EXPLORING THE DEVELOPMENT AND ASSESSMENT OF WORK-READINESS USING REFLECTIVE PRACTICE IN CONSTRUCTION EDUCATION

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It is well known that the construction industry is characterized by the need for practical knowledge and skill. However, this creates special challenges for universities in the development of work readiness in graduates. This research investigates the attitudes of students towards a course which was designed to develop work-readiness skills in construction management. The paper focuses on the distinctive issues associated with Work-Integrated Learning (WIL) using a formally assessed industry-mentored course of study. Past research shows that university degrees should promote reflective thinking since, in construction, it is necessary to make reflective judgements which deal with ill-defined problems. This is a generic capability that is needed by all graduates in knowledge-based occupations. The study utilized reflective practice to examine the perceptions of construction management students towards the development of attributes which were known to improve work skills. The students were asked to capture their reflections on their experiences in the form of reflective diaries, which were prepared weekly throughout the course. The results showed that the students expressed very positive views about their learning experiences. This occurred in spite of the challenges caused by the formal assessment processes that were undertaken as part of the course. This paper compares the student perceptions with the teachers' reflections on the ability of traditional assessment methods to measure graduate attributes and work-readiness. The research explores the issues associated with assessing work-readiness skills in higher education. The findings suggest that student reflection is a necessary precondition to the development of effective work-readiness. In addition, the research concludes that more non-traditional assessment approaches are needed in construction programmes in order to develop the type of graduate required by the industry.

Keywords: work-integrated learning, work-ready graduates, student engagement.

INTRODUCTION

A major criticism often levelled at university teaching is that students are not required to adopt a participatory role in their learning. As Costley and Armsby (2007) point out, passive learning techniques characterize the typical university experience. The authors expands on this, stating that lectures and presentations frequently fail to engage learners and have been found to encourage "surface level learning" only. With limited opportunities for students to actively combine theory and practice, a total reliance on these methods is untenable for undergraduate programmes such as

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construction, whose graduates are required to possess both theoretical and practical knowledge.

This paper explored the expectations of both teacher and learners in a formally assessed industry-mentored course which was included as part of an undergraduate construction management degree. The course was university-based but industry-mentored, and was considered an improvement on the existing informal work experience courses which had led to a number of problems in previous years (Mills, Lingard and McLaughlin 2009). The findings will inform the future of the WIL courses in construction management, and raise issues for the assessment of work-readiness within the wider context of undergraduate education.

Work skills and generic attributes

Employers within the construction industry expect graduates to possess not only practical and theoretical knowledge, but the ability to apply this knowledge in the work environment. Several studies have stressed the importance of graduates being equipped to deal effectively with real world problems and issues (Hager, Holland and Beckett 2002). Work-readiness is an essential imperative for construction-related programmes.

Past work by Crebert *et al.* (2004) examined the development of work-ready attributes during engineering work placements. The research found that students were aware of the importance of industry experience in the development of generic attributes. The authors point out that working "collaboratively" with others enhances their skills for the workplace. This collaboration allows an opportunity for reflection and improves many aspects of work-readiness including; critical thinking, communication and team work. Other research by Love, Smith and Georgiou (2003) in construction management expanded these characteristics into six generic attributes which are important to the construction management practice: critical thinking, problem solving, teamwork, professional communication, professional practice and technical knowledge.

These attributes are also considered important for the development of construction management professionals. They are important indicators of work readiness and therefore critical for the development of future professionals in industry. McLeish (2002) described "employability skills" by defining them as "skills required not only to gain employment, but also to progress within an enterprise so as to achieve one's potential and contribute successfully to enterprise strategic directions." These skills could also be extended to include; industry aware practice, negotiation skills, leadership and logical and independent thought.

Traditional approaches to assessment have not typically focussed upon the measurement of work-readiness, nor identified frameworks for assessing student progression towards such attributes.

Assessment of reflective practice

Reflective thinking is not new and much has been written about this practice, especially in the fields of health and science. In a more general context, Boud, Keog and Walker (1985) described reflective practice as being about an individual's learning and involvement of self. Similarly, Danielson (2008) comments that 'a great deal has been learned about reflective practice, and emphasis has been placed on fostering reflection as an active behaviour in contemplating past, present and future decisions.'

Many courses aim to promote reflective thinking or developing the ability to reflect on practice. This is particularly true in professional degrees. Schön (1983) argued that expert practitioners in a profession were distinguished from novices by their ability to reflect on their practice when dealing with unusual or particularly complex cases. The logical corollary is that, to ensure adequate preparation for a professional career, programmes need to cultivate the ability to reflect on practice (Schön 1983)..

Given that students are assessment driven (Biggs 2003), and for courses to be consistent with goals of promoting reflection, a significant part of the assessment needs to be assessing the ability to think reflectively, make reflective judgements or reflect on practice. This in turn implies the need for teachers to determine whether or not students are reflecting on practice and to judge or measure the level of reflection displayed in assignments (Kember, Jan Mckay, Sinclair and Wong 2008).

Assignments that call for reflection normally seek written responses. Examples are reflective journals, judgements on case studies and contributions to online discussion forums. If teachers are to assess levels of reflection, they therefore need a means of determining the level of reflection in a piece of writing. Such a scheme will obviously not provide a precise measurement, but will provide guidance in making judgements, so decreasing the level of subjectivity. Boud (2009) makes the point that "assessment as informing judgements must be contrasted to a view of assessment as measuring learning outcomes". Boud also goes on to say "we must also consider the changing context of professional practice". The next section of the paper describes the nature of the student cohort and the learning environment.

Learning environment

The purpose of the industry professional practice projects as a form of work integrated learning is to provide students with the opportunity to apply their academic learning to a real world problems, situations and issue. The industry projects in this study took the form of a consulting-type exercise for an industry client. The purpose of reflective practice in this instance is to provide students with an opportunity to develop in-depth reflection in regards to their project experience. The aim of the course entitled "BUIL1224 Work-integrated Learning in Construction" was to provide a university-centred WIL experience that was mentored by industry. The course undertaken in 2008 was a pilot study of 12 enrolled students. The course was set up to provide a vehicle to develop work-readiness and employability skills using an Enterprise Education[1] approach.

This research project was the second phase of work previously undertaken in 2007. The results of the first phase demonstrated that industry had considerable good will towards the concept of WIL. However, the industrial employers were clear that educational development was not a significant part of the commercial realities of their work places. The key results of the previous research project indicated that the construction industry was looking for the development of WIL in two areas, namely; university-centred assessment processes that includes qualitative advice from industry, and robustly tested business-orientated models that provide long-term collaboration opportunities for industrial partners. The current phase of this research used the

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[1] Enterprise Education is an educational approach which uses team-based problem solving as the basis for learning. The approach usually involves groups of students who are mentored by industry professionals, this can occur within a university or workplace environment.

Enterprise Education model which was believed to provide a solution to the issues previously raised by industry stakeholders (Figure 1).
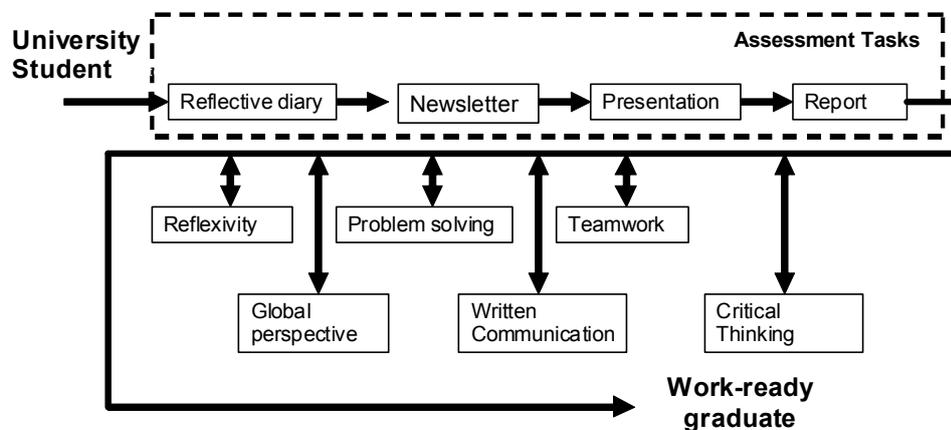
Figure 1: Teachers' intended learning journey

The course comprised four types of assessments; reflective diary, newsletter, presentation and final report. The objective of the assessment was to measure the development of work-ready graduate attributes. The assessment task and weights were as shown in Table 1.

Table 1: Weighting of course assessment

Assessment Task	How assessed	Weighting
Newsletter	Group work	10%
Presentation	Group work	50%
Report	Group work	20%
Reflective diary	Individual assessment	20%
Total		100%

METHOD

As qualitative research, the authors were interested in the responses of the individual students and how they, and their teacher, perceived attribute development. Epistemologically, the perspective taken here sees each student as a "person who learns" uniquely situated within a matrix of experiences. Haggis (2004) identifies this experience of the world as a point where the individual is conceived of as within a range of discursive, experiential and social dimensions that exist at any point in time.

The assessment approach utilized in this study, emphasized formative assessment. The assessment tasks were designed to facilitate student's active engagement in learning, to ensure that there were opportunities for teacher, industry and peer feedback, and to provide opportunities for self assessment through reflection. Beyond the reflective diaries, all tasks were undertaken as group work since the teacher sought to create a learning community, "that emphasizes social interaction and identify over individual action, collaboration amongst students and active engagement in problem solving" (Bath and Smith 2006).

Following negotiation with the teacher and the industry partner, each group identified a construction related industry issue: Group One-Occupational Health and Safety;

Group Two-Work Life Balance. Authenticity was embedded in the assessment tasks, as students were required to examine an actual industry issue, investigate the issue in the construction industry and wider regulatory and policy contexts, and formulate appropriate process improvement strategies and recommendations for their industry partner. Whilst discipline knowledge is not considered to be generic, this attribute was considered by the teacher as fundamental to the outcomes of any undergraduate course, and thus included as an intended learning outcome.

The teacher also re-examined student's performance as captured through the formal assessments. In undertaking a personal refection on the assessment practice, the teacher paid particular attention to the degree to which student's evidenced incremental generic attribute development. The authors then cross referenced the two sources of data to identify the degree of alignment between student's perceptions of their attribute development and the teacher's perspective of learning as captured via the assessment.

The aim of the reflective diaries was to provide the student with an opportunity to more deeply examine their experiences in the WIL style of the course. But from the teachers perspective the use of reflection was a challenge to assess. The teacher was new to the use of the diaries, and did not direct the students on the best way to reflect, instead encouraging free flowing unstructured comments in their diaries. The diaries were undertaken weekly after each face-to-face session, and were supposed to allow students to unpack their experiences, using a written blog or diary style. It is not clear whether the "open style free-flowing" approach produced the best reflective practice. Nevertheless, students did use the diaries on a regular basis and made extensive comments about their perceptions and experiences. In addition students completed a course evaluation survey for this course as part of the university requirement for all courses.

A total of eleven participants were included as part of the study and all were in the third year of construction management at university; 10 were male and 1 was female. The next section presents the student perspectives and the teachers' reflections on the diaries in order to provide insights into the development of generic attributes.

RESULTS

The first section of the results outlines the results of the Course Evaluation Surveys (CES) completed by the students as part of the university-wide quality assurance processes. The CES surveys are undertaken using a standard format for all courses offered by the university. This information enables the university to judge the quality of its courses across the programmes, schools and the wider university.

The second section of the research analysed the intended student learning outcomes, which were planned as part of the assessment process. The reflections were based on re-reading and analysing the students' reflective diaries. The re-analysis occurred some months after the completion of the course in from 2009. The authors read and analysed the transcripts as evidence of attribute development.

Students' Perspectives

Overall, the results of the CES were very positive. The overwhelming response from students was that they enjoyed the course and were most enthusiastic about their experiences. The CES survey which was administered centrally by the university

produced a Good Teaching Score[1] of 95%, which was the highest in the School and is amongst the best in the university. This encouraging result was evident from not only the survey scores, but also from written comments made by the students. In particular students were particularly pleased with two aspects of the course, relating to their workplace confidence and career development.

Although the number of enrolled students is small (n=11), which does not permit any detailed statistical analysis, all enrolled students agreed that the course improved their confidence in tackling unfamiliar problems, with a mean score 4.4 (of 5). Many positive comments were put forward in the surveys support of this new found confidence.

"I think that my confidence actually built as I began to meet more (industry) people, so that's one thing that sort of grew out of the course, which was really good."

Other results from the CES survey showed that the course improved their career development. All students believed that "what they learned could be used in their future career" with a mean score of (4.6 of 5). This was not surprising because the principal aim of WIL was to prepare students for the world of work. However, it is a comforting outcome and supports the research by Harvey, Moon and Geall (1997) who states "it is not about delivering 'employability skills in some generic sense, rather it is about developing critical lifelong learners.

The results of the reflective diaries show the generic attributes that were considered to be a proxy for the students learning journey. Overall, the students through their diary entries expressed a range of views that indicated that they did develop graduate attributes. It is reasonable to suggest that the attribute development was not uniform across all students but there was some evidence that each student had positive sentiments about their learning journey. The next section of the paper examines the teachers' assessment experience, in trying to accurately determine if graduate attributes were being developed.

Teacher Perspective of the assessment of work-readiness

The learning approach emphasized formative assessment and was designed to provide students were given diagnostic feedback. Tasks one to three as detailed in Table 3 were undertaken as group work, with the reflective diaries completed by each student individually. By framing much of student's assessed learning as group work, the teacher attempted to create a learning community, "that emphasizes social interaction and identity over individual action, collaboration amongst students and active engagement in problem solving" (Bath and Smith 2006: 266). As Bath and Smith identify, attributes are more actively and fully developed through learning experiences defined by high levels of interaction, and collaboration with the teacher and their peers.

The assessment tasks were designed to facilitate student's active engagement in learning, to ensure that there were opportunities for teacher, industry mentor and peer feedback and to provide opportunities for self assessment through reflection.

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[1] Good Teaching Scores (GTS) was derived from a student questionnaire of teaching performance based on a standard set of questions. The survey instrument is undertaken in all courses at the university in every semester. Results of the teaching surveys are reported to the federal government as part of the quality control processes in Australian higher education.

There were four types of assessment (refer to Table 2) that the teacher was required to grade. The data below presents the represents teacher's reflections on student learning.

Industry Newsletter: Group One: Roles of group members not clear. Students struggled to identify particular roles within the team, and to provide peer to peer feedback; approach to industry issue was limited and required more in depth analysis. Group Two: Effectiveness of team function constrained by a lack of cohesion amongst the group; newsletter demonstrated a degree of independent analysis and research, but overall output was limited.

Table 2: Teachers' assessment and learning plan

Assessment type	Intended attribute development
Industry Newsletter: Investigate industry issue and develop a marketing and awareness raising strategy	teamwork, discipline knowledge, critical thinking problem solving, professional communication
Project Report: Examine and formulate strategies in response to industry issue; analyse relevant, contemporary research, and analyse issue at the local level and in relation to wider socio political, economic and regulatory contexts, national and international.	teamwork, discipline knowledge, critical thinking, problem solving, professional communication, global perspective
Oral Presentation: Presentation of project report to industry partners, peers and wider university community; exchange of ideas with audience, responsiveness to questions and feedback	team work, discipline knowledge, professional communication; critical thinking, global perspective
Reflective Diaries: Weekly entries recording and reflecting on learning	reflexivity, communication

Project Report: Group One: Demonstrated understanding of discipline knowledge and technical content, some critical analysis evidenced, links between report and the implications for the industry beginning to be established, effective teamwork not evidenced. Group Two: Similar to group one, with some further evidence of critical analysis of current research, and greater depth in understanding the wider industry context.

Oral Presentation: Group One: Limited collaboration and cooperation between members of the group evidenced, with inconsistencies in appropriate use of communication displayed, and overall limited critical analysis of primary and secondary sources. Group Two: Similar to group one, with a heightened degree of awareness of audience and context; group demonstrated a more analytical approach to the industry issue than Group One.

Reflective Diaries: Students did use the diaries on a regular basis and made extensive comments about their experiences. For the majority of students their diary entries were only descriptive and contained limited reflections. Some students displayed a lack of clarity as to the purpose of the reflective diary. Where students did reflect on their capability and learning this related to the importance of team work; their own group's dysfunction, the need to develop strategies when dealing with uncooperative team members; and the need for more industry exposure and analysis of their industry issue.

In summary the teacher found the assessment of generic attributes very challenging. Upon reflection, the teacher noted that it was very difficult to measure the attainment of many of the skills through the traditional assessment modes. Only the reflective diaries provided a better insight into the learning journey of the students. The next

section discusses the mismatch between the teachers approach to the learning and the students' perceptions of their own journeys, and draws some conclusions.

DISCUSSION AND CONCLUSIONS

The significance of this research was that it demonstrated that the assessment of such skill development is challenging and problematical using traditional assessment modes. Findings from the study also suggest a possible lack of coherence and integration in the development of work-readiness across the wider Built Environment/construction management programme which may warrant further investigation, since programme coherence is fundamental to the acquisition and incremental development of attributes.

Past literature contains numerous examples of approaches to the assessment of generic attributes which demonstrate a wide diversity of methods. According to Boud (2009) these include non-traditional assessment like, entry and exit interviews, institutional grade descriptors, self-rating scales, portfolio approaches, standardized graduate skills tests, and oral defences. This research exposed the lack of an effective assessment framework, the restrictions of using traditional approaches, and suggests that the use of reflection as an assessment model is an important issue that warrants further and more wide ranging debate.

This research can report that students were highly supportive of work-integrated learning and most displayed positive sentiment towards the WIL course. This research supports the work of Crebert *et al.* (2004) who suggested that work-readiness is important to employers who believe that universities have a responsibility to prepare students for work environments.

On the whole students were satisfied that they had developed sufficient skill to eventually become productive workers. The type of learning that takes place in the presence of industry mentors, who are potential employers, enhances this type of motivation and self-efficacy levels.

The aim of the study was to reflect on the effectiveness of the WIL course to develop a set of generic attributes that would enhance work-readiness in construction students. The results of the student evaluations (i.e. Good Teaching Scores), and feedback from the industry mentors was very good, but from the teachers perspective some students displayed inconsistent and/or limited attribute development throughout their formal assessments.

From the teacher's perspective, the assessment of attributes presented significant challenges which included how to know the level of a student's capability at the commencement of the course; and how to measure attributes which are interwoven clusters of skill, knowledge, and ability. Findings from the study reinforce both the recognized need for assessment to be consistent with the teaching approach (Biggs 2003; Kember 2008), and for teachers and students to engage in critical reflection to inform learning and practice.

Past research has shown that generic skills such as communication, teamwork, and critical thinking are valued very highly by employers Watson (2002). These attributes should be developed during a university degree as a consequence of the educational process. There was general agreement by most students that they improved their work-readiness' skills and that the course contributed positively to the development of these generic skills.

Student's perceived attribute development recorded here reflects a spectrum from a developed awareness and valuing of a particular attribute, to the explicit development of an attribute through practice. Nevertheless, the capacity to reflect on practice is integral to development of work-ready skills and a precondition to the development of the student as a professional practitioner. This study has shown that this is currently not easy to achieve in university environments, partly because traditional forms of assessment are not necessarily effective at measuring the attainment of work-ready skills.

It is hoped that this research has reawakened the need for universities to develop reflective practitioners in their graduates. The construction industry through its various contacts with universities, like accreditation, should be more vigilant about the manner in which assessment and reflective learning are developed. Although the scope of this study did not allow for formal feedback from the industry mentors, the anecdotal evidence suggests that industry partners are willing and able to provide opportunities to develop reflective practice in construction graduates.

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