



University of
Salford
MANCHESTER

Addressing the construction labour market skills mismatch through lifelong learning in higher education institutions

Siriwardena, ML, Amaratunga, RDG, Malalgoda, CI and Thayaparan, M

Title	Addressing the construction labour market skills mismatch through lifelong learning in higher education institutions
Authors	Siriwardena, ML, Amaratunga, RDG, Malalgoda, CI and Thayaparan, M
Type	Conference or Workshop Item
URL	This version is available at: http://usir.salford.ac.uk/16880/
Published Date	2011

USIR is a digital collection of the research output of the University of Salford. Where copyright permits, full text material held in the repository is made freely available online and can be read, downloaded and copied for non-commercial private study or research purposes. Please check the manuscript for any further copyright restrictions.

For more information, including our policy and submission procedure, please contact the Repository Team at: usir@salford.ac.uk.

Paper 162 – Full Paper

Addressing the construction labour market skills mismatch through lifelong learning in higher education institutions

Authors

Mohan Siriwardena
Dilanthi Amaratunga
Chamindi Malalgoda
Menaha Thayaparan

Address for correspondence

Mohan Siriwardena, Lecturer, School of the Built Environment, The University of Salford, 4th Floor, Maxwell Building, The Crescent, Salford, Greater Manchester, M5 4WT.

M.L.Siriwardena@salford.ac.uk

Prof. Dilanthi Amaratunga, Associate Head of International Development, Head of Centre for Disaster Resilience, School of the Built Environment, The University of Salford, 4th Floor, Maxwell Building, The Crescent, Salford, Greater Manchester, M5 4WT.

R.D.G.Amaratunga@salford.ac.uk

Chamindi Malalgoda, Researcher, School of the Built Environment, The University of Salford, 4th Floor, Maxwell Building, The Crescent, Salford, Greater Manchester, M5 4WT.

C.I.Malalgoda@edu.salford.ac.uk

Menaha Thayaparan, Researcher, School of the Built Environment, The University of Salford, 4th Floor, Maxwell Building, The Crescent, Salford, Greater Manchester, M5 4WT.

M.Thayaparan@salford.ac.uk

Abstract

The mismatch between graduate skills and labour market skills requirements has been identified as one of the main factors behind graduate unemployment and employer dissatisfaction, particularly in the Built Environment sector. Higher Education Institutes (HEIs), despite being a body for knowledge creation and sharing, do not seem to adequately address this mismatch. Built Environment Lifelong Learning Challenging University Responses to Vocational Education (BELL CURVE) collaborative research project aims to identify the ways to reform the HEIs in order to make them more responsive to the labour market skills requirements and in turn to reduce the mismatch. This conceptual paper discusses the changing nature of the construction labour market skills requirements. The conceptual framework governing the research project and the research methodology are presented. The role of BE professionals in addressing such requirements are also discussed giving particular focus on professionals attached to disaster management and quantity surveying sectors. Disaster management (context base sector) and quantity surveying (trade base sector) have been identified by the project as two specific sectors to be focused in

promoting the lifelong learning due to the constantly changing knowledge and skill base of these sectors. The responsiveness of HEIs to minimise the mismatch and to support the lifelong learning through governance reform is explained.

Keywords: *Lifelong learning, Higher Education Institutes, Governance reform, Labour market skills, Disaster Management, Quantity Surveying*

1. Introduction

The mismatch between graduate skills and labour market requirements is one of the main factors behind graduate unemployment and employer dissatisfaction, particularly in the Built Environment (BE) sector (OECD, 2008). Accordingly, BELLCURVE research project focuses on integrating the construction labour market skill needs into the modernisation agenda of the HEIs in Europe. Challenges faced by construction enterprises are fed into the European higher education agenda through the lifelong learning feedback loop, thereby ensuring the subject content of the European HEIs is dynamic, and of high quality, to address the market needs (Thayaparan *et al.*, 2010a). One of the main areas of reform as identified in the modernisation agenda is governance reform (see European Commission, 2010), where the focus of the BELLCURVE lies. In terms of response to the changing labour market requirements, the governance reform intended to be proposed through this project ensures that the HEIs will be more agile and dynamic in providing the appropriate mix of skills and knowledge, to the target audience at the appropriate time.

Section 2 of this paper describes the nature of the construction labour market skills and briefly explains the options available for the employers and the employees to survive in the competitive market. Section 3 explains the responsiveness of the HEIs in order to reduce the mismatch between graduate skills and labour market skills requirements. Section 4 provides an introduction to the BELLCURVE project followed by the initial conceptual framework and the research methodology. Section 5 discusses the role of lifelong learning for the BE professionals in meeting various skills demand in the industry, where particular focus has been given to the professionals who are attached to 'disaster management' and 'quantity surveying' sectors. Finally the summary and the way forward of the project are provided. This paper contributes to enriching the networking and partnerships theme of this conference.

2. Dynamic nature of the construction labour market skills

Construction labour market, due to its labour-intensive, multi-disciplinary and highly fragmented nature, relies highly on the skills and competencies of its workforce. As it involves workers with various disciplinary backgrounds, the industry uses a wide range of technical and managerial skills (Thayaparan *et al.*, 2010a). The labour market requirements of the construction industry are of dynamic nature, due to various factors. Demographic decline in the number of people entering the labour market; the changing and fluctuating nature of the market and the related decline in the operative skills; the introduction of the new technologies; the growth in self employment and the use of specialist and labour only sub contractors; the fragmentation of the industry; the decline in the training and related resources; the changes in the industrial structure, wastage rates and industrial competition; and considerable market expansion are some of the factors identified (Dainty *et al.*, 2005) which affects the skills shortfalls.

Due to the dynamic and competitive nature of the labour market, the employers mainly seek those with good degree level qualifications; specific skills; generic or transferable skills; experience; and personal attribute (Gilleard, 2010) when recruiting employees to their organisations. Therefore individuals are expected to increase their employability skills to enter the labour market as selection of qualified human resources is highly competitive. The

employability skills includes the ability to gain initial employment; the ability to maintain employment; ability to meet new job requirements; ability to make transitions between jobs and roles within the same organisation; and the ability to obtain new employment if required (Hillage and Pollard, 1998). UK Commission for Employment and Skills (UKCES, 2008) has classified the employability skills into two categories such as 'Personal skills' and 'Function skills'. The former consist of self-management; thinking and solving problems; working together and communicating; and understanding the business, whereas the latter consist of using effectively the numbers, IT and language. According to Curtis and McKenzie (2002), communication; problem solving; personal skills; numeracy; information technology and competence in a modern (foreign) language are the core skills required for an employee in the United Kingdom. This shows that there is a strong link between the skills and employability (Thayaparan *et al.*, 2010a) and hence, in addition to the academic achievement, one should be able to demonstrate a good level of skills and competencies to succeed in today's competitive world.

Further, the current downturn in the economy has reduced the construction demand and new employment opportunities. Employers tend to maximise the utilisation of the existing workforce without new recruitments. Hence, construction workers increasingly concentrate on acquiring / developing new skills in order to meet various skills demand and to survive in the industry (Thayaparan *et al.*, 2010a). In support of this, Dainty *et al.*, (2005) state that there is a need for multi-skilled workers as the employers need the employees to be able to work in more than one trade area. Hence, possessing up-to-date skills and competencies, and the ability to demonstrate a range of skills have become a necessity for the employees to survive in the construction sector. In this regard, training and development programmes offered by professional or educational centres would help the employees to develop their skills and competencies. Moreover, proper skills utilisation will also contribute to meet the labour market requirements without additional recruitments. One of the key gaps in the existing sources of labour market information is the issue of how employers make use of the skills their employees possess (UKCES, 2010). Policy makers from across UK nations are now increasingly turning their attention to the issue of skill utilisation in the workplace. This is a development that is likely to exacerbate as there is a widening realisation that '*there is little value to an organisation having a skilled workforce if the skills are not used well*' (UKCES, 2009, p.11).

In summary, the dynamic nature of the construction labour market possibly leaves three options for the employers to meet the changing skills demand. They are, recruiting employees with particular focus on their generic and transferable skills; giving adequate training and development opportunities for the existing employees to improve and learn new skills and competencies; and maximising the utilisation of the skills their employees possess. The above discussion regarding the mismatch between the graduate skills and labour market requirements, together with the dynamic nature of the construction labour market compels the HEIs to respond appropriately. The next section discusses the responsiveness of the HEIs in this regard.

3. Skills mismatch and the responsiveness of HEIs

In the light of the aforementioned discussions, it is also worth noting that the universities are under pressure to change as they are expected to produce new knowledge which is to respond to student needs and to satisfy the practitioners (OECD, 2003). The Higher Education Funding Council for England (HEFCE) funded the Enhancing Student Employability Co-

ordination Team (ESECT), which comprises key researchers; practitioners in the field; and representatives of stakeholder organisations, in order to help the sector engaging with the issue of the employability of graduates. As a body for knowledge creation and sharing, the HEIs are also responsible in enhancing the student employability (Amaratunga *et al.*, 2010). Developing employability skills involves experiential action-learning; work experience and opportunities for reflection and integration (Smith, 2010) and lack of such skills is one of the criticisms attributed to new graduates from HEIs. Therefore the HEIs need to place greater emphasis on employability skills of their graduates in order to ensure that they supply employable individuals to the labour market. Further, educational institutions are improving their system to incorporate the concept of lifelong learning as they recognise that lifelong learning is a common importance for many countries both at national and international levels (Xiaozhou, 2001).

Sir Andrew Burns, the chair of the Committee of University Chairs (CUC) says that *'universities and colleges must respond to heightened expectations from their students, from government, from business and from their own academic and professional staff. Learners are more demanding. Government seeks to underpin economic growth and social inclusion. Business and industry look for graduates with stronger and more relevant skills to compete in the world economy. And those who work in the higher education sector have greater expectations of their career opportunities and progression'* (Committee of University Chairs, 2009, p.1). He further states that governing bodies must therefore also be ambitious, as they seek to mould the circumstances which will convert those aspirations into successful outcomes within a robust and reliable framework of governance (Committee of University Chairs, 2009).

The above discussion indicates the importance of researching how HEIs can be modernised to provide an uninterrupted supply of skills and knowledge to the construction labour market in an efficient and effective manner. Therefore, BELLCURVE research aims at higher education governance reform with particular focus on lifelong learning in the field of Built Environment.

If Europe is not to lose out to global competition in the education, research and innovation fields, this crucial sector of the economy and of society needs in-depth restructuring and modernisation (Commission of the European Communities, 2006, p.11). In this context, HEIs has an important role to play in order to create better conditions for universities. Further, the strategic framework for European co-operation in education and training (which is famously known as ET 2020), emphasises the need to promote the modernisation agenda for higher education to improve the quality and efficiency of education and training (European Commission, 2010). Based on this emphasis, the European Commission has identified three main areas of the HEIs for reform namely curricular reform; governance reform; and funding reform.

Since the governance of higher education has both direct and indirect links with the curriculum and funding, the reforms in governance can impact curriculum development and delivery and on the funding systems too (Thayaparan *et al.*, 2010a). Therefore, when providing recommendations on the governance reform for HEIs to be more responsive to the construction labour market skills requirement, the funding and curriculum issues will also be taken into consideration.

Next section provides an introduction to the BELLCURVE project, its conceptual framework governing the research project, and the research methodology.

4. Built Environment Lifelong Learning Challenging University Responses to Vocational Education (BELLCURVE)

4.1 An overview of BELLCURVE

BELLCURVE research project is currently being conducted at the School of the Built Environment, University of Salford, UK, in collaboration with Department of Construction Economics and Property Management, Vilnius Gediminas Technical University, Lithuania and Department of Building Production, Tallinn University of Technology, Estonia. It addresses issues associated with the mismatch between graduate skills and labour market requirements, and suggests that the HEIs should be able offer innovative curricula, teaching methods and training/retraining programmes which include broader employment-related skills along with more discipline specific skills. This requires a much clearer commitment by universities to lifelong learning opportunities.

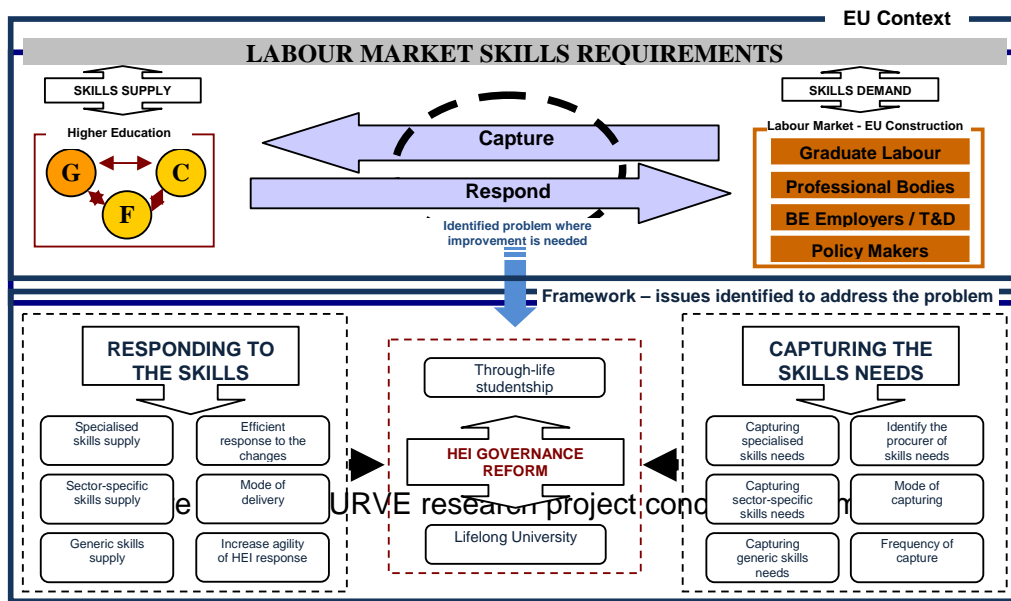
BELLCURVE considers ‘student engagement’ as a continuous through-life process rather than a temporary traditional engagement limited by the course duration. This through-life studentship defines the essence of the new innovative “Lifelong University” concept, whereby providing an opportunity for learners to acquire and develop skills and knowledge enabling responds to changing construction labour market needs on a continuous basis. Thereby, universities will increasingly become significant players in the economy, able to respond better and faster to the demands of the labour market through providing opportunities to different types of learning and learners. Universities will not become innovative and responsive to change unless they are given real autonomy and accountability. This requires a reform in governance systems based on strategic priorities to respond labour market needs effectively while promoting lifelong learning agenda. Thus, BELLCURVE aims to promote the concept of ‘lifelong university’ in modernising HEIs to be more responsive to labour market skills needs.

The project focuses on governance reforms in HEIs delivering Built Environment programmes across the European Union (EU). The existing interactions between the HEIs and the labour market are to be investigated and any improvements that could possibly be imposed on the nature of such interactions needs to be analysed. This demands the concept of lifelong university to be structured into a framework, identifying the possible components which will either directly or indirectly have an impact on the way the lifelong university has to function. This has resulted in developing an initial conceptual framework for HEIs to become ‘continuing education centres’ for graduates while responding to labour market skill needs. The next section presents the framework developed together with the overall research methodology.

4.2 BELLCURVE research project conceptual framework and research methodology

“A conceptual framework explains, either graphically or in narrative form, the main things to be studied – the key factors, constructs or variables – and the presumed relationships among them” (Miles and Huberman, 1994, p.18). Figure 1 illustrates the initial conceptual framework which will be updated as the project progresses. The labour market skills requirements for built environment professionals are considered in terms of demand and

supply side issues. The HEIs are expected to fulfill the labour market requirements. However, the problem was spotted within the process of capturing the skills requirements of the construction labour market and the process of appropriately responding to such requirements by HEIs, despite that HEIs are one of the major suppliers of skills and knowledge. BELLCURVE will address this problem by developing a framework to capture and respond to the skills requirement, giving particular attention to governance reform.



Governance (G), Funding (F), and Curriculum (C) are identified as the major components of a higher education system. The main focus of this research will be on governance reform where it aims to minimise the mismatch identified between the skills demand and the skills supply. In this regard, three major elements such as capturing skills need (Demand), Responding to the skills needs (Supply) and HEI Governance reform have been identified within the initial framework as shown in Figure 1. Key issues associated with these 3 elements will be analysed in order to address or minimise or resolve the identified problem. This will be done through 4 phases such as framework development, framework refinement, framework validation and research conclusion. Since this involves a development process, a design science approach (Van Aken, 2004; 2005, Van Aken *et al.*, 2007) is used as the most appropriate overall research methodology for this project.

In order to produce the initial input for the framework, a thorough literature analysis was conducted. This helped to identify the issues associated with the framework development. In addition, questionnaire surveys with graduates in the EU construction, construction employers and recruitment agencies; interviews with higher education lead officers, professional bodies and policy makers; and workshops with academic members will be carried out to elaborate the identified issues within the framework development. The developed framework will further be refined based on expert interviews and focus group. The purpose of this phase is to ensure that the framework has captured all the important components associated with the identified research problem. Case studies will be conducted to validate the framework on built environment sectors such as quantity surveying, disaster management, civil engineering, and construction management sectors.

Figure 2 below indicates how the 3 key stages of the BELLCURVE research framework development process (i.e. framework development, framework refinement, framework validation) synchronise with the main phases of design science research methodology.

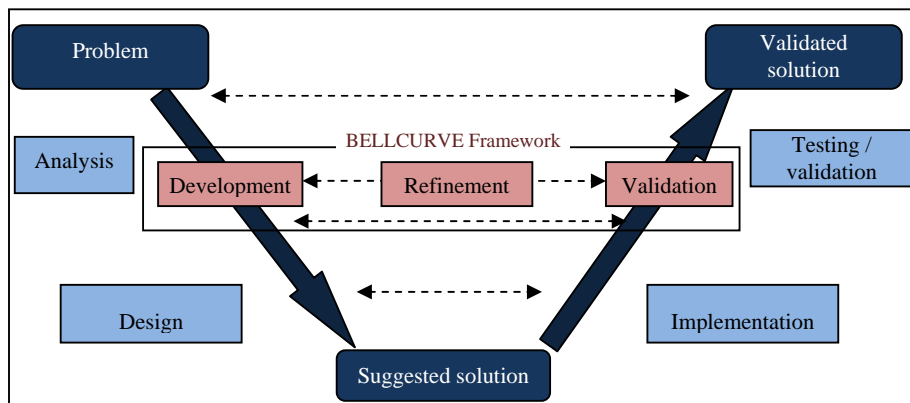


Figure 2: BELLCURVE framework development through a design science approach

As an outcome of the research carried out in all 3 phases, recommendations will be provided on governance reform for HEIs to become continuing education centres for graduates while responding to labour market skills needs. These will be in the form of best practice guidelines and policy documents which will finally be disseminated to the stakeholders of the EU HEIs and construction labour market.

In summary, the BELLCURVE research project aims to reform the HEI governance in order to make the HEIs more responsive to the constantly changing construction labour market requirements by promoting the lifelong learning agenda. BELLCURVE framework which will be developed as part of this project will be validated using four case study sectors, namely quantity surveying, disaster management, civil engineering and construction management. Within the project partnership quantity surveying and disaster management sectors are investigated by the University of Salford, UK; civil engineering sector is investigated by Tallinn University of Technology, Estonia; and the construction management sector is investigated by Vilnius Gediminas Technical University, Lithuania. The following section focuses on the sectors that are being investigated by the University of Salford. In doing so, the role of lifelong learning for the built environment to meet the changing skills demand is presented with specific focus on quantity surveying and disaster management case study sectors.

5. Role of lifelong learning for the built environment professionals

Built environment represents a significant component of every nation's savings (Ofori, 2008) and encompasses with the products and processes of human creation including physical alterations to the natural environment through construction work (Lawrence and Low, 1990). The role of the built environment professionals is essential for the planning, designing, constructing and operating of the built environment process. In general, built environment professionals are from the fields of architecture, building science, building engineering, construction, landscape, surveying and urbanism (RAE, 2008).

By nature, the role of the built environment professionals is complex and time dependent. Inalhan (2002) point out that the built environment students and practitioners are working in

demanding, challenging and competitive environments, and are required to balance their technical, human and conceptual skills while understanding the broader idea about the overall industry without limiting their skills to one profession. Numerous reasons contribute to the growing complexity of working environment of the BE professionals. They include the breakdown of traditional professional boundaries, the development of new technologies, procurement strategies and related management practices within the construction and property sectors (Chynoweth, 2006). Also, due to rapidly changing nature of the world, the techniques, customs and practices of a built environment professional too are constantly changing. In the meantime the organisations are constantly changing their shape and style in order to cope up with the technological, economic, political and social changes (Inalhan, 2002). Hence, lifelong learning has become an essential feature of a professional's life and to support this a high emphasis has been given to continuing professional development at all levels (Chynoweth, 2006). As such there is a need for built environment professionals who are capable of knowing how to learn and initiate the required learning activities when and where necessary (Inalhan, 2002).

To encompass the changing nature of skill requirements, BELLCURVE intends to conduct four case studies on different built environment sectors, namely quantity surveying, disaster management, civil engineering and construction management. The next section of the paper provides the justification for the use of two of the above sectors, quantity surveying and disaster management. These two sectors have been selected for discussion in this paper firstly due to their constantly evolving nature of knowledge and skill requirements, and secondly due to being investigated by University of Salford as part of their contribution to the research project partnership.

5.1 Quantity Surveying

Quantity surveying is one of the built environment disciplines which has undergone considerable changes over the past few decades. Originally the quantity surveying was centred on quantifying construction works in construction projects, but today the field of quantity surveying encompasses large variety of work ranging from providing investment appraisals to construction project management (Ashworth and Hogg, 2007; Thayaparan *et al.*, 2010b). As such, the quantity surveyors are no longer expected to just measure and price the work, but are required to do a more strategic role. Some of the evolving areas of quantity surveying include life-cycle costing, value management, risk management, insolvency and facilities management (Ashworth and Hogg, 2007). Due to this evolving nature of the professions, the quantity surveyors are required to constantly update their skills on changing roles. According to Ashworth and Hogg (2007), new forms of procurement and construction arrangements, impact of information technology, and the growing client demand for the management of construction projects throughout their life cycle, have forced quantity surveyors to acquire new skills. As a result of this changing role, the title 'quantity surveyor' is no longer used in a number of instances.

In this context, the quantity surveyors are forced to update their skills in line with the changing market needs. According to Perera *et al.* (2010) the current education system of quantity surveying does not recognise the needs of all stakeholders and hence often produces graduates who are not up to industry requirements. As such, the graduates are expected to participate in skills training programmes in order to provide a better service to their employers.

The quantity surveyor's profession is the most rapidly changing profession when compared to all other construction professions (Ashworth and Hogg, 2007). In addition, Powell (1998) has recognised the importance of lifelong learning to the career success of a quantity surveyor. Therefore, due to the changing skills requirement of the profession, considering quantity surveying as a possible case study area for lifelong learning is well justifiable.

5.2 Disaster Management

Disasters either natural or manmade cause a significant impact to the entire world. The occurrence of natural disasters has increased considerably in the recent past resulting a higher number of mortalities, economic losses and social losses. The recent disasters have clearly highlighted the fragility and the vulnerability of the built environment to disasters (Bosher, 2008). Thus it has reinforced the need for proactive disaster risk reduction in order to increase the society's resilience to disasters. Built environment facilities such as buildings, roads, bridges, water supply plants, communication and power services, harbours, etc. are most likely to damage by disasters, and clearing, salvaging, rehabilitation and reconstruction work, fully or partly, require serious effort of the construction sector (Thayaparan *et al.*, 2010a). On the other hand the severity of the impact by natural disasters is directly linked to unplanned urban development and ecosystems (ISDR, 2010) and hence the prevalence of the disasters are related to how the built environment is planned, designed, built and operated (Bosher *et al.*, 2007). In this context, in the recent years there has been a growing recognition that the construction industry and the built environment professionals have a vital role in contributing to society's improved resilience, which would be achieved through a multi sectoral and inter disciplinary strategy (Haigh and Amaratunga, 2010). In this context, it is important to educate the construction professionals to contribute efficiently and effectively to achieving disaster resilience.

It is the responsibility of the HEIs who are delivering Built Environment programmes to equip with specific skills and knowledge which are necessary to act proactively in a disaster situation (Thayaparan *et al.*, 2010a). The lifelong learning opportunities further enhance this provision as it will provide an opportunity for the HEIs to act as continuing education centres which provide skills and knowledge in a dynamic environment (Thayaparan *et al.*, 2010a). Due to this peculiar nature of disaster management sector, disaster management sector is a timely and a highly appropriate candidate for lifelong learning research.

6. Summary and the way forward

The construction labour market skills requirements are constantly changing. The mismatch between graduate skills and the labour market requirements challenges the higher education sector to appropriately respond. The roles of BE professionals are also of dynamic nature and they are in need of continuous development of skills and competencies to perform in the labour market effectively. Lifelong learning is one of the pathways for the employees to improve their skills and knowledge on a continual basis. The HEIs could be a key entity in providing lifelong learning as part of their education supply. Considering these aspects, it has been realised that the system of higher education needs to be modernised to become continuous education centres in meeting the skills requirements. In this context, the research project BELLCURVE aims to contribute to modernising the HEIs through a governance reform in order to make them more responsive to the labor market skills needs. BELLCURVE seeks further input and feedback from the academic and professional community to improve the framework developed to capture and respond to labour market skills requirements.

7. Acknowledgements

BELLCURVE research project has been funded with support from the European Commission. This publication reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Prof Dilanthi Amaratunga is the principal investigator of this project. Dr. Chaminda Pathirage, Dr. Kaushal Keraminiyage, Dr. Udayangani Kulatunga and Mohan Siriwardena of the School of Built Environment, University of Salford, United Kingdom; Prof. Arturas Kaklauskas of Department of Construction Economics and Property Management, Vilnius Gediminas Technical University, Lithuania; and Prof. Irene Lill of Department of Building Production, Tallinn University of Technology, Estonia are co-investigators of this project. More information on BELLCURVE can be obtained from the project website <http://www.disaster-resilience.salford.ac.uk/bellcurve>

8. References

- Amaratunga, D., Pathirage, C.P., Kereminiyage, K., Thayaparan, M. (2010) 'Advancement of Built Environment Higher Education through Lifelong Learning', *Proceedings of International Research Conference on Sustainability in Built Environment*, Colombo, Sri Lanka, 18 – 19 June 2010, Moratuwa, Building Economics and Management Research Unit (BEMRU), Department of Building Economics, University of Moratuwa, Sri Lanka, 31-39.
- Ashworth, A. and Hogg, K. (2007) *Willis's Practice and Procedure for the Quantity Surveyor*, 12th ed., UK, Blackwell Publishing.
- Bosher, L. (2008) 'The need for built in resilience', in Bosher, L. (ed), *Hazards and the built environment- Attaining built-in resilience*. London and New York, Routledge.
- Bosher, L., Dainty, A., Carrillo, P. and Glass, J. (2007), 'Built-in resilience to disasters: a pre-emptive approach', *Engineering, Construction and Architectural Management*, 14(5), 434-446.
- Chynoweth, P. (2006) 'Professional doctorates in the built environment: how higher education is responding to the changing needs of industry and the professions', *The proceedings of the Built Environment Education Annual Conference (BEECON)*[Online], London, 12-13 September 2006, http://ctiweb.cf.ac.uk/news/events/beecon2006/pdf/P25_Paul_Chynoweth.pdf [Accessed 16 February 2011].
- Commission of the European Communities (2006) *Communication from the commission to the council and the European parliament: Delivering on the modernisation agenda for universities: education, research and innovation* [Online], <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2006:0208:FIN:EN:PDF> [Accessed on 20 June 2010]
- Committee of University Chairs (2009) *Guide for Members of Higher Education Governing Bodies in the UK*, England, HEFCE
- Curtis, D. and McKenzie, P. (2002) *Employability skills for Australian industry: Literature Review and Framework Development* [Online], Australian Council for Educational Research, http://www.decs.sa.gov.au/learningandwork/files/links/literature_research_1.pdf. [Accessed 13 May 2010]
- Dainty, A.R.J, Ison, S.G. and Briscoe, G.H. (2005) 'The construction labour market skills crisis: the perspective of small-medium-sized firms', *Construction Management and Economics*, 23(4), 387-398.
- European Commission (2010), *The Higher Education Modernisation Agenda* [Online],

- Gilleard, C. (2010) 'The graduate market place and what employers look for in graduates, Association of Graduate Recruiters', *Presentation of the Careers and Employability Internal Conference*, Salford, 16 April 2010, The University of Salford.
- Haigh, R. and Amaratunga, D. (2010) 'An integrative review of the built environment discipline's role in the development of society's resilience to disasters', *International Journal of Disaster Resilience in the Built Environment*, 1(1), 11-24.
- Hillage, J. and Pollard, E. (1998) *Employability: Developing a Framework for Policy Analysis – Research Brief No 85* [Online], Department for Education and Employment, <http://www.dcsf.gov.uk/research/data/uploadfiles/RB85.pdf> [Accessed October 2009].
http://ec.europa.eu/education/higher-education/doc1320_en.htm [Accessed August 2010]
- Inalhan, G. (2002) 'Book review: management and business skills in the built environment', *Facilities*, 20(3&4), 164-165
- ISDR (2010), *Strategy outline for the 2010-2011 ISDR world disaster reduction campaign on building resilient cities, addressing urban risk* [online], International Strategy for Disaster Reduction – ISDR.
www.unisdr.org/.../campaigns/campaign20102011/.../230_CampaignStrategy.doc [Accessed 28 Feb 2010].
- Lawrence, D.L. and Low, S.M. (1990) 'The built environment and spatial form', *Annual Reviews*, 19, 453-505.
- Miles, M.B. and Huberman, A.M. (1994) *Qualitative Data Analysis*, 2nd ed., London, Sage Publications.
- OECD, 2003 *Changing Patterns of Governance in Higher Education* [Online], Organisation for Economic Co-operation and Development,
<http://www.oecd.org/dataoecd/0/20/35747684.pdf> [Accessed December 2009].
- OECD, 2008 *OECD Employment Outlook*, Organisation for Economic Co-operation and Development.
- Ofori, G. (2008) 'Construction in developing nations – towards increased resilience to disasters', in Boshier, L. (ed) *Hazards and the built environment- Attaining built-in resilience*. London and New York: Routledge.
- Perera, S., Pearson, J. and Dodds, L. (2010) 'Alignment of professional, academic and industrial development needs for quantity surveyors', *The proceedings of the Construction, Building and Real Estate Research Conference of the Royal Institution of Chartered Surveyors (COBRA)* [Online], Dauphine Université, Paris, 2-3 September 2010,
http://www.rics.org/site/download_feed.aspx?fileID=7867&fileExtension=PDF [Accessed 10 February 2011].
- Powell, C. (1998) *The Challenge of Change*, UK, Royal Institutions of Chartered Surveyors.
- RAE (2008), *UOA 30 architecture and the built environment UOA descriptor* [online],
<http://www.rae.ac.uk/panels/main/h/architect/> [Accessed 18 Feb 2011].
- Smith, J. (2010) 'Developments in teaching and learning: employability and employee learning, Higher Education Academy', *Presentation of the Careers and Employability Internal Conference*, Salford, 16 April 2010, The University of Salford.
- Thayaparan, M., Siriwardena, M., Kulatunga, U., Amaratunga, D. and Malalgoda, C. (2010b) 'Reforming HEI for through- life sustainability of construction professionals', *The proceedings of the International Conference on Sustainable Built Environment (Volume 1)*, Kandy, Sri Lanka, 12-14 December 2010, 22-30.
- Thayaparan, M., Siriwardena, M., Malalgoda, C., Amaratunga, D., Kaklauskas, A., and Lill, I. (2010a) 'Reforming HEI to improve skills and knowledge on disaster resilience among construction professionals', *The proceedings of the Construction, Building and Real Estate Research Conference of the Royal Institution of Chartered Surveyors (COBRA)*[Online],

- Dauphine Université, Paris, 2-3 September 2010,
http://www.rics.org/site/download_feed.aspx?fileID=7837&fileExtension=PDF [Accessed 1 November 2010].
- UKCES, (2008) *Employability Skills Project* [Online], UK Commission for Employment and Skills, <http://www.ukces.org.uk/upload/pdf/employability-skills-project-0608.pdf> [Accessed March 2010].
- UKCES, (2009) *Ambition 2020: World Class Skills and Jobs for the UK* [Online], UK Commission for Employment and Skills,
http://www.ukces.org.uk/upload/pdf/UKCES_FullReport_USB_A2020.pdf. [Accessed April 2010]
- UKCES, (2010) *Contributing to the Debate: Assessing the Evidence Base on Employment and Skills in the UK* [Online], UK Commission for Employment and Skills,
http://www.ukces.org.uk/upload/pdf/Assessing%20the%20UK%20Evidence%20Base%20on%20Employment%20and%20Skills_1.pdf [Accessed April 2010].
- Van Aken, J. E. (2004) 'Management Research Based on the Paradigm of the Design Sciences: the Quest for Tested and Grounded Technological Rules', *Journal of Management Studies*, 41(2), 219–246.
- Van Aken, J.E. (2005) 'Management Research as a Design Science: Articulating the Research Products of Mode 2 Knowledge Production in Management', *British Journal of Management*, 16, 19–36.
- Van Aken, J.E., Berends, H. and Van der Bij, H. (2007) *Problem Solving in Organisation: A methodological Handbook for Business Students*, Cambridge, Cambridge University Press.
- Xiaozhou, X., 2001 'The role of the university in lifelong learning: perspectives from the People's Republic of China', *Higher Education Policy*, 14 (4), 313–324.