AN ANALYSIS OF STAKEHOLDER PREFERENCES FOR THRESHOLD LEARNING OUTCOMES IN CONSTRUCTION MANAGEMENT IN AUSTRALIA

Sidney Newton[1] and Rosalie Goldsmith

Faculty of Built Environment, The University of New South Wales, NSW 2052, Australia.

As a precursor to a new national regulatory and quality agency for higher education in Australia, the Australian Teaching and Learning Council (ALTC) has been commissioned to work with clusters of discipline communities to begin to specify how Threshold Learning Outcomes (TLOs) particular to each discipline might be used as a basis for academic standards. In 2010, a series of 14 workshops and follow-up questionnaires was convened to examine the preferences of key stakeholder groups for particular TLOs. A thematic analysis of the workshops identified six broad classifications: Judgement, Communication, Self-Development, Knowledge, Innovation and Work-Integrated Learning. Draft TLO statements for each have now been developed. An analysis of the stakeholder preferences reveals significant differences and interesting similarities in the preferences being expressed. These differences are examined in terms of TLO and source classifications. Results confirm that Judgement is generally a low preference for Industry and Students. There is also a strong case for curriculum review around Innovation. There is consistently high preference expressed for the development of graduates as individuals. Overall, the strong message from this data is that Industry is uncomfortable with learning outcomes being expressed in other than a traditional competency statement form. A critical requirement is to come not only to a shared expression of the TLOs, but also a shared understanding of them.

Keywords: accreditation, education, threshold learning outcomes.

INTRODUCTION

"The new [Tertiary Education Quality and Standards Agency] will be at the centre of a new standards-based quality assurance framework. The framework will establish minimum standards that higher education providers are required to meet in order to be registered and accredited, as well as academic standards… Key to the success of the new quality assurance arrangements–and meaningful academic standards in particular–will be the active involvement of the academic community… Discipline communities will 'own' and take responsibility for implementing academic standards (working with professional bodies and other stakeholders where appropriate) within the academic traditions of collegiality, peer review, pre-eminence of disciplines and, importantly, academic autonomy." (Australian Government 2009:32)

The Australian Government is in the process of establishing a national regulatory and quality agency for higher education, the Tertiary Education Quality and Standards Agency (TEQSA). TEQSA will have responsibility for the registration of all higher

[1] s.newton@unsw.edu.au

Newton, S and Goldsmith, R (2011) An analysis of stakeholder preferences for threshold learning outcomes in construction management in Australia *In:* Egbu, C. and Lou, E.C.W. (Eds.) *Procs 27th Annual ARCOM Conference*, 5-7 September 2011, Bristol, UK, Association of Researchers in Construction Management, 127-136.

education providers, undertake the evaluation of the performance of all such providers, protect and assure the quality of international education undertaken by the higher education sector and will seek to improve and streamline all current regulatory arrangements in Australia's Higher Education system. As a precursor to the establishment of TEQSA, in 2010 the Australian Teaching and Learning Council (ALTC) was commissioned by the Australian Government to work with those communities of academic, professional, scholarly and business groups who constitute the broad range of discipline stakeholders represented in the higher education sector. The aim of that Learning and Teaching Academic Standards (LTAS) project is to facilitate and coordinate clusters of discipline communities to begin to specify how Threshold Learning Outcomes (TLOs) particular to their discipline might be used as a basis for the evaluation and improvement of academic standards. A TLO has been defined as "a clear statement of the set of knowledge, skills and the application of the knowledge and skills a person has acquired and is able to demonstrate as a result of a particular program of study in a given discipline, at the point of graduation" (Australian Qualifications Framework Council, 2010:82).

For the Building Discipline, the LTAS project has involved the appointment of a Discipline Scholar to manage the process over a period of 12 months, from July 2010 to July 2011. A Building Discipline Reference Group (BDRG) has been established to guide the project, with broad-based representation from the Australian Deans of Built Environment and Design, relevant professional bodies, academics, employers, students and recent graduates. The BDRG has an independent Chair and the Discipline Scholar is an observer only. For a variety of reasons, primarily related to time and resource limitations, an early decision was taken by the BDRG to focus the project on the Bachelor level outcomes only, in Construction Management or equivalent. A smaller Building Discipline Working Party (BDWP) was then established to promote the consultation process and development of appropriate TLO statements for construction management.

A critical requirement for the project is that it be evidence-based and robust. This makes the consultation and development process itself of particular significance and interest. A multi-instrument approach has been adopted that combines workshops, online surveys and visual mapping exercises to inform both quantitative and qualitative analyses of the results. This paper provides an overview of the consultation and development process and examines in particular detail the stakeholder preferences to have emerged at this stage.

AN OVERVIEW OF THE CONSULTATION AND DEVELOPMENT PROCESS

The overall structure

The overall LTAS project for the Building Discipline has been structured around four discrete stages:

A review of similar work undertaken elsewhere and identification of potential frameworks for academic standards

There are a number of national accreditation systems currently or recently under development and review which relate directly to the Australian LTAS project. These include: The Quality Assurance Agency for Higher Education subject benchmark statements in the UK, the Tuning Educational Structures in Europe and The American Council for Construction Education (see, for example, The Quality Assurance Agency

for Higher Education 2008). At the same time a range of professional accreditation frameworks relate directly to construction management. These include the Chartered Institute of Building, Royal Institution of Chartered Surveyors, Australian Institute of Building and Australian Institute of Quantity Surveying (see, for example, Australian Institute of Building 2006). At an institutional level, various learning and teaching agendas are of relevance, most specifically perhaps there is the national graduate attributes project (Barrie *et al* 2009). A multitude of other initiatives also relate directly to academic standards in construction management, including the Australian LTAS project itself, where a number of discipline clusters have already completed their development of TLO statements (see, for example, Hancock *et al* 2010).

The Review of Australian Higher Education (Bradley *et al* 2008) recognised legitimate concerns with the knowledge-specific nature of many professional accreditation frameworks at one extreme, and the generic nature of institutional graduate attributes at the other. A key element of the project was therefore to generate a representative sample of relevant learning outcome statements drawn from a mix of professional accreditation, TLO and graduate attribute sources. Further details of this initial stage can be found in Newton and Goldsmith (2011a).

Community engagement to canvass opinion and determine a draft set of TLO statements

The consultation process began with a series of meetings and communications with relevant professional bodies, academic peak groups, academic staff, professional practitioners, students and recent graduates to raise awareness of the project. This was followed by a series of 14 half-day workshops, including eight specific to the academic staff of Construction Management programs, three specific to industry practitioners and employers, two specific to current students and recent graduates, and one a mix of academic staff and students. The workshops involved a total of 108 participants at locations across Australia.

The structure of each workshop was the same. It began with an open invitation to participants to brainstorm the TLOs they regarded as critical, with open-ended questions to refine the statements further. There then followed a Pyramid Discussion (Jordan 1990) based on a prepared set of 64 candidate TLO statements printed on individual cards randomly distributed to pairs of participants. Each pair began by nominating only their five most preferred expressions of TLOs from the cards allocated to them. The selections were recorded and then each nomination discussed with respect the pre-selection discussion and the overall set of candidate TLOs.

Anchoring, where an initial expression sets the focus for subsequent expressions, is always a concern in group discussion work. The workshops were structured into three discrete stages of open discussion, small-group discussion on prescribed statements, followed by broader consideration of the small-group work. An analysis of the workshop transcripts demonstrates that topics moved significantly from one stage to the next, and helped to mitigate the potential for anchoring to occur.

A transcription of both the pre-selection and post-selection discussions at each workshop were analysed using the thematic analysis functionality of Concordance software (Watt 2011). Several broad classification categories (or themes) were identified. Some were expected themes while others were emergent (Bender and Ewbank 1994:71). The classification categories were then used to cluster the prepared set of candidate TLOs for numerical analysis based on their source, stakeholder preference and overall frequency.

Based primarily on the numerical analysis but informed by the thematic analysis, an initial draft set of TLO statements was proposed. An anonymous online survey of 150 registered participants provided feedback and commentary from a response rate exceeding 30%. The respondents were broadly representative of the overall composition of the registered parties, with 62% being academics, 31% industry and 7% students. Based on an analysis of the survey responses the categories and statements were reviewed by the BDWP using guidelines provided by the Tuning Project (Tuning 2010:44). A revised draft set of TLO statements has now been circulated for further comment.

It is apparent that whilst representative of the particular participant group for the project, the representation of the stakeholder groups in the survey responses is far from equal. A subsequent survey and workshop process managed to increase the representation of industry in the processes very significantly. The poor representation of students in this initial phase of the project and in the project overall is a significant limitation of the results. A follow-up project is now focussing specifically on growing the representation of final year students and recent graduates in the process.

For a detailed description and discussion of this methodology, including the specific draft TLO statements, please see Newton and Goldsmith (2011b).

A trial of the draft TLOs to map and calibrate them against existing academic programs and accreditation standards

The draft set of TLOs is now being exercised to determine the relationship of each statement with existing professional accreditation requirements, the various Bachelor of Construction Management programs of study currently available in Australia and the structured graduate training programs offered by some of the larger employers. The mapping exercise comprises a matrix of the draft TLO statements ranged against the various professional competencies/core subject learning outcomes/training module outcomes. Each element is being scaled using a derivative of Bloom's Taxonomy of Educational Objectives and the relative scaling of each matrix is then visually represented in the form of a multi-level radar chart for comparison.

The mapping exercise itself is adopting a double blind refereed approach. The source and context of each competency/learning/module outcome is removed. Several anonymous experts then assess the relationship of each discrete outcome to the draft TLO statements. It is intended that this assessment process be managed and facilitated using a web-based self and peer assessment kit. SparkPlus enables participants to compare their own and others' assessment of a task along with their justification for such an assessment (see http://spark.uts.edu.au/). Such a process of comparison is considered essential in order to quality-assure the mapping exercise.

The potential for different interpretations of the TLO statements is significant. Indeed, much of the work of this project is aimed at making those different interpretations more explicit. In the final expression of the TLOs, for example, each statement is accompanied by notes that seek to clarify the meaning of each statement through an explanation of context and provenance, and use of examples of the kind of evidence each statement might entail.

Following a review of the mapping exercise for competency/learning/module outcomes, the same process will be used to test the TLO statements against actual assessment tasks. In other words, rather than using the statements of intention represented by competency/learning/module outcomes the subsequent mapping will use actual examples of assessment outcomes. It is noted however that this is a far

more ambitious undertaking and will be dependent on the time and resources available at that stage of the project.

An evaluation of the work and the outcomes
A final round of forums, surveys and publications is proposed to evaluate and if necessary revise the draft TLOs before seeking endorsement by the BDRG and the more specific peak bodies it represents.

Rather than being stakeholder group-specific (as was the first round of workshops), the final round of forums will each involve a mix of academics, professionals, employers, students, recent graduates, etc. The forums again will be structured around a Pyramid Discussion, but one this time informed by the findings of the mapping and calibration exercises. At question will be more than the general classification and wording of the TLO statements. Each TLO statement will be associated with representative learning outcome statements drawn from the mapping exercise and actual examples of assessment tasks drawn from the calibration exercise. The purpose of the forums will be to assess the specific details of each draft TLO and come to not only a shared expression of the TLOs but a shared understanding of them as well.

To canvass as broad an assessment as possible, the same material will be incorporated into an online survey and responses also sought in that way.

The final outcome of the project is intended to be a set of TLOs endorsed and developed in close consultation with the Discipline. It is critical that the TLOs be clearly articulated, assessable, written for a broad audience (including academics, students, parents and employers), contemporary and forward thinking, and situated in a national and international context. A crucial outcome is that the various stakeholder groups begin to build a shared understanding of what (in explicit learning assessment outcome terms) each statement actually means. A draft report, equivalent to those of other LTAS Disciplines (see, for example, Hancock *et al* 2010), including information related to the nature and extent of the discipline, scope of the standards statement, notes on the TLOs, and the relationship between the TLOs and other benchmark statements (most notably those developed overseas), has recently been circulated.

AN ANALYSIS OF STAKEHOLDER PREFERENCES

The methodology and purpose

A review of the literature and broad anecdotal experience indicates a clear difference in the learning outcome preferences between key stakeholder groups. For example, Nkado (2001) identifies the difference in preferences between stakeholders, but amalgamates the different group views to focus on differences between current importance, future importance and proficiency levels. Xia (2009) focussed exclusively on one stakeholder group (industry) and identified a particular set of preferences, presumably but not directly distinct from the preferences of other stakeholder groups. Dainty *et al* (2004) review the different stakeholder perspectives on competencies but specific to project management. Recent national reviews of construction management provision in higher education in Australia (Williams *et al* 2009) and the UK (Williams *et al* 2010) both highlight differences in preferences for learning outcomes across the higher education sector (demonstrated through different program learning outcomes) and between the providers and industry/students (demonstrated through the focus of concerns being raised about existing programs, particularly by industry/students). Almost every higher education program of study in construction management will have different stakeholder views represented on an industry or program advisory

committee, and these undoubtedly will echo differences in opinion and preferences with respect to learning outcomes.

There is general agreement that the preferences are different, but there is also a clear lack of robust evidence about the particular preferences different stakeholder groups hold in terms of the learning outcomes specific to graduates in construction management in Australia. The focus of this research is to determine what, specifically, those differences are and the extent of the difference. This is critical information if a consensus on a single set of learning outcomes is to be achieved. Where significant differences exist either one or other or all of the (industry/students) expectations and (academic) provisions need to be better managed. Significant difference will also indicate where consensus is most at risk.

A detailed description of the research methodology specific to stakeholder preferences, including an analysis of the results in terms of the actual TLOs determined by this process, is available in Newton and Goldsmith (2011b). The current paper will focus on an analysis of the differences between stakeholder groups. For that analysis, a broad set of candidate/representative learning outcome statements were harvested from typical professional accreditation competencies, the graduate capability statements of a typical higher education provider, and the TLOs already established in relatively comparable disciplines. A total of 64 candidate learning outcome statements were collated from the Mandatory and Core competencies for Quantity Surveying and Construction by the Royal Institution of Chartered Surveyors; the Entry Level Skills for Construction Management defined by the Australian Institute of Building; the LTAS Engineering and ICT Discipline TLOs; the LTAS Business Discipline TLOs for Accountancy; and the generic graduate attributes applied by Queensland University of Technology.

Each candidate learning outcome statement was reproduced on a colour-coded and numbered card for use at each workshop. A total of 14 workshops were convened. Eight of the workshops were specific to the academic staff of Building programs, three specific to industry practitioners and employers, two specific to current students and recent graduates, and one was a mix of academic staff and students. The workshops involved a total of 108 participants, at locations across Australia.

At each workshop a single copy of each of the 64 cards was randomly distributed in even numbers to self-selecting pairs of participants (generally pairs formed around whoever happened to be sitting next to each other). Each pair was required to sort through the cards allocated to them and to identify their top five preferences only. The top five preferences for each pair at each workshop were recorded for analysis.

Subsequent to the workshops a draft set of six TLOs was developed (see Newton and Goldsmith 2011b) using the following six categories or themes: Judgement, Knowledge, Communication, Innovation, Self-Development and Work-Integrated Learning. Each candidate learning outcome was then classified according to this draft set of TLOs. Note however that Work-Integrated Learning has been omitted from the analysis because none of the candidate TLO statements referred to it.

The results and discussion

The analysis of stakeholder preferences was undertaken first in terms of the draft TLO classification for each learning statement ('TLO'), and second in terms of the source for each learning statement ('Source'). For each analysis the individual learning statements were grouped according to their TLO or Source classification. For each

classification the total number of times a learning statement in that classification was selected in a workshop was then calculated. A separate total was calculated based on the overall number of workshops, and then also for each sub-group of workshops by stakeholder (Academic, Industry and Student). Those totals were then expressed as a percentage of the total number of selections in the relevant group.

The percentages to emerge from this process are presented in Table 1. It identifies the overall highest preference for TLO classification is Knowledge (27.39%) and the overall highest preference for Source is the AIB (24.78%). The lowest overall preference for TLO classification is then Communication (12.61%) and the overall lowest preference for Source is Accountancy (13.48%).

Table 1: Overall, Academic, Industry and Student preference data by TLO and Source

TLO	Overall	Academic	Industry	Student
Judgement	17.83	20.14	13.64	13.64
Knowledge	27.39	25.18	25.76	29.55
Communication	12.61	12.95	13.64	15.91
Innovation	19.13	14.39	27.27	20.45
Self-Development	23.04	27.34	19.70	20.45
Source	Overall	Academic	Industry	Student
RICS	17.39	14.39	21.21	20.45
AIB	24.78	20.14	31.82	22.73
Engineering	22.17	25.18	13.64	27.27
Accountancy	13.48	15.11	12.12	6.82
QUT	22.17	25.18	21.21	22.73

It is important to note that this is not a preference of the themes themselves (Judgement vs Knowledge vs Communication, etc.). Rather, the participant preference specific learning outcome statements that have then been classified in terms of the roader themes, and the percentage provided in Table 1 represent the extent of the preferencing in that context. The equivalent note applies to the source data.

The relative stakeholder preferences can also be identified. Figure 1 presents a radar diagram of the Overall, Academic, Industry and Student stakeholder preferences by TLO. The further from the centre, the greater the preference.

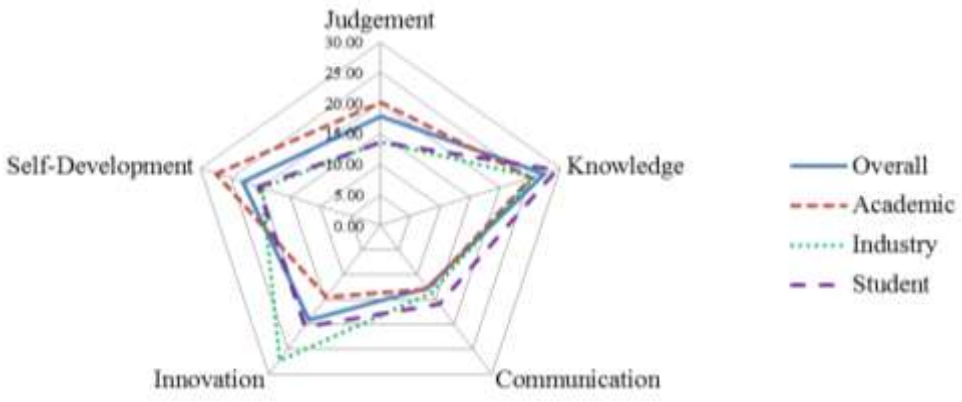

Figure 1: Relative stakeholder TLO preferences as a percentage

Immediately it is evident that whilst Knowledge and Communication remain relatively high and low respectively and across the board, there are significant differences in the

other TLO preferences. Academics preference Self-Development and Judgement more highly than do Industry and Students, and Industry and Students are almost identical in their preferences for each. This might suggest that there are fundamental differences when it comes to Self-Development and Judgement, or it may simply be a difference in understanding of what might constitute Self-Development and Judgement. In either event, the difference calls for close attention to be paid when more specific details are developed. The particularly low preference for Judgement by both Industry and Students is certainly cause for concern. The actual draft TLO statement speaks of exercising judgement, employing appropriate problem-solving and decision-making methodologies to solve routine building problems under supervision. For both Industry and Students to preference this so low highlights the need for further investigation to determine what it is about Judgement that is problematic.

It is very clear, however, that the substantial difference in opinion between Industry and Academics relating to Innovation is the most significant factor to emerge from the data. The fact that the draft TLO statement for Innovation speaks of researching and evaluating methods and strategies for the procurement, planning, control and/or financial management of contemporary construction work, is possibly even more alarming, not least because it is the Academics who preference it so low. Some context to the high preference given by Industry is provided in the transcripts of the workshop discussions. It is apparent that procurement, planning, control and/or financial management are the learning outcomes of most concern to Industry currently, because they believe the topics are either not dealt with in sufficient detail or they are failing to keep up to date with significant changes in the industry. There is a strong case here for curriculum review.

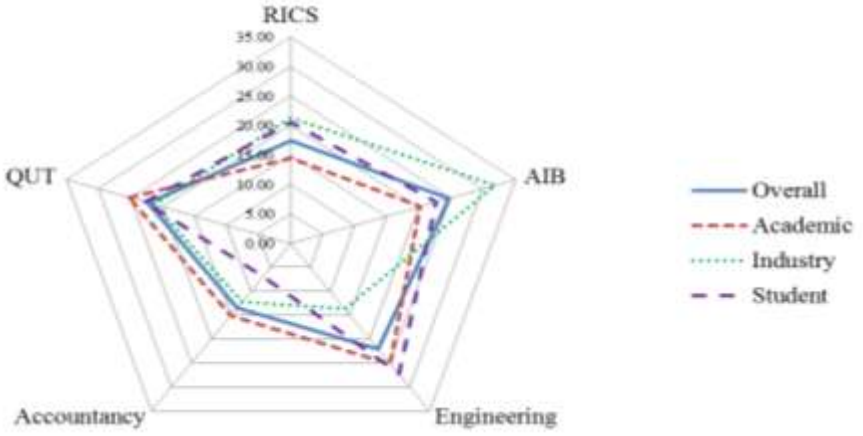

Figure 2: Relative stakeholder Source preferences as a percentage

The equivalent radar diagram representation for Source is presented in Figure 2. Here there is more variation in general and overall the relationships between competencies (RICS and AIB), capabilities (QUT) and TLOs (Accountancy and Engineering) are more complex. What is striking is the strong consensus across all stakeholders that graduate capabilities are a high preference. Equally striking perhaps is the strong difference in opinion between Industry on the one hand and Academics and Students on the other about the preference for AIB competencies versus Engineering TLOs. The strong message in this data is that Industry is still far more comfortable with learning outcomes expressed in traditional competency terms. They are clearly uncomfortable with the language of TLOs. Despite the requirement for TLOs to be written for a broad audience, including students, parents and employers as well as

academics, industry still seem to react negatively to such expressions. Students are certainly less uncomfortable if there preference of Engineering TLOs is any indicator, however the same Students preference Accountancy TLOs extremely poorly.

Whilst the relative preferences are less extreme for Academics than for Industry, the two stakeholder groups are almost a perfect mirror of each other in terms of competencies and TLO statements. Whilst the evidence is far from compelling, the pattern of preferences at least suggests the possibility that much of the literature and broad anecdotal experience indicating a clear difference in the learning outcome preferences between key stakeholder groups could largely be an issue of expression. This suggestion alone certainly encourages the next phase of the current project, to map and calibrate the draft TLO statements against existing academic programs and accreditation standards.

CONCLUSIONS

At the time of writing this paper, the LTAS project for the Building Discipline is still current. A draft set of TLOs is being exercised by mapping them against professional accreditation competencies, course learning outcomes and employer training module outcomes. A final evaluation of the work will be undertaken through a series of forums and online surveys. A significant aspect of the initial community engagement has involved an analysis of stakeholder preferences for particular TLOs.

There is general acknowledgement that preferences differ between the key stakeholder groups, but there is also a distinct lack of evidence specific to what those differences actually are and the extent of the difference in the particular context of construction management in Australia.

An analysis of stakeholder preferences drawn from a candidate set of 64 learning outcome statements has identified overall, academic, industry and student preferences, classified in terms of the draft TLO statements and the sources from which the candidate statements have been drawn.

The results confirm that overall the highest TLO preference is consistently Knowledge, lowest TLO preference is consistently Communication, highest Source preference is AIB and lowest Source preference is Accountancy. Radar diagrams also help identify some useful differences between stakeholders. Further investigation is called for to determine why Judgement is generally a low preference for Industry and Students. There is also a strong case for curriculum review around Innovation.

The different preferences expressed for different sources of learning outcome statement are more complex. There is, perhaps surprisingly, consistently high preference expressed for graduate capabilities. Overall, the strong message from this data is that Industry is uncomfortable with any expression other than a traditional competency statement. This suggests that much of the difference in preferences between different stakeholders might reasonably be ascribed to the choice of language. The critical requirement is to come to not only a shared expression of the TLOs, but a shared understanding of them.

ACKNOWLEDGEMENTS

Support for this research has been provided by the Australian Learning and Teaching Council (ALTC), an initiative of the Australian Government Department of Education, Employment and Workplace Relations. The views expressed here do not necessarily reflect the views of the ALTC.

REFERENCES

Australian Government (2009), *Transforming Australia's Higher Education System* http://www.deewr.gov.au/ [Accessed 30 January 2011].

Australian Institute of Building (2006), *The Cooperative Accreditation Agreement for Education Providers: Handbook for Users*, AIB, Canberra, Australia.

Australian Qualification Framework Council (2010), *The Australian Qualifications Framework* http://www.auqa.edu.au/ [Date accessed 30 January 2011].

Barrie, S., Hughes, C. and Smith, C. (2009), *The national graduate attributes project: integration and assessment of graduate attributes in curriculum*, http://www.altc.edu.au/ [Date accessed 30 January 2011].

Bender, D E and Ewbank, D. (1994), "The focus group as a tool for health research: issues in design and analysis", *Health Transition Review*, **4**(1), 63-79.

Bradley, D., Noonan, P., Nugent, H. and Scales, B. (2008), *Review of Australian Higher Education: Final Report*, http://www.deewr.gov.au/he_review_finalreport/ [Date accessed 30 January 2011].

Dainty, A., Cheng M-I. and Moore, D. (2004), "A competency-based performance model for project managers", *Construction Management and Economics*, **22**, 877-886.

Hancock, P., Freeman, M. and *associates* (2010), *Learning and Teaching Academic Standards Statement for Accounting*, http://www.altc.edu.au/standards/ [Date accessed 30 January 2011].

Jordan, R. R. (1990), "Pyramid discussions", *ELT Journal*, **44**(1), 46-54.

Newton, S. and Goldsmith, R. (2011a), "Defining guaranteed learning outcomes for building and quantity surveying graduates in Australia", *Proceedings of 15th Pacific Association of Quantity Surveyors Congress*, Institute of Quantity Surveyors, Colombo, Sri Lanka (in press)).

Newton, S. and Goldsmith, R. (2011b), "Setting Academic Standards for Tertiary Education in the Construction Industry", *Proceedings of 36th AUBEA Conference*, Bond University, 306-318, Gold Coast, Australia.

Nkado, R. and Meyer, T. (2001), "Competencies of professional quantity surveyors: a South African perspective", *Construction Management and Economics*, **19**, 481-491.

The Quality Assurance Agency for Higher Education (2008), *Subject benchmark statement Construction, property and surveying* http://www.qaa.ac.uk/ [Date accessed 30 January 2011].

Tuning (2010), *A Tuning Guide to Formulating Degree Programme Profiles*, http://www.core-project.eu/ [Date accessed 30 January 2011].

Watt, R. J. C. (2011), *Concordance 3.3*, http://www.concordancesoftware.co.uk/ [Date accessed 30 January 2011].

Williams, A., Galloway, K. and Mullin, P. (2010), *Higher education: State of the nation*, University of Salford, Greater Manchester, UK.

Williams, A., Sher, W., Simmons, C., Dosen, A. and Pitt, B. (2009), *Construction Education in Australia: A Review of Learning and Teaching Challenges and Opportunities*, http://www.altc.edu.au/ [Date accessed 12 February 2011].

Xia, B., Chan, A. P. C. and Yeung, J. F. Y. (2009), "Identification of key competences of design-builders in the construction market of the People's Republic of China (PRC)", *Construction Management and Economics*, **27,** 1141-1152.