Institution: University of Bolton

Unit of Assessment: 16 Architecture, Built Environment and Planning

Title of case study: Improving Standards and Practice in the Built Environment and Related Industries

1. Summary of the impact (indicative maximum 100 words)

In response to the University's strategy on improving standards in professional practice, several research projects were undertaken in health and safety management, procurement, transport planning, energy management, and professional practice. These focused on improving standards of professional practice in construction management, energy management, facilities management, and sustainable transportation planning. Two projects resulted in sector guidance, whilst two others had a direct impact on practice in the University. Another has influenced the way cycling use data is collected by the two leading organisations in this sector. This case study demonstrates the impact on professional practice linked to the university's vision.

2. Underpinning research (indicative maximum 500 words)

This case study involved 8 cross-disciplinary academics: Dr Peter Farrell, Reader in Construction Management; Dr Fred Sherratt, Lecturer Construction Management; Neil Davies, Senior Lecturer Health and Safety (left 31/03/13); David Walker, Senior Lecturer Health and Safety; Dr Margaret Nelson, Reader in the Built Environment; Prof Danny Morton, Professor of Engineering; Prof Rob Ranyard, Professor of Psychology; Prof John Parkin, Visiting Professor; Rosie Middlemass, Research Assistant (left 30/11/05); 3 PhD students Andrew Arewa, Grainne Gordon (completed) and Mohammad Tammo; and one MSc student, Jason Challender.

Farrell led a £90,000 (£40,000 in-kind contribution) research project, ABECAS (2004-06). This identified barriers to education and employment for persons with disabilities in built environment disciplines, and made recommendations about reasonable adjustments to be made for students and employees.

Doctoral research by Sherratt (2007-12) established new insights through a constructionist approach into how operatives and managers view health and safety on construction sites. Further doctoral work (RAE2008 funded) by Arewa (2010-14), found a link between the application of best practice in construction site safety and corporate profits. Construction companies have been reluctant to spend on health and safety, seen as a cost and a 'drain' on profit. The Health and Safety Executive (HSE) and others have frequently argued, without evidence, that sensible spend on health and safety is quite the reverse; and spending on safety is an investment that has spin off into many areas of production and thus increases profits. This research sought the evidence for these assertions.

As a member of the FMW1 Facilities Management sub-committee of the British Standards Institute, we undertook research to support the review of the BSi Standard BS8210 Guide to Facilities Maintenance Management (2011-12, in-kind contribution). Walker and Davies contributed to the development of health and safety in the guidance, whilst Nelson led the 2nd review committee and authorship. Doctoral research by Walker was translated into material for the guide.

Research by Farrell and Challendar (2013) investigated the application of partnership principles in a period of market austerity with Leeds City College. It identified that some large companies are returning to competition, whilst others still procure projects under the partnering banner; but indeed, resort to competitive and sometimes 'unfair' market practices. Whilst these practices may indicate the possibility of short-term savings in capital costs, findings from the research identified a long-term detrimental effect on project outcomes.

Parkin, Ranyard and Gordon investigated improvements to standards in cycling measurement. This research (2009-13) undertaken in partnership with Sustrans and the Department for Transport (DfT) identified key issues in missing data leading to poor quality of data used in calculating cycling

use for transport planning.

Morton and Nelson were part of a university-wide project ECCILES (2008-10) which investigated energy management in computer intensive buildings. This led to the development of a detailed model for energy consumption factors around computer use on campus, development of a costed plan for optimising temperatures in computer rooms, equipment planning now included in course development planning, and better awareness of energy consumption issues by staff and students.

3. References to the research (indicative maximum of six references)

1. ABECAS project Guidance documents, The University of Bolton. Available at URL http://www.bolton.ac.uk/Subjects/Civil-Engineering-Construction/Research/ABECAS/ABECAS.aspx

2. Letter from British Standards Institute

3. Letter from Leeds City College

4. University agreement with Sustrans for EPSRC cycling project

5. ECCILES Final Report

4. Details of the impact (indicative maximum 750 words)

Research activities on improving standards in professional practice have resulted in the developments in health and safety and risk management, identification of improvements to techniques in cycling measurement and data collection, improvements in teaching practice and support for students with disabilities, improvements in procurement practice at Leeds City College, and improvements in the energy performance of computer intensive buildings in Higher Education.

Research by Walker and Davies informed the development of a new section on health and safety in the 2012 BSi BS8210 standard in facilities maintenance management (see Ref 3.2). This sets the standard for good practice in health and safety management in facilities maintenance management. The guidance is used by organisations and individuals to conform to best practice.

Sherratt's health and safety doctoral work supervised by Farrell, and sponsored by Laing O'Rourke and the Chartered Institute of Building (CIOB) (£9, 000 and £8,000.00 respectively) fed into policy development at Laing O'Rourke, her previous employer, and provided the platform for a recently awarded contract from Routledge for a practitioner's textbook. It also led to her appointment to the CIOB health and safety committee where her work is influencing the development of new policy in health and safety.

Arewa's doctoral study supervised by Farrell has developed a classification system for assessment of investment in health and safety practice. The research further identified a causal link between health and safety and company profitability in SMEs. The potential impact of this research lies in its findings of the evidence required by the HSE in justification of its emphasis on investment in health and safety.

Research on improvements to methodologies and techniques for cycling measurement is being applied by Sustrans who developed and undertook the Sustainable Transport project in conjunction with the University. The research revealed serious problems with data quality, and in particular, large amounts of missing data. There are also problems with the representativeness of count sites. These findings will lead to improvement of standards in data collection, both how and where collected. Sustrans have recently changed the way they select sites and have implemented a new data collection and analysis system which will go some way towards dealing with the problem of missing data. A new classification system has been developed and groups of counters have been modelled to provide parameter estimates for day of the week, month of the year and bank holidays. There is potential for these to be developed into expansion factors which could improve the accuracy of the estimates currently being produced by both organisations. New profiles for analysis of data developed through the research can be applied to existing incomplete data sets to improve quality of analysis.

Improvements to curriculum in the Built Environment were impacted on by the Accessible Built Environment Careers for all Students (ABECAS) project in terms of driving changes to the delivery of programmes from the recommendations to HEIs. Improvements to curriculum implemented on the recommendations of the ABECAS project include:

- An audit of programme specifications
- Removing barriers from learning outcomes and assessment
- Making reasonable adjustments in teaching and learning
- Making reasonable adjustments to equipment and laboratories
- Making reasonable adjustments to land surveying equipment
- Agreeing reasonable adjustments in tutorials with individual students
- Ensure options are available at all levels of study
- Appointing a built environment tutor as an accessibility specialist
- Providing staff development opportunities
- Providing electronic learning material in accessible formats

These resulted in a more accessible study environment for students with a disability, and the highest increase in the numbers of students with disabilities undertaking built environment programmes in 2006. The results were disseminated through the Centre for Education in the Built Environment (CEBE) and the project webpage http://www.bolton.ac.uk/Subjects/Civil-Engineering-Construction/Research/ABECAS/ABECAS.aspx . Academic publications were also published and presented at conferences.

Joint research with Leeds City College through a Masters dissertation (Farrell and Challender) led to improvements in procurement practice at the host organisation. The research identified the need to adopt non-adversarial partnering methods of procurement, and ensure compliance with key performance indicators. This is presently implemented through the procurement of £50M of construction work over the next five years by Leeds City College (see Ref 3.3).

Impact from the ECCILES project on the University has been focussed on improvements to our green credentials. It has included a reduction in energy consumption, change to programme development process including equipment planning now included in course development planning and a change in behaviour towards energy use by staff and students. These have resulted in cost savings and improved carbon footprint for the University.

5. Sources to corroborate the impact (indicative maximum of 10 references)

1. Inclusive and Sustainable Environments Research Group http://www.bolton.ac.uk/Subjects/Civil-Engineering-Construction/Research.aspx
2. Mrs Stephanie Kosandiak, Secretary FMW/1 Facilities management Committee Manger, Construction Standards Development, Telephone: 0208 996 7268, Email: stephanie.kosandiak@bsigroup.com
3. ABECAS Project http://www.bolton.ac.uk/Subjects/Civil-Engineering-Construction/Research/ABECAS/ABECAS.aspx
4. Mr Tom Harte, Estates Manager Physical Resources, Leeds City College, Telephone: 0845 045 7275
5. ECCILES Project http://www.bolton.ac.uk/Projects/JISC/ECCILES/Home.aspx