TEACHING AND LEARNING IN THE 'LEAN TIME': RESEARCHING THE ISSUES AND OPPORTUNITIES CONFRONTING TERTIARY BUILDING EDUCATION IN AUSTRALIA

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Abstract

The education of construction and building professionals at Universities is unique as the curricula straddle diverse areas, including building technology, design, law, management and finance. Furthermore, the opportunities for would-be Construction Managers, Quantity and Building Surveyors (CMQSBS) are extensive. In Australia, a buoyant construction industry is currently fuelling high student expectations. A recent KPMG (an Accounting firm) survey (Sher, Brewer, Gajendran & Williams 2007) reported the most significant challenge the industry faces is an increase in demand for qualified practitioners whilst there are decreasing graduates to be found. Currently CMQSBS programmes contribute over 1000 graduates annually, despite this contribution of graduates these disciplines make to the industry there are barriers to be found. For example, these disciplines are often overshadowed by high profile professions such as Architects and Engineers. More significantly there are possible issues facing these disciplines at the instructional level. An Australian Learning and Teaching Council (formally Carrick) grant has provided the opportunity to promote innovation and 'best practice' within the CMQSBS disciplines. This research project established at the University of Newcastle is investigating potential issues confronting the CMQSBS disciplines. This paper describes the process that has been undertaken for the study and reports on the preliminary findings from the online survey and qualitative data. Initially, broad issues within the CMQSBS disciplines have been studied and mapped through an online survey administered to full-time academic staff who teach in these professions Australia wide. Following the theme for this years AUBEA conference it will look at current 'lean time' influencing university CMQSBS education, these being how student's time and teaching time influence teaching and learning and how these disciplines are administered Australia wide. The paper concludes by offering some observations of how these disciplines might be improved considering these current issues.

Keywords: Issues, Opportunities, Construction Disciplines, lean time, teaching, learning.

Introduction

Graduates from the disciplines of Australian Construction Management, Quantity Surveying and Building Surveying (CMQSBS) are currently in great demand largely as a result of a buoyant industry at home and abroad. The education of construction and building professionals at Universities is unique as the curricula straddle diverse areas such as building technology, design, law, management and finance. Furthermore, the opportunities for would-be CMQSBS are extensive. Australia is ideally placed to exploit building opportunities abroad and at home. At home these disciplines have in all probability stagnated over the years due to the high demand of graduates during the building 'boom'. Accordingly there is a need for reflection and self-analysis of the disciplines.

Indeed, the boom/bust nature of the construction industry has led to a hand-to-mouth existence for many Australian Universities. The educational landscape for CMQSBS programs has changed significantly due to a number of factors, such as; changes in Government funding to Australian universities, the integration of information technology initiatives and on-site training and training packages (DEST 2004; Pick 2005; Hager, Crowley, & Melville 2001).

An Australian Learning and Teaching Council (formally Carrick) grant has provided the opportunity to study CMQSBS education in Australia and this paper discusses the initial findings of this research project. Initially, broad issues within the CMQSBS disciplines have been studied and mapped through an online survey administered to full-time academic staff who teach in these professions Australia wide. More in-depth analysis was then undertaken through qualitative research methods. Overall, this research project aims to develop an understanding of key curriculum, teaching and instructional challenges and opportunities facing the CMQSBS disciplines across Australia. It will underpin future targeted projects in disciplines and allow for the development of benchmarking strategies to align Australian and International 'best practice' in CMQSBS education.

This paper begins by outlining the aims of this study and the methodological processes it has employed. The paper then goes on to discuss, broad trends observed from the DEEWR data on the disciplines, in particular student trends over the past 6 years. Emerging issues from the data and related literature on the disciplines will then be identified. These broad issues are drawn from the data gained so far for the study from the online survey and from discussions with staff and students. In relation to 'lean time' these emerging issues include; balances of staff workload, increased student numbers and students working full time whilst studying full time. These, among other regional issues, have the potential to influence teaching and learning in the domain.

The Study

As mentioned above, this study was generated from an Australian Learning and Teaching Council grant and following Australian Learning and Teaching Council's guiding principles seeks to identify the challenges for Australian CMQSBS education in maintaining and improving its quality, responsiveness and competitiveness in a global educational environment and marketplace. Furthermore, the study aims to ascertain the 'change readiness' of CMQSBS education units, their staff, professional institutions, government bodies and business and employer organizations. This component will be for the purpose of planning strategic implementation strategies to renew the disciplines. The future outcomes of the study will be to set in place an agenda for impending research and dissemination strategies to undertake detailed investigations into specific initiatives which will support and enhance educational practice across the sector.

While the primary motivation underlying this study is to promote innovation and 'best practice' in CMQSBS education, a substantial component involves gaining a broad perspective of the context in which this education is located. Thus, the outcomes of the study will have immediate relevance to CMQSBS education but will also have wider relevance in related disciplines from the construction industry domain.

CMQSBS education is important because the built environment represents a substantial and long term investment in Australia's future. Whether it is from a social, cultural, economic or environmental perspective the construction industry has a significant impact on the lives of Australians. For example, Australia is already one of the most urban countries in the world. For these reasons CMQSBS education is crucial therefore highlighting the need to identify and research issues which limit the effectiveness of teaching and learning in the discipline and consequently establish solutions for these potential issues.

There are limited studies that analyse CMQSBS education in Australia (Taylor 2004), again highlighting the need for a holistic study such as this one. From the literature a strong argument runs throughout, that is improvements need to be made. It is argued in the literature that industry training has become increasingly fragmented and specialised which has resulted in a lack of breadth of skills being taught and learnt (Hager et al. 2001). Other issues identified in the literature include;

- a low level of qualifications across the industry,
- low access to resources,
- a decrease in practical experience within subjects (due to OH&S reforms),
- an increase in students studying part-time due to employment,

- issues related to course structure - course definitions and assessment (Birch, Warren & Westcott 2005; Hager *et al.* 2001; Ashford & Mills 2006; NCVER 2001; Taylor 2004).

The outcomes of this research project will lead to the further investigation of the issues highlighted above, as well as the identification of other issues, which have potentially diminished the disciplines' status. Through the development of a shared understanding nationally of these issues and collaboration with both the CMQSBS education providers and the professional Accreditation bodies a way forward towards improvement will be established. This project will provide the much needed 'kick start' to engage the sector in reinvigorating the curricula, teaching and learning within CMQSBS education. The subsequent phase of engaging with the associated disciplinary domains will have a flow-on effect through the broader construction domain of industry and professionals.

This research is the first of its kind in Australia on these disciplines and is jointly supported by the key professional and academic bodies representing the CMQSBS disciplines in Australia and overseas; the Australian Institute of Building (AIB), the Australian Institute of Building Surveyors (AIBS), the Australian Institute of Quantity Surveying (AIQS), the Australasian Universities Building Educators Association (AUBEA), the Chartered Institute of Building (CIOB) Australasian Initiative and relevant international bodies. Furthermore, the project has National Human Ethics Clearance and the findings from the research will remain the Intellectual Property of the Australian Learning and Teaching Council. However, the results of this study (due via a report to Australian Learning and Teaching Council in December 2008) will be disseminated through Australian Learning and Teaching Council at no cost to any institution.

Methodology

To achieve the objectives of the study an empirical investigation of CMQSBS education was conducted. Within this investigation the state of CMQSBS education was explored. The study specifically focussed on academic units that educate CMQSBS graduates in 12 universities across Australia. Issues within CMQSBS disciplines were initially mapped through an online survey administered to teachers in the professions along with the analysis of historical data gained from DEEWR, the Department of Education, Employment and Work Relations (formally DEST Department of Education, Science and Training), historical comparisons of the disciplines structures sourced from University's websites, and the Graduation Destination Survey (GDS) to get a broad understanding of possible issues that exist and changes over time. Interviews and focus groups were then implemented and conducted with teachers and students to find out more in-depth opinions and reasons for these issues which have been confronting the disciplines.

In stage one of the research, the quantitative aspect of the study, historical data was obtained from DEEWR collections, data from University's websites on the curricula and the Graduate Destination Survey. These data sets were managed in an Access database and comparisons were conducted. These historical data provided the research team with an initial understanding of trends and recent changes and/or developments which have occurred over the past 6 years in regards to student numbers, graduate numbers, changes of the curriculum structures within the disciplines and the destinations of Construction education graduates. Some of these comparisons are explored further in 'Historical Trends' below.

An additional quantitative stage of the research included the implementation of an online survey which was devised and sent to full-time staff teaching in the disciplines which demonstrated overall potential issues and opportunities through statistical measures. The online survey was sent to approximately 150 staff teaching in the disciplines and had a response rate of 40%. The aim of the online survey was to allow the researchers to make reliable comparisons of quantitative and additional qualitative data from the devised open-questions in the survey.

In stage two semi-structured interviews with Heads of School in Construction, Discipline Heads and Subject Convenors in Built Environment Faculties were conducted to further explore the issues confronting CMQSBS education. Interviewing was chosen as it is the most suitable method to thoroughly examine individuals' experiences as it provides an immediacy of communication with the source (Jones 2004).

Focus groups with both staff and students teaching and learning in CMQSBS disciplines were also conducted. Focus groups are the ideal method for the purpose of pedagogic research as they provide an arena to generate ideas for the purposes of making recommendations for curriculum development, future changes and improvements in student learning (Breen 2006). As these discussions have just been conducted, limited analysis of this data has been made so far. Nevertheless, some of the topics and issues highlighted from these discussions and in the in-depth interviews will be discussed in relation to relevant literature in the 'CMQSBS Emerging Issues' section below.

Discussion
Historical Trends Observed from DEEWR and Course Guides

Number of Students

The following trends from the raw data gathered combines the three disciplines of CMQSBS. Figure 1 below shows student numbers over the past six years, including the total as well as commencing and completing students.

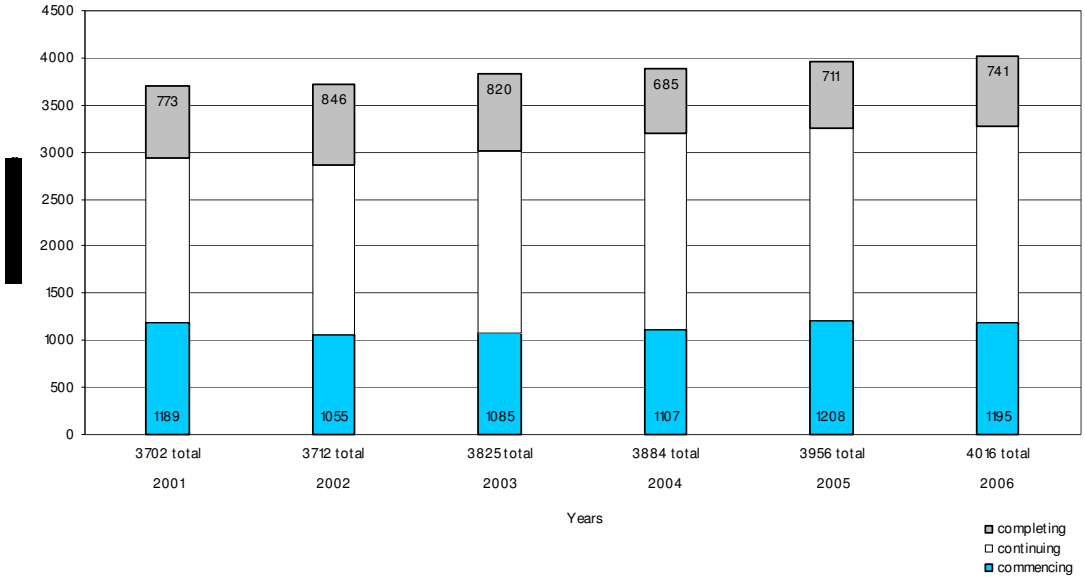

Figure 1: Total Number of Students, Commencing, Continuing and Completing for the CMQSBS Disciplines, 2001 - 2006.

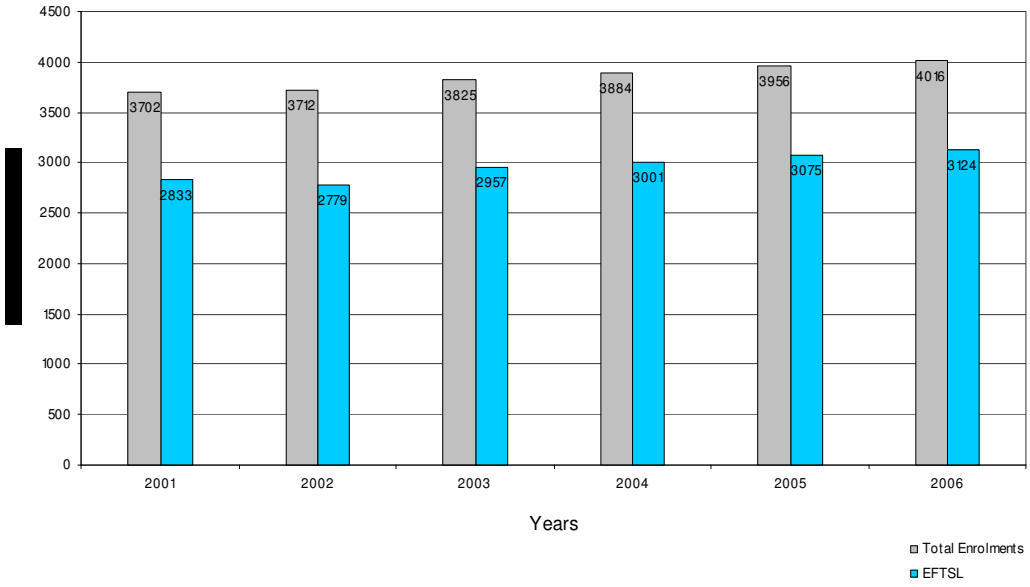

Figure 2: Total Number of Students, EFTSL (equivalent full-time student load) and Total Enrolments, 2001 – 2006.

Both Figures 1 and 2 above show that there has been a slow increase in student enrolment in all three of the disciplines Nationwide over the past 6 years, including full time students, with 3702 total students in 2001 compared to 4016 total students in 2006. This trend relates to relevant literature on students perceptions of these disciplines. The literature discusses students' lack of awareness of choosing CMQSBS as a career path, in particular in regards to the Quantity Surveying and Building Surveying disciplines (Birch, Warren & Wescott 2005). To rectify this issue there has been a recent promotion of the QS profession led by the Australian Institute of Quantity Surveyors (AIQS) in 2007 which aimed to raise the profile of the QS vocation through advertising articles in the career sections of the Sydney Morning Herald and the Australian (see Martin 2007).

Figure 1 and 2 suggest there has been a change in students' responsiveness in choosing CMQSBS as a career path over time. Simultaneously, this rise in student numbers could also infer other overall Societal trends, such as increases in population, overall higher proportions of school leavers entering university education or lowering of entry scores for university education.

Gender

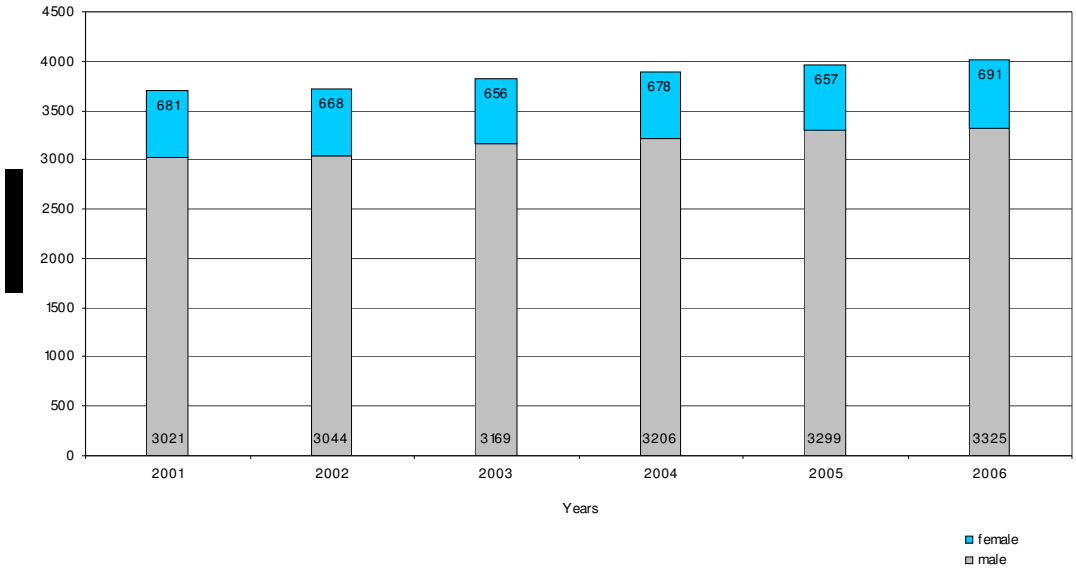

Figure 3: Total Number of Students by Gender, 2001 - 2006

Figure 3 above reveals that the population enrolment into these disciplines are predominantly male students, an ongoing trend with these disciplines which is debated widely in the literature (London, Gajendran & Yun Loy 2007). It is argued in the literature that women similarly do not consider a career in the CMQSBS disciplines due to their perceptions of it being a male dominated profession (Francis, Kestle, Scofield & Wilkinson 2004; Wilkinson 2007; Fielden, Davidson, Gale & Davey 2000). This trend is International, as discussed by (Fielden et al. 2000, p.114) in regards to the UK building industry;

> …These problems [*this being women not choosing the building industry as a career*] have been isolated as being due to a number of factors including: the education process; image of the industry; recruitment practices; sexist attitudes; organizational culture; and working environment. What is clear is that not only is the construction industry the second most male dominated industry in the UK (after mining and quarrying in which no women are employed), with 84% of its workers male, but also it appears to exhibit the greatest degree of vertical segregation by sex.

Further, women may want to enter these professions due to other issues in regards to gender inequalities. As stated by (Francis, Kestle et al. 2004) women "in male dominated professions, are often misunderstood, experience equity issues and face barriers to professional advancement and success". Further it is argued that "the industry is missing out on some of the brighter female students because of the perception that construction is a trade, not a profession" (Heathcote

2007, p.178). Heathcote suggests that combining double degrees, like construction with business could possibly draw more women to the profession. Indeed, Figure 3 also shows there is a slow increase of women entering the professions, with 681 females students enrolled in 2001, and 691 enrolled in 2006.

Strategies within the industries and organizations are also being put into place to change this trend, such as support and scholarships for women in the field (NAWIC 2008). RICS (Royal Institute of Chartered Surveyors) has also recently developed a report and action group called 'Raising the Ratio' to promote the profession to women and further to support women who work in the industry through reports, meetings and publications on the challenges of being a woman working in the building profession (RICS, 2003). Nevertheless, and as Figure 3 displays, this trend is still well in force as there are continuing marked differences between female and males within the student ratio in Australia over the past 6 years, with a higher percentage of males still choosing CMQSBS as a program and future careers.

Changes in Curricula

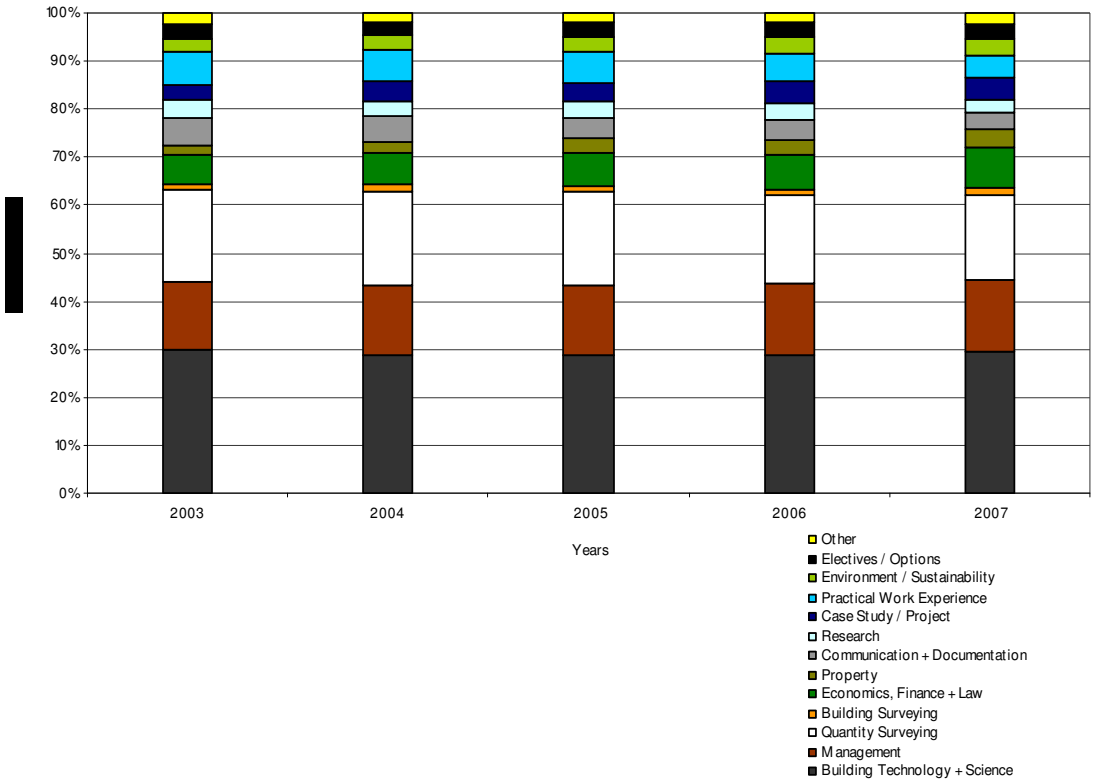

Figure 4 – Curricula Content (%), 2003 - 2007

Figure 4 above and 5 below data was sourced from the course curricula's on University websites which provide an overview of similarities, differences and trends within the courses/programs across Australian Universities.

In Figure 4 the topic and related subjects of sustainability in regards to building has emerged as having a slow subject area increase over the past few years within some Universities programs. This situation reflects societal changes in attitudes to the environment and consequent building requirements and ethical waste management. Other changes in curriculum could have occurred due to the introduction of the Bologna model to Universities (see Ashford and Francis 2007).

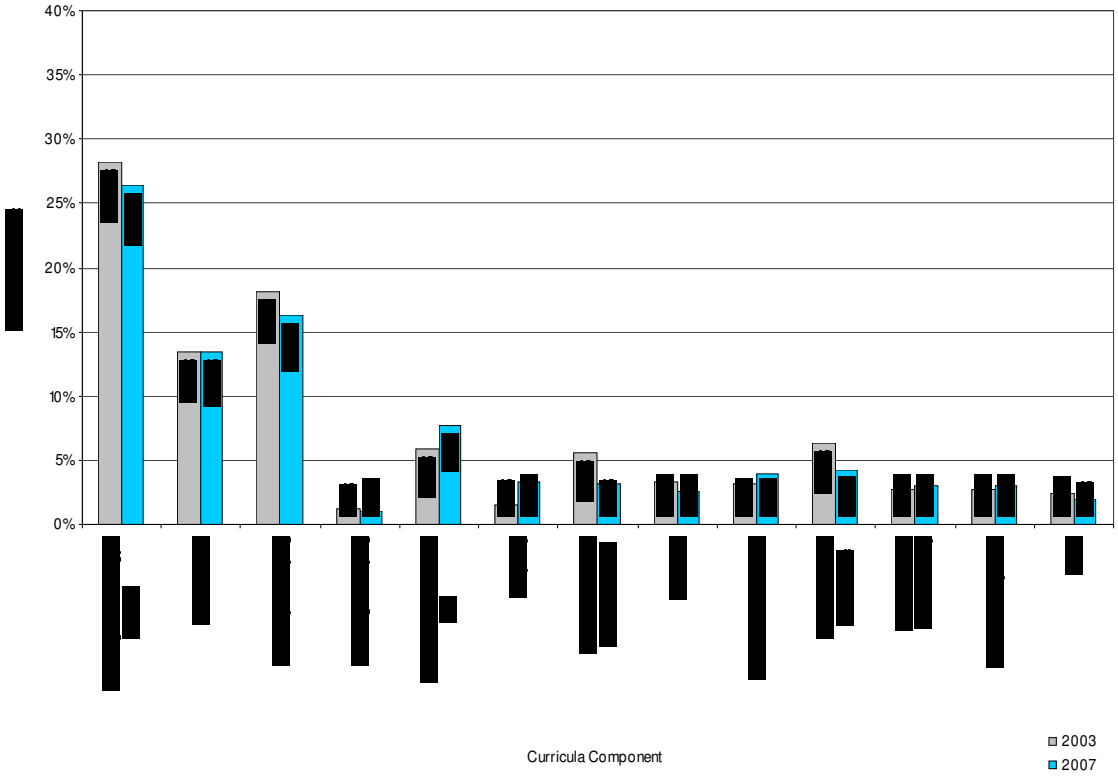

Figure 5 – Curricula Content (%), 2003 compared to 2007

Figure 5 indicates that there has been a reduction of practical work experience opportunities for students (this is also indicated in Figure 4). Figure 5 also indicates reductions in subjects in the areas of 'Building Technology and Science' and 'Quantity Surveying' when comparing 2003 with 2007. There has been an increase in topics in 'Economics, Finance and Law'. This data indicates that there is a diversity of structures and content which is slowly evolving and changing over time.

CMQSBS Emerging Issues 'Lean Time'

The following discussion relates relevant literature to emerging issues from the quantitative and qualitative data gained from the online survey and interviews and focus group discussions with staff and students confronting the CMQSBS programs at this time. These emerging issues include:

- the different ideologies between university education and industry requirements,
- staff and their increased workload,
- students' and their workload, in particular students' paid work whilst studying.

All these issues lead to 'lean time' for staff and students in these disciplines - with lean time staff have restricted time to teach due to workload and students have restricted time to learn due to work commitments. These issues discussed are still embryonic and need more thorough analysis and synthesis made before provision of detailed descriptors. Therefore, it needs to be stressed that these are preliminary findings which only offer a course grained snapshot of issues confronting the programs at this time, and is more of an overall discussion of trends from the data gathered in relation to relevant literature on these already existing trends.

Industry Requirements and University Education

The issue of different ideological objectives between industry and university education has emerged from the data. These ideological differences relate to a lack of understanding by industry to see the value and worth of university knowledge compared to technical training

provided by TAFE courses, and simultaneously for university curriculum to be up to date with the requirements of industry. Hager, Crowley and Melville (2001) likewise state that employers within the construction industry view industry-related skills to be predominately acquired through on-site experience rather than formal education. Therefore suggesting there are pedagogy disparities between what knowledge students gain from university education and the knowledge and requirements industry practitioners desire from graduates. Indeed a student in a focus group discussion in this study stated that they were learning an innovative IT program from their full-time work in industry. This student suggested that it would have been good if this program was taught initially in their degree. Hager, Crowley & Melville (2001) confirm this trend by stating that the construction industry has become increasingly IT sophisticated and competitive locally and globally (1990-2000) which has resulted in the need for new skill requirements from graduates.

Another student participant in this study suggested that there were some compulsory subjects in their degree that could have been learnt in a one off lecture rather than in a whole subject. These sorts of gaps between industry's agenda and their requirements and the content of university programs needs stronger communication initiatives implemented between Industry bodies and Universities. Whilst the role of Accreditation bodies is to supply these benchmarks aspects of the Accreditation process too has been identified in this study as in need for change.

Furthermore, for staff to find the resources, time and personnel to conduct strong links with industry results in further issues. This primary issue of disparate ideologies between industry requirements and university education is connected to other issues facing academic staff and students at Universities with these disciplines nationwide. These other issues have been emerging in the quantitative and qualitative data and overall include a lack of time due to increased staff workload, lack of up to date industry experience of staff and students working in industry whilst studying. These issues will now be discussed.

Lean Teaching: Academic Staff and their Workload Pressures

There have been increased pressures in Universities that have meant academic staff are struggling to find time to address all areas of their workload quota. A finding from the online survey in regards to this workload issue suggests that staff are spending more time on administration and research and less time on teaching (this is a preliminary observation and needs further testing to be validated). These lean time issues for academic staff relate to university funding cuts, lack of resources, new programs being implemented and existing degree programs being taught out (see Ashford and Francis 2007) and access to sessional teaching staff.

These issues can be seen as universal to all degree programs taught at Universities, therefore in particular to these disciplines staff have the extra workload problem of trying to find time to work in industry and/or refresh their knowledge of industry requirements, as discussed above as a primary issue. Quite a few staff members indicated in the discussions that this is a predominant problem. Furthermore, staff indicated that it is very difficult to find academic staff to employ with industry experience. This latter issue could relate to the fact that students who graduate from these disciplines and people who already work in industry have more incentive to follow careers in the building industry due to higher salaries compared to academia. Indeed, it was identified in the interviews that students studying the CMQSBS disciplines and working in industry may be earning higher wages than their lecturers. Furthermore, with the introduction of the 'partnership model', universities are required to meet performance measures – this is connected student entry scores to the courses – as such students are seeking to enter the profession are electing to enter the workforce rather than seeking tertiary qualifications (Birch, Warren et al. 2005).

Another correlation from the online survey showed that staff in the CMQSBS disciplines do not have a high level of promotion, with a high percentage of respondents in the survey answering 'no' or having just one promotion during their academic careers so far. It could be suggested that this factor could be due to the specifics of these disciplines - that is staff are required to have relevant up-to-date industry experience. Therefore, potentially academic staff in these disciplines come to teach at university later in their careers after working in industry then they have to start building up their academic career (lower promotion rates indicate this but further analysis is needed). Therefore, this later entry into academia becomes problematic in regards to having the time for this professional development when there are already staff workload issues, mentioned above. Indeed, quite a few staff members in this study mentioned that there is significant

pressure to take on a PhD which means more work and time needed to study as well as conduct other responsibilities of research and teaching and to add to this pressure ensure up-to-date industry experience.

Lean Learning: Students and their Workload Pressures

Another lean time factor influencing these disciplines is students studying and working workloads, in particular the pressures of working in industry whilst studying and its impact on learning. As Birch, Warren et al. (2005) state in regards to the BS and QS professions there has been an increase in work based learning and part-time study in the disciplines. This issue of students working whilst studying in the built environment disciplines has been explored and analysed extensively by Ashford & Francis (2007) and Mills & Ashford (2004). They argue that students have changed compared to the past by taking on more paid employment whist studying (Ashford & Francis 2007; Mills & Ashford 2004). This issue becomes more apparent in these disciplines as industry poaches students as soon as in their first year of studying (a student participant discussed this happening to them in this study). Indeed, so far the majority of students in the discussions for this study were working full time and studying full time. Though one student mentioned they realised they were not the norm, choosing to work one day a week so they could enjoy their student lifestyle.

A student working whilst studying has the potential to create a tremendous issue in regards to learning performance. For example, students may not have the time to learn and meet their demands of assessment tasks and further possibly desire a short, quick fix degree. Indeed, some students in this study mentioned that they would prefer if their degree was shorter. Mills and Ashford (2004) found in their study that students could accommodate their work responsibilities whilst studying though students were "unclear about their obligations to the university, and tend to spend less time on tasks that improve their learning experience" (McInnis 2003 cited in Mills and Ashford 2004, p.197).

Lingard, Yip, Rowlinson & Kvan (2007) similarly discuss student burnout in their research of students from Australia and Hong Kong from the demands of studying in the construction disciplines. They found that in their "Australian sample, tension rose as *inner*-role conflict between paid work and study" (Lingard et al. 2007 p.355). From these examples of existing research on this issue of students working whilst studying and it now becoming an emerging issue again in this study implies that this is a significant problem within the disciplines - it has the potential to influence learning and the skills of graduates and further be frustrating for teaches when students do not attend classes. This issue needs addressing and changes made by all parties involved - the Universities, Industry demands for student labour and student's choices.

Conclusion

This paper has introduced the Australian Learning and Teaching Council study implemented to address opportunities and issues for the CMQSBS disciplines offered by Universities Australia wide. The paper revealed facts and trends of student enrolments in the disciplines, gender and curriculum structures. This paper then identified some issues from the literature and further related issues emerging from the data gathered for this study. These issues highlight the need for more time for staff and students to make improvements for teaching and learning and the need to address issues of industry expectations of the curricula. This paper aimed to show only the emerging findings of this study. Due to the early stages of the quantitative and qualitative data analysis these findings are very limited. As more in-depth analysis continues further issues and possible solutions will begin to emerge. These future issues and solutions will be reported for this study to Australian Learning and Teaching Council in December 2008 and will be disseminated accordingly with the Universities, the Accreditation bodies, industry professionals and the wider community. In the meantime the issue of lean time for staff and students needs to be acknowledged as an issue within the disciplines.

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