demands of students, professional bodies and employers.

The aim of this paper is to examine students' perceptions of assessment in built environment courses to establish whether they evaluate assessment modified to enhance authenticity as better meeting their learning needs. Objectives of this paper are as follows. First, through a literature review to explore the central issues pertaining to learning, authentic assessment, and, employability. Second, to modify assessment design then gather and analyse data regarding student evaluations of their learning experience in respect of the modified assessment.

THEORETICAL PERSPECTIVES

Learning and skills development

Learning is when people can demonstrate something they could not previously do or did not know (Honey and Mumford 1992). To be effective, high quality 'deep' learning should be undertaken (Eastcott and Farmer 1995). Deep learning involves the learner understanding a subject rather than merely reproducing portions of it (Baek and Lee 2012), interacting with the subject (Cotton 1995), and the learner researching for themselves (Biggs and Telfer 1987). This suggests that assessment, should be designed to stimulate deep learning; on professionally focused courses, this includes learning of practice-based knowledge in addition to theory.

Formal learning occurs in an educational institution and non-formal learning occurs in the workplace (Rubenson 2010). For undergraduates in professionally focused courses, formal learning should connect with the demands of the workplace thereby helping to prepare students as practitioners. In other words, formal and non-formal learning should be clearly connected. However, formal learning undertaken in higher education and the learning necessary for effectiveness in professional practice can sometimes be different. Consequently, this creates challenges for students as they attempt to understand and link these two disparate entities (Joseph and Juwah 2012).

Knowledge acquired through formal learning can be categorised in Bloom's taxonomy of educational objectives, which is composed of behaviours in "three domains – the cognitive, the psychomotor, and the affective" (Bloom 1956: 19). These domains are important because they identify the areas of knowledge and skill development which are relevant to academic study and which are also reflected in the demands placed on practitioners in the workplace. However, it is possible that assessment in formal learning environments focuses in particular on the cognitive domain, requiring students to undertake activities to demonstrate their theoretically-based knowledge, which would consequently diminish the practitioner-based aspect of assessment.

Authentic assessment

Assessment is often concerned with measuring attainment and providing a means to formally acknowledge what an individual has learnt in a specific area (Carter 2012). Authentic assessment, while having no generally agreed definition (Whitelock and Cross 2011), embraces assessment activities and resources which are relevant to the real world (Bosco and Ferns 2014), and which may require students to undertake real-world activities and develop knowledge and attitudes necessary in the workplace (Carter et al. 2015). Authentic assessment may be regarded as being on a continuum from replicating or simulating practice-based activities to assessment which requires engagement with the real world but does not require the student to undertake real world activities. A key driver for this continuum is the nature of each subject under consideration. For example, some theoretically-based subjects on built environment courses provide appropriate knowledge for practitioners and which have application in industry but which do not form the basis of activities that practitioners would normally undertake.

Given that assessment forms the focus of students learning activities, authentic assessment can offer scope to enhance students' preparedness for industry, presenting students with real world learning challenges and activities. Such challenges would offer scope for students to develop their attributes in each of Bloom's domains. Arguably, assessment which is authentic may also stimulate students to undertake deep learning as they recognise the application and value of such knowledge in industry. However, a challenge in built environment courses is that industry activities are often, at best, difficult to re-create with a high degree of authenticity. Finding routes to enhance authenticity could offer a route to augment students' preparedness for industry by engaging them with challenges and resources encountered and used by practitioners and which contain challenges the real world presents.

Employability

The role of higher education in contributing to development of students employability skills has been widely recognised, including by the European Commission (European Commission/EACEA/Eurydice 2014). Built environment courses prepare undergraduates for industry, and this includes employability skills as well as industry specific technical and theoretical knowledge.

There is no widely agreed definition of employability, but a useful description is in that in addition to knowledge, employability skills include personal qualities and being able to critically reflect on experience (Ornellas, Falkner and Edman Stalbrandt 2019), and these skills are recognised as valuable for industry (Knight and Yorke 2003). The Confederation of British Industry and the National Union of Students identify employability skills as communication, team working, problem solving, application of IT, self-management, customer awareness, application of numeracy,

and having positive attitude (CBI/NUS 2011). Unfortunately, it is known that employers often consider undergraduates' employability skills as limited (CBI 2012). This suggests that enhancing the learning experience would be beneficial in order to develop those skills. Employability skills are important if students are to be able to function as effective industry practitioners, and are a complement to technical industry-based knowledge which graduates should possess.

Developing employability skills "derives from the ways in which the student learns from his or her experiences" (Yorke 2006: 7). This is an important point, because it identifies the contribution that experience makes to development of employability skills and so highlights the value of authentic assessment as providing relevant learning experience. Given the significant role of assessment in learning, then it is clear that assessment can contribute to development of employability skills as well as development of students' theoretical knowledge.

METHOD

This work was undertaken as part of an action research project conducted at a post-1992 university. Such institutions have a long history of delivering practice-based courses (Aldhous 1991), which makes the study all the more relevant. The goal of this project was to implement and evaluate modifications to assessment design in built environment courses, seeking to enhance the learning experience through increased authenticity of assessment. The greatest challenge facing the researcher was to encourage tutors to enhance the degree of authenticity in the design of assessed coursework. This was addressed through two meetings of tutors to discuss issues including assessment design, two staff development days which considered assessment, and, informal verbal discussions.

As at most higher education institutions, courses in this study are composed of modules, which are a means of dividing courses into separate units of learning and assessing students in each of these units (Rodeiro and Nádas 2010). Assessment in a built environment practice-based module was modified during the academic year 2016/17 with the goal of increasing the degree of authenticity in order to enhance the student learning experience. It must be noted that the decision to change assessment in this particular module arose from earlier work of the doctoral study. This paper reports findings following this modification.

The module was studied by 35 students. Previously, assessment in the module had required students to make a group presentation to their tutors and with several weeks to prepare. For the action research of this study, assessment was modified to require students to give a group presentation to an industry practitioner as well as their tutors, the brief for which was provided on the morning of the presentation. These modifications to the brief were designed to bring about an increased degree of real world authenticity. Also increasing the real world authenticity was that students would have to make their presentation to a practitioner, and, having to produce the work in one day meant the deadline was short. It must be noted that in the preceding weeks students spent time with their tutor studying and reflecting on the subject matter, although the brief was not provided until the morning of the assessed presentation. This meant that students had limited time to prepare, which simulated something of the challenges facing practitioners, where time is often in short supply. Arguably, these modifications to the assessment were small. However, their consequence for assessment was perceived by students as significant, making the assessment more challenging and relevant.

Following this change to assessment, there was a follow-up focus group of eight students to evaluate students' perceptions of the modifications. The focus group was composed of students who had studied the module and completed the modified assessment, and was drawn from all students in the class. Students who participated were all volunteers, meaning that the sample was one of convenience (Gray 2014) and participants were self-selecting.

Ethical approval to undertake the research was secured prior to modifying assessment and the institutional ethics protocol was adhered to throughout the research. At the start of the focus group, each participant was provided with an information sheet explaining the purpose of the focus group. There was then an opportunity to clarify any areas of uncertainty and the opportunity for participants to decide whether or not to proceed. Participants also were offered the opportunity to check the transcription of the focus group and interpretation of the data if they so wished. To help put participants at their ease, the researcher explained that their contribution to the research by sharing their own views was vitally important as they were the experts not the researcher. It was also explained to participants that only a small amount of illustrative comments would be published and consequently would not be possible to identify any individual. Each participant, prior to the commencement of the focus group discussion, signed the institutional ethics paperwork as part of the required institution protocol. These completed forms were returned to the researcher and stored securely as required by the institution.

The researcher had a short list of written questions which were asked of the group to provide a framework for the discussion. Discussion in the focus group was recorded, transcribed, and checked several times for accuracy and was then subject to thematic analysis. Reasons for selecting thematic analysis were that it allows patterns to emerge from data (Braun and Clarke 2006), themes that coalesce around central ideas and meanings contained in the data (Gray 2014) could be identified and allow the researcher to understand participants experiences (Christensen and Probst 2015).

It should be noted that research such as this, with qualitative data, cannot with confidence be generalised to a wider context (Newman and Benz 1998). This project was intended to explore the issues within a single setting, and so generalisability was not a goal. However, it is expected it will be possible to make a "fuzzy generalization" (Bassey 1999: 12) and that the research should be of interest to tutors on similar courses at comparable institutions.

FINDINGS AND DISCUSSION

Findings

Focus group data revealed an interesting picture and a number of themes relating to development of real-world skills were identified: assessment was perceived as providing higher level challenges; team-working was developed; and, working under the small time constraint proved challenging. Despite this, students valued this modified assessment with its enhanced authenticity. Authentic assessment challenged students in each of Bloom's domains.

Students valued use of a real situation which involved engaging with practitioner during their assessment, and which they perceived made the assessment 'a big deal'. They also recognised that the assessment required them to behave more like practitioners, to 'think very quickly'. Authentic assessment was perceived as more challenging but part-time students, with industry experience, noted that 'you've got to

do stuff like that'. They recognised that the higher degree of challenge was related to the practice-based authentic element of the task.

In this module, following the introduction of authentic assessment, students recognised the need for and value of teamwork: 'you've got to work as a team' and they had to 'help [team members] out if they struggled'. This was an interesting point because teamwork was embedded in course design yet this was the only instance in the doctoral study where students alluded to it. They recognised that teamwork involved mutual support for other members which they had to provide in order to enhance overall group performance. In other words they implicitly understood their team as a mutually supportive group striving to achieve a common goal.

The students also recognised that time was a constraint within which they would have to operate as practitioners and which was incorporated into the assessment: 'we had limited time to prepare'. There was a perception that the limited time increased the degree of challenge they faced. This additional challenge reflected the real world, as practitioners often have to work to tight deadlines, and the authentic assessment emphasised this point to students.

Discussion

In summary, students perceived authentic assessment as an enhanced experience which helped their learning and development for professional practice through providing real world challenges which reflected the demands placed on practitioners. Authentic assessment allowed students to develop their practice-based skills, albeit in an academic environment, and to experience something of the day-to-day challenges encountered by practitioners. This is similar to Wu, Heng and Wang (2015), who also found that students reported that authentic assessment enhanced their learning experience.

Students evaluated assessment more favourably than previously and the work as being interesting and relevant, and giving a learning experience which gave insight into practitioners' day-to-day work and to the real world. Arguably, if students perceive their assessment activities as professionally relevant then this would be more likely to encourage them to take a deep approach to learning as well as supporting development of their practice-based knowledge and skills and understanding of theoretical knowledge. James and Casidy (2018) also found that authentic assessment was linked positively with student satisfaction. Swanson (2011) found that students profit from real world practice-based activities which can provide an enhanced learning experience for students. These each highlight the 'added value' that the real world activities of authentic assessment provide.

Challenges of the modified assessment were perceived by students as requiring them to act as practitioners under conditions which simulated aspects of the real world. This meant that they developed not only the skills required in industry, but importantly, the ability to use those skills under challenging conditions which simulated the real world so far as practicable. Helping students to develop as practitioners better meets the needs of industry, providing graduates who have experienced real world challenges and so the opportunity to develop their skills in response to those challenges. This is an important finding, and identifies the role that assessment plays in contributing to students' preparation for industry as effective practitioners. This is similar to Teagle et al. (2017), who found that authentic assessment was evaluated positively by students and considered an effective learning experience in respect of preparing them for professional practice, which is the goal of accredited courses. Built environment

graduates often lack adequate competency development and also readiness for professional practice (Witt et al. 2013). Findings here suggest that the use of authentic assessment helps students to experience something of the challenges of the real world, and so supports their development as effective industry practitioners.

Students valued assessment which had immediate and direct application in the workplace; authentic assessment provided experience of such activities as well as supporting students' academic development. The importance and challenges of developing students' employability skills in preparation for industry has been recognised (Olawale 2015). This work suggests that using authentic assessment to develop such attributes provides an enhanced learning experience and helps prepare students for industry through undertaking activities which simulate the real world.

Authentic assessment encouraged students to take a deep approach to their learning. Authentic assessment has been found elsewhere to increase students' engagement and enhance their motivation (Davison 2011). This was evident in the application of knowledge and linking of theory with real world activities, which students perceived as more challenging and interesting. This is similar to Adapa (2015), who also found that authentic assessment facilitates deeper engagement with the subject. This suggests that authentic assessment encourages a deep approach to learning by providing clear relevance to professional practice. For built environment students, such relevance was an important contributor to their engagement with the assessment and potentially undertaking a deeper approach to their learning. As assessment is central in formal learning, so this use of authentic assessment provides a virtuous circle - supporting learning, helping students to take a deep approach and preparing them for industry by enhancing engagement with the real world through undertaking activities of practitioners. Assessment is the focus of students learning activities (Boud and Falchikov 2007) and assessment is a prevailing driver of the learning activities which students undertake (Deneen and Boud 2014). This highlights, together with evidence from this research, the value of assessment in built environment courses to embed authenticity which enables students to experience something of the challenges of the real world and so contributes to their preparation as practitioners.

CONCLUSIONS

A central role of higher education is to provide graduates who are able to meet the needs of industry using the knowledge and skills they have developed. Professionally recognised courses have a vital role to play, providing industry with graduates who have developed appropriate attributes to meet the demands placed on practitioners. Findings of this study suggest that student learning may be enhanced through the use of authentic assessment, that students expressed a preference for authentic assessment, and, that they perceived it as being helpful for their own personal professional development.

It is recognised that this research has been carried out in one place and over one time period, and indeed this was a goal of the main study which was seeking to address a specific problem. Nevertheless, this paper highlights the value of authentic assessment for built environment students' professional development and their preparation for employment as more effective industry practitioners.

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