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Progress Through Partnership: How do Industry and UK Higher Education Built Environment Courses Work Collaboratively?*

ALED WILLIAMS
Research Institute for the Built and Human Environment, University of Salford, M7 1NU, UK.
E-mail: a.w.williams@salford.ac.uk

The paper presents the initial findings of the UK-based Accelerating Change for Built Environment Education (ACBEE) initiative. An empirical investigation of first phase ACBEE case studies of excellence has been carried out to unpack the type and level of industry–higher education engagement within UK built environment courses. These range in nature from continuing professional development and whole courses down to individual modules taught at undergraduate, postgraduate or corporate levels. The method comprised of the structuring and classification of the case studies through the use of setting and content codes. These were tabulated and subsequently analysed to determine the characteristics of engagement. This has resulted in the development of an initial outline classification framework of the type and level of industry/higher education engagement derived from the case study analysis.

Keywords: Industry engagement, industrial partnerships, collaboration, classification.

INTRODUCTION

THE WAY THAT industry engages with higher education is critical to the future success of the construction sector and the UK economy. The need for collaboration between industry and higher education has been concluded by the recent Lambert Review of Business–University Collaboration [1] and the White Paper on *The Future of Higher Education* [2]. The complexity of industry and higher education engagement raises questions of considerable interest for our understanding of how these inputs add value to the parties involved.

Successive government reports all directly address the need for fundamental change to increase the performance of the construction sector including Constructing the Team [3], Rethinking Construction and Accelerating Change in Construction [4, 5]. The competitiveness of the industry relies on investment, innovation and attracting talented people. Some progress has been made towards achieving these aims but there is still much work to be done.

The Construction Industry Training Board's (CITB) 'Making Connections' seminar in 2001 initiated a campaign to improve the recruitment, education and retention of graduates. This led in 2002 to a workshop in Leeds on 'Rethinking Construction Education'. From this a representative group was formed to find a way forward in Accelerating Change in Built Environment Education (ACBEE). The ACBEE programme was established to encourage improved dialogue between the built environment industry, universities and professional bodies to provide more relevant training and education for the future [6]. A diverse steering group has driven this initiative with representation from higher education institutions, industry, professional and trade bodies.

The programme set itself the bold aim of improving the dialogue between industry and universities with the clear intention that the momentum should be shifted back in favour of increasing levels of engagement. Clearly, there are demonstrable knowledge transfer benefits to all parties from working together. It is thus of interest to learn from the ACBEE programme how we encourage the construction industry and higher education to work together on a more structured basis to improve dialogue. Consequently, what are the ways in which higher education can collaborate successfully with industry?

Instruments adopted for assessing the interaction between industry and higher education has been the use of case studies, semi-structured interviews and workshops. The main vehicle for demonstrating high quality engagement is through the ACBEE case studies of excellence. These verified case studies highlight innovative approaches to the incorporation of 'real life' situations and work environment

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Table 1. Case studies of industry/higher education engagement (Phase 1)

Key	Main collaborator	Title
A	University of Central England	'APEX'—Reflective Practice for Housing Practitioners
B	Sheffield Hallam University	Short Industrial Work Placements
C	Loughborough University	Centre for Innovative Construction Engineering (CICE)
D	Loughborough University	Commercial Management & Quantity Surveying (CMQS)
E	University of Central Lancashire	Foundation Degrees for Construction
F	Heriot Watt University	Personal Learning in the Built Environment
G	University of Westminster	Foster Firm Scheme
H	Leeds Metropolitan University	Inter-professional Studies
J	Edinburgh University	Health and Safety Management
K	University of Abertay Dundee	Undergraduate Construction Skills Application
L	The Hanzehogschool, Groningen	The European Challenge
M	Imperial College	'Constructionarium'
N	Costain	The Educational Supply Chain
O	Manchester Business School	The Styles & Wood Academy
P	University of Salford	BAE Systems Corporate Training Initiative in Project Management
R	Henley Management College	The Project Team Leadership programme
S	University of Cambridge	Interdisciplinary Design for the Built Environment (IDBE)
T	University of Reading	Construction Cost Management
V	Oxford Brookes University	Real Estate Management
W	Sheffield Hallam University	Women into the Built Environment (WITBE)
X	Construction Industry Council	Occupational Standards in the Built Environment

into education (see Table 1). They take the form of project simulations, complete modules and, in some instances, entire programmes of study. In all cases, there is clear enhancement of the student experience driven by alignment with industry needs. These case study exemplars have become an important aspect of unpacking the relationship between industry and higher education institutions and are available at the ACBEE web site (www.acbee.org).

AIMS AND OBJECTIVES

This paper intends to model both the level and type of engagement in an attempt to feed into the development of an industry/higher education taxonomy. The rationale behind this initial assessment is to ascertain whether there are any underlying factors affecting the nature of the engagement. An aim of this investigation is to analyse the first phase of 21 case studies of excellence from the ACBEE programme to:

- determine the characteristics, types, forms and scope of engagement and underlying issues;
- develop a taxonomy of the type and form of engagement.

METHOD

The method is based upon an empirical review of the ACBEE case studies and the development of a classification framework for industry/higher education engagement. Case studies were structured and classified initially into two frameworks that represented the data and nature of relationships. Coding was used to develop these frameworks to enable representation of the data initially through 'Setting and Content' codes. This approach developed classifications firstly based upon the type of case study (i.e. module, course, continuing professional development) and secondly the level of engagement (i.e. undergraduate, postgraduate, corporate). These were tabulated and analysed separately against whether they were classroom or workplace based and whether they had a single or multi-disciplinary focus. The nature of the discipline focus was derived from either the student cohort or nature of the workplace (which is assumed to be multi-disciplinary in the application of knowledge).

The rationale behind this is distinguished by Mode 1 knowledge, which is characterised by a single discipline approach moving along a continuum to Mode 2, which is based upon an integrated, experiential and multi-disciplinary approach to learning [7]. This viewpoint is echoed by Hills and Tedford, in looking at the uneasy relationship between engineering, science and technology [8]:

> The reform of undergraduate education . . . has been concerned to shift the emphasis from didactic lectures, subject-centred teaching, the rote learning of facts, explicit knowledge, and memory based examinations to the softer world of student-centred learning, tacit, implicit knowledge and continuous assessment.

In terms of Gibbons categories, this can be related to moving from Mode 1 to Mode 2 context based education [7]. Examples of this are present in the case studies undertaken in ACBEE Phase 1.

Consequently, an analysis was carried out of the respective frameworks that allowed for comparing and contrasting. This configuration is supported by the work of both Glaser & Strauss [9] and Battersby [10] who stressed the importance of evaluating groups and subgroups. It is envisaged that this approach should assist in unpacking the taxonomy of types, form and scope of engagement. The results are based upon information gathered

from the Phase 1 case study templates and supplementary information submitted.

ANALYSIS, DISCUSSION AND FINDINGS

The characteristics of a case study

The ACBEE programme has involved the production of a number of case studies. A template was produced following a workshop that examined the characteristics of case studies of high quality in industry-higher education (HE) engagement. The set of characteristics is:

- Active partnership/collaboration of industry, HE and/or institutional partners.
- Clearly defined objectives and potential benefits for each partner that are defined before commencement and which can be readily measured.
- Inclusion of a clear industry subject or theme with wide built environment appeal.
- Approaches and ideas that are replicable and transferable and that include well-structured modular learning elements.
- Relevance and value to students and appropriate to real industry activities.
- Inclusion of recognised best practice approaches.
- Commitment to the case study being tracked and measured over time.

Data synthesis and interpretation

An analysis of the Phase 1 case studies has been carried out to ascertain whether there are any issues that arise when considering the type of engagement. Also, a mapping exercise was performed so as to ascertain whether there were any trends in the level of industry/higher education engagement. Figure 1 summarises the taxonomy of the type and level of industry-higher education engagement and a key to the case studies is available in Table 1.

There is no bias in terms of the quality of the engagement as there have been a variety of experiences contained within the case studies which all have a positive outcome. The mapping exercise revealed that some case studies within the contexts were applicable over several settings. This can be deemed as a positive attribute, demonstrating the flexibility and thereby the value of different modes of learning. At course level this is expected to be flagged as applicable over several settings. Notwithstanding, a module normally runs over a twelve-week period, which may limit the scope somewhat.

Much of the interaction took place within the workplace multidiscipline setting. The level of engagement occurred most strongly within the undergraduate context, followed by postgraduate and corporate level courses. What follows is a more detailed consideration of the types and levels of engagement. Extended case study materials available at http://www.acbee.org

COURSE

When looking at the setting of the collaboration there is a strong bias towards workplace multidiscipline engagement between industry and higher education. The majority of these sit within the context of whole courses of study. Also, the most populated engagement between the higher education and industry are courses. All of the courses consist of industry sponsoring programmes, students' study (part/full-time) or work placement. Much of the interaction is multidisciplinary which reflects the vocational nature of the industry and ethos of integrated teams in practice.

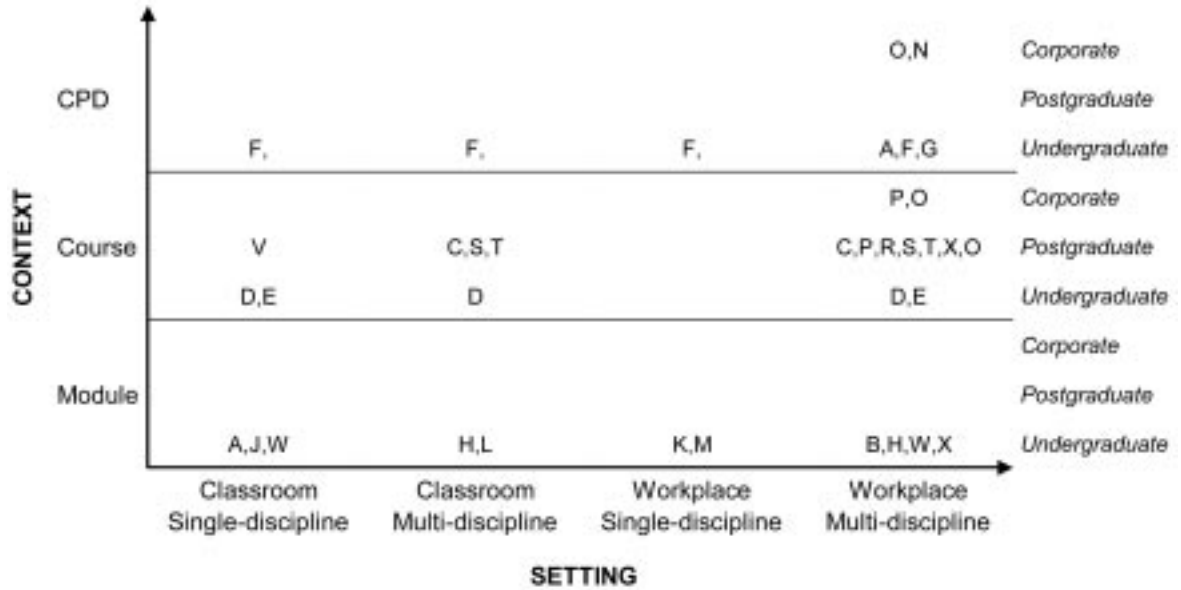

Fig. 1. Taxonomy of types and levels of industry-higher education engagement.

At course level, there was a reasonably balanced split between undergraduate and postgraduate modes of study. However, there were only two corporate level case studies, which were contained within this category. This reflects the difficulty of setting up such bespoke relationships when aligning educational provision with business strategy.

Vignette 1: University of Cambridge Workplace multi-discipline course:

> ***[S] Interdisciplinary Design for the Built Environment (IDBE)***
> Interdisciplinary education is one way of moving towards integrated thinking and the IDBE course is a pioneering example. The IDBE course is an interdisciplinary Masters programme (MSt) that accepts Engineers, Architects, Constructors, Surveyors, Planners, Clients and host of other disciplines. Through lectures, seminars and collaborative project work it encourages them all to explore beyond the historic boundaries of their own particular specialism. It is a part-time course organised into a pattern of one week intensive study sessions, arranged so as to be convenient to the students and their employers. This is necessary because unlike many Masters courses it is aimed at young professionals who are fully qualified and fully employed.

MODULE

Similarly, the module level industry case studies have slightly more 'work-based' leanings. A large proportion of the single-discipline modules are informed by industry input, guest lectures or 'hands-on' site basis, which is grounded in multi-disciplinary 'real world' application. The workplace multi-discipline inputs range in nature from work placement and experience, 'real world' interdisciplinary live projects informed by industry, to vocational qualifications.

All of the industry engagements within the context of module level study occur at undergraduate level only. This possibly is due to the nature and scale of industry engagement at postgraduate level and beyond.

Vignette 2: Imperial College Workplace single-discipline module:

> ***[M] Constructionarium***
> This project is designed to generate an atmosphere that is as close as possible to the experience of working on a real engineering project. During the intensive 6 day course, students work on the 'Constructionarium'—a challenging engineering design for a real site using their own initiative and engineering tools they have learned during the first three years of the MEng course. They are guided experienced contractors and engineers. The emphasis is on experiential learning of design and construction: students gain experience of creativity, design, teamworking and communication skills, as well as engineering judgement and problem solving.

CONTINUING PROFESSIONAL DEVELOPMENT (CPD)

CPD (or lifelong learning) refers to forms of study that count for the continuing experience requirement for membership of professional institutions. Due to the nature of application CPD cuts across all settings as it is a normal part of professional practice. For example, the Styles and Wood Academy, in conjunction with Manchester Business School, is a corporate university initiative which runs at many levels involving all of the partners in the business supply chain. It could be argued that CPD is imbued within the postgraduate courses, although this is not represented in the model above.

Vignette 3: Heriot Watt University:

> ***[F] Personal Learning in the Built Environment***
> A Personal Learning Plan (PLP) for all undergraduate students studying in the Construction Management and Surveying Programme (CMS), School of the Built Environment, Heriot Watt University has been produced and implemented for the last two years. This is in preparation for the requirement of all UK higher education providers to offer a Personal Development Plan for all students by 2005/2006. The PLP requires students to self assess their skills and plan ways of developing and improving them by undertaking either academic work, paid employment (related or not related to their degree) and social activities/interests.

The majority of CPD engagement will increase at undergraduate level due to the impending Quality Assurance Agency (QAA) requirements for all universities to facilitate the development of student personal development plans by 2005/2006.

CONCLUSIONS

This paper has attempted to classify the ACBEE Phase 1 case studies into type and levels of engagement in order to develop a framework of explanation. These case studies demonstrate that they all share elements of linking theory with practice which are situational depending upon curriculum requirements. Thus, when contextualising the curricula it is difficult to separate the context of the knowledge and understanding from its application due to the vocational nature of the built environment.

The majority of case studies are within the setting of a multidisciplinary workplace which can be taken as being the context of application within a real work environment. However, even within a single-disciplinary context many of the case studies are experiential. These lie on a continuum of Gibbons classification of Mode 2 knowledge, applicable outside the traditional discipline boundaries. However, at this stage of the research it is difficult to claim trans-disciplinary working which results in a shared emergent perspective [7].

The next phase of ACBEE aims to track current case studies and identify, write-up and publish 50 case studies. A preliminary framework is to be established for evaluating the value of industry/higher education engagement at subject level for higher education institutions. The aim is to identify a series of indicators (proxies) that could be measured and which would give a reasonable indication of the level of engagement within a subject area in a particular University.

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Aled Williams has spent over 11 years as a Senior Lecturer on professionally accredited courses in UK Higher Education. Currently he is National Academic Co-ordinator for Construction, Surveying and Real Estate, within one of the UK's Higher Education Academies—the Centre for Education in the Built Environment (CEBE). This paper was developed as a result of his involvement as Project Manager for the Accelerating Change for Built Environment Education (ACBEE) programme that is funded by Construction Skills who are the UK Sector Skills Council for Construction.