REFORMING HEI FOR THROUGH-LIFE SUSTAINABILITY OF CONSTRUCTION PROFESSIONALS

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Abstract: BELLCURVE research project aims to promote the concept of 'lifelong university' in modernising Higher Education Institutes to be more responsive to labour market skills needs by continuously improving the skills and knowledge of the construction professionals. This paper briefly explains improving such responsiveness of HEIs through governance reform. Initial conceptual framework and the research methodology are illustrated. In responding to labour market skills requirements, the need for sector and context specific skills and knowledge to the construction professionals is emphasised. Lifelong learning on Disaster Management and Quantity Surveying sectors are considered as proposed case study areas.

Keywords: Disaster Management, Quantity Surveying, Lifelong Learning, Higher Education, Governance Reform

1. Introduction

The mismatch between graduate skills and labour market requirements has been identified as one of the main factors behind graduate unemployment and employer dissatisfaction, particularly in the Built Environment (BE) sector [1]. Some advances have been made in recent years to incorporate the roles of construction professionals into topics such as climate change and sustainability.

This paper is based on the EU funded project titled Built Environment Lifelong Learning Challenging University Responses to Vocational Education (BELLCURVE). BELLCURVE aims to modernise the Higher Education Institutions (HEIs) in order for them to be more responsive to the labour market skills needs. In doing so, the focus of this paper is on the role HEIs play in continuous improvement of the skills and knowledge on disaster management and quantity surveying among the construction professionals.

Section 2 provides an introduction to the BELLCURVE project and the need to reform governance followed by the initial conceptual framework and research methodology. Section 3 explains the case studies on lifelong learning in the built environment, with particular focus on disaster management and quantity surveying sectors. Finally the conclusion and the way forward of the project are provided.

2. Built Environment Lifelong Learning Challenging University Responses to Vocational Education (BELLCUREVE)

2.1 Introduction of BELLCURVE

BELLCURVE (Built Environment Lifelong Learning Challenging University Responses to Vocational Education) is an EC (European Commission) funded research project currently being conducted at the Centre for Disaster Resilience, 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.

BELLCURVE aims to promote the concept of 'lifelong university' in modernising Higher Education Institutes (HEI) to be more responsive to labour market skills needs. 'Lifelong university' encourages graduates who are either employed or unemployed to inform their university on labour market skill requirements. This will provide the opportunity for HEIs to be appropriately responsive to provide the required mix of skills for the labour market through training / retraining programmes. The rationale behind the existence of this project is mainly the issues associated with the mismatch between graduate skills and labour market requirements and its impact on graduate unemployment and employer dissatisfaction in the Built Environment sector. The universities are expected to offer innovative curricula, teaching methods and training/retraining programmes which include broader employment-related skills along with the more discipline specific skills. This requires a much clearer commitment by universities to lifelong learning opportunities. Lifelong learning presents a challenge, in that it will require universities to be more open in providing courses for students at later stages in the life cycle.

In addressing this, 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. Universities will not become innovative and responsive to change unless they are given real autonomy and accountability. This demands a reform in governance systems based on strategic priorities to respond labour market needs effectively while promoting lifelong learning agenda.

In this context, the project focuses on governance reforms in HEIs delivering Built Environment programmes across the EU, emphasising the ERASMUS programme's objective "to contribute to the development of quality lifelong learning and to promote high performance, innovation and a European dimension in systems and practices in the field". To achieve this objective, 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. The objectives of this project are therefore formulated as, to develop a framework for HEI's to promote the concept of lifelong university in capturing and responding to labour market skill needs in the Built Environment; to refine, test and validate the developed framework through existing HEI Built Environment programmes/ sectors; to provide recommendations on governance reform for HEIs to become 'continuing education centres' for graduates while responding to labour market skill needs.

2.2 The Need to Reform Governance

The objective of this project is directly linked various strategies such as Lisbon strategy, EU 2020, Education and Training 2010, and Modernisation agenda for universities. Europe faces major structural challenges such as globalisation, climate change and an ageing population. The economic downturn has made these issues even more pressing. In order to address these challenges, Lisbon Strategy was set out, based on a consensus among Member States, to make Europe more dynamic and competitive, in a sustainable way and while enhancing social inclusion. The Lisbon strategy thus aims

to stimulate growth and create more and better jobs, while making the economy greener and more innovative [2]. The 'EU2020' Strategy, the successor to the Lisbon Strategy, highlights education as a key policy area where collaboration between the EU and Member States can deliver positive results for jobs and growth. This strategy shows how the EU can come out stronger from the crisis and how it can be turned into a smart, sustainable and inclusive economy delivering high levels of employment, productivity and social cohesion [3]. 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. In this framework, higher education has an important role to play. Governments and higher education institutions are looking for ways to creating better conditions for universities. At the same time, the strategic framework for European cooperation in education and training ('ET 2020'), adopted by the Council in May 2009, underlines the need to promote the modernisation agenda for higher education to improve the quality and efficiency of education and training (Council of the European Union).
The main areas for reform identified in the agenda are [3]:

- Curricular reform: The three cycle system (bachelor-master-doctorate), competence based learning, flexible learning paths, recognition, mobility.
- Governance reform: University autonomy, strategic partnerships, including with enterprises, quality assurance.
- Funding reform: Diversified sources of university income better linked to performance, promoting equity, access and efficiency, including the possible role of tuition fees, grants and loans.

Since BELLCURVE focuses on integrating the construction labour market skill needs to the modernisation agenda of the HEIs in the Europe, the vision to increase corporation between the higher education and the enterprises is the core of this project. Challenges faced by construction enterprises are fed to 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 [4].One of the main areas of reform as identified in the modernisation of agenda is governance reform which is where the focus of the BELLCURVE lies. Governance of higher education has both direct and indirect links with the curriculum and funding systems. The reform in governance might therefore have an impact on the way a curriculum is developed and delivered and on the system of funding, and vice versa. In terms of response to the changing labour market requirements, the governance reform 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.

2.3 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" ([5];p18). Accordingly, this project has developed an initial conceptual framework and this will be continuously improved as the project progresses. The Figure 1 illustrates the initial conceptual framework.

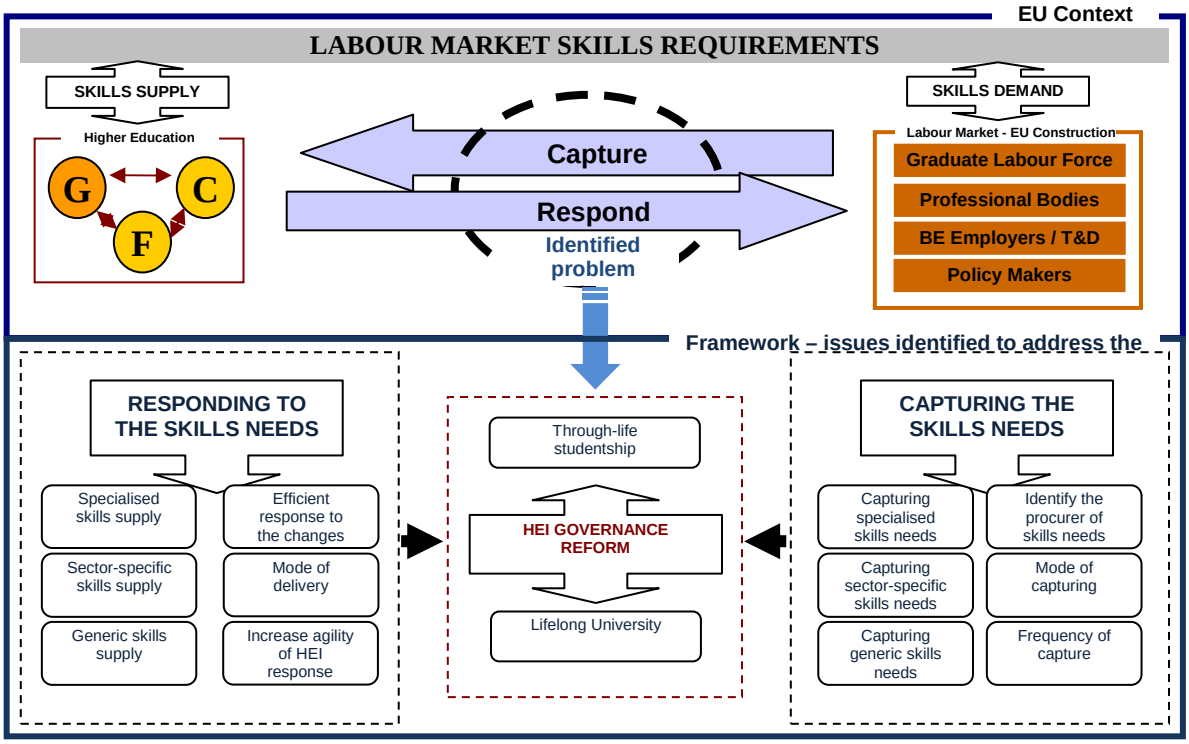

Figure 1: Conceptual framework

The labour market skills requirements for built environment professionals are perceived with the demand and supply side issues. The HEIs, being a body for knowledge creation and sharing, are expected to fulfil the labour market requirements. However, the problem was spotted within the process of capturing the skills requirements of the EU 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.

As shown in Figure 1, all three areas of reform that are Governance (G), Funding (F), and Curriculum (C) are identified as the major components to deal with within the higher education system. Nevertheless, the major focus of the 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 process of framework development, a design science approach ([6],[7],[8]) is used as the most appropriate overall research methodology for this project.

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

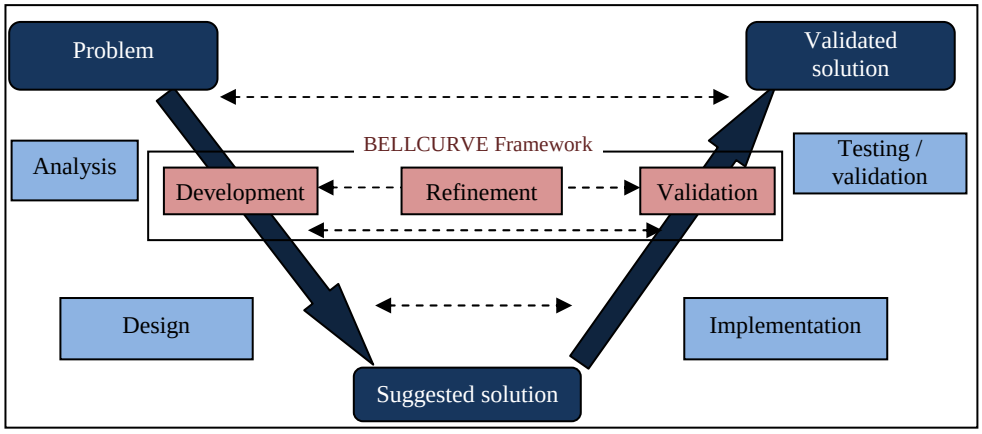

Figure 2: BELLCURVE framework development thorough a design science approach

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 and interviews with Higher education lead officers, professional bodies, construction employers will further confirm the identified issues with the framework development. The developed framework will then be refined based on expert interviews and focus group. The purpose of this phase is to ensure that the developed framework captures all the important components associated with the identified research problem. Once the framework is developed and refined, then it needs to be validated for its practicality. A case study strategy has been chosen to achieve this purpose. Case studies will be conducted on built environment sectors such as quantity surveying, disaster management, civil engineering, and construction management in order to validate the framework. This paper introduces the case studies on disaster management and quantity surveying sectors which will be conducted by the University of Salford.

As a contribution 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. This will ultimately lead the HEIs to provide lifelong learning to the graduates and in turn to become lifelong universities.

The next section explains the case studies selected by the University of Salford to validate the BELLCURVE framework.

3. Sustaining Built Environment Education: Case Studies on Lifelong Learning on Disaster Management and Quantity Surveying Sectors

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. The labour market requirements of the construction industry are of dynamic nature, changing from time to time, due to various factors. In addition, the recent developments in the economic recession have made a reduction in the labour demand and vacancy levels for construction workers. The employers are thus trying to achieve the maximum utilisation with the minimum numbers of workers [4]. This has resulted in the existing construction workers to concentrate more on acquiring or developing new skills in order to retain in the industry and to meet various skills demand. Hence, possessing up-to-date skills and competencies has become a vital role in the construction sector.

3.1 Case Study Area 1: Disaster Management

Disasters cause a considerable amount of damage around the world every year [9]. There has been an increase in the number of natural disasters over the past few years, and the impact in terms of human,

structural and economic losses has increased considerably. Disasters create significant challenges to the EU which includes the loss of lives and hindering the social economic capacity of the member countries and also of the union as a whole. According to CRED & UNISDR [10] in the past 20 years, 953 disasters killed nearly 88,671 people in Europe, affected more than 29 million others and caused a total of US$ 269 billion economic losses. Compared to the rest of the world, economic loss per capita is high in Europe mainly because it is very densely populated. Disaster scholars who have investigated the relationship between development and vulnerabilities have identified that the impact of disasters are likely to increase in the future [11].

Considering the impact of disasters towards the built environment, it is evident that most of the material damages of disasters have been on engineering related facilities of the built environment such as buildings, roads, bridges, water supply plants, communication and power services, harbours, etc. and therefore clearing, salvaging, rehabilitation and reconstruction work fully or partly require serious effort of the construction sector. On the other hand, prevalence of disasters is related to how the built environment is planned, designed, built, maintained and operated [12]. Therefore the severity of the impact due to disasters can be linked to unplanned development of built environment. For example, though the Chile earthquake in February 2010 was far stronger than the one that struck Haiti in January 2010, the damage was much more contained comparatively [13].

In accordance with what has been discussed, the need to respond, recover, rebuild or reinstate the built environment affected by disaster can be identified as a major challenge for the countries affected by disasters. Construction industry and built environment disciplines have a major responsibility in responding to the above context. Apart from the physical construction process the knowledge and the experience of the construction professionals are essential in the disaster mitigation process [12].

One of the main reasons to focus on disaster management sector in the context of lifelong learning is due to the widespread agreement in the literature that disaster management is a continuous process and has no specific end point. According to Haigh and Amaratunga [14] the built environment discipline at each stage of disaster management process has invaluable expertise and key role to play in the development of society's resilience to disasters. Further, the construction professionals are generally expected to possess specific knowledge and expertise to act effectively in a disaster situation. The main reason is the peculiar nature of disaster reconstruction. Some factors that explains the unique nature of disaster reconstruction are short time for rebuilding; low cost; use of local resources; well developed communication links and relationships including trust and respect between parties [15]. In addition, disaster reconstruction differs from normal construction based on funding arrangements, project planning and monitoring, stakeholder involvement, and adaptation of disaster risk reduction strategies ([4], [12], [16]).

In this context, educating the construction professional to make them act efficiently and effectively in a disaster situation is vital. HEIs delivering Built Environment programmes have a major responsibility to provide specific skills and knowledge that are necessary to be acquired and apply in a disaster situation by the construction professionals. The lifelong learning opportunities further enhance this provision as it will facilitate the HEIs to act as a continuing education centres providing skills and knowledge in a dynamic environment.

3.2 Case Study Area 2: Quantity Surveying

Quantity surveying skills sector has undergone significant changes over the past decade. Although, it was initially considered as the main profession for quantifying construction works in projects, quantity surveyors today undertake a spectrum of work ranging from providing investment appraisals to construction project management. Trends in building economics that have occurred during the latter part of the twentieth century made an impact on the changing roles of quantity surveying profession. This can be seen clearly in Table 1.

Table 1: *Chronology of developments in building economics (Ashworth [17]; p29)*

Date	Building Economics	Other Developments	Practice
Pre - 1960s	Building Bulletin: Cost study (1957) Building price books RICS Cost Research Panel	Post-war building boom	Approximate estimating Bills of quantities Final accounts
1960s	Const Studies of elements Cost limits and allowances Value for money in building Building Cost Information Service The Wilderness Group	Cost-benefit analysis	Elemental bills Operational bills Cut and shuffle Cost planning Standard phraseology
1970s	Cost-in-use Cost modeling Contractor's estimating Cost control	Measurement conventions Data coordination Building maintenance information Buildability Value-added tax/taxation Bidding strategies Computer applications Undergraduate surveying degrees	Computer bills Formula methods of price adjustment Cash flow forecasting Engineering and construction
1980s	Life-cycle costing Cost data explosion Cost engineering techniques Accuracy in forecasting Value engineering	Coordinated project information Procurement systems European comparisons Construction industry analysis Postgraduate education Single-point responsibility	Project management Post-contract cost control Contractual procedures Contractual claims Design and build
1990s	Value management Risk analysis Quality systems Expert systems	Facilities management Commercial revolution Single European market Building sustainability Information technology	Fee competition Diversification Blurring of professional boundaries Development appraisal
2000s	Benchmarking Added value in building and design Whole-life costing	IT in construction Knowledge management	Rethinking construction Lean construction Facilities management

In addition, changes in market, construction industry, client needs and profession posed threats and opportunities to the profession. A report titled 'The challenge of change' produced by the former Quantity Surveyor's Division of the RICS, provided warning to the profession that if the profession did not adapt to change then it would not exist in the future [18]. The quantity surveyors have subsequently begun to explore new potential roles. The traditional role of quantity surveyors, which is still practised by some and especially on small and medium sized projects, can be briefly described as a measure and value system [19]. Apart from the traditional roles, there were other evolving roles in the profession with increased importance and emphasis on meeting clients' needs. This involves quantity surveyors to work on procurement, design cost planning, whole life costing, value management, and risk analysis and management. Since the buildings have become more engineering services oriented, emphasis was placed on measurement, cost and value of such services. Other evolved roles have also included project and construction management, facilities management, contractual disputes and litigation [19]. The role of quantity surveyors are expected to develop in future due to the factors such as client focus, development and application of information and communication technologies, research and its dissemination, graduate capability and practice size. With particular focus on graduate capability Ashworth and Hogg ([19]; p13) say "*the number of graduates in quantity surveying is unlikely to change significantly in the short term from the reduced numbers experienced in the late 1990s. The relative shortage in supply has already had the effect of increasing salaries. Those graduates who have a good technical understanding, a broader use of*

business skills and a commitment towards lifelong learning are likely to be in high demand. For other graduates they will need to make themselves either more valuable to practices and contractors or less expensive". In this context, considering quantity surveying as a possible case study area for lifelong learning is dully justifiable, due to the changing and increasing skill requirements of the profession.

3.3 Supply side issues

Built environment requires a diverse range of professionals teaming up to deliver the products and services. Therefore, education and training of such professionals is a major aim of most built environment (BE) educational programmes in HEIs, which has resulted in competency based education being a major influencing factor for the design and conduct of such programmes. There have been various efforts to promote integration between built environment disciplines including that of Latham [20] and Egan [21] reports. Three key barriers to interdisciplinary studies, namely faculty structures, staff relationships, resource pressures and the influence of external accreditation bodies have been reported [22]. Engagement with the industry is seen as a requisite to rapidly changing industry requirements ([23],[24],[25]). Construction Knowledge exchange initiative centred on Continuing Professional Development (CPD) and action learning are used in the industry [23]. Further, the lifelong learning is an emerging concept of acquiring new skills throughout the life of an employee. The CITB Construction Skills [26] has identified that more employers are supporting the lifelong learning and have begun to use associated products and toolkits. Little has been realised by the HEIs to adopt lifelong learning within their education system, despite the fact that lifelong learning is a core concept in modern education. In this context, it is vital to explore the role of HEIs in the lifelong learning and how could they continuously support the construction workers, throughout their life time, through training and re-training programmes. This research will also help HEIs to increase the duration of their student-engagement, which is presently limited to the course duration.

4. Conclusions and way forward

BELLCURVE research project aimed at modernising the HEIs thorough governance reforms in order for them to be more responsive to the labour market skills needs, considers skills requirements in the fields of disaster management and quantity surveying sectors. The peculiarities of disaster contexts require specific skills. The evolving and developing roles of quantity surveying profession also demand specialised skills. The HEIs are partially responsible in meeting these skills requirements for which lifelong learning has been proposed as an appropriate approach. The conceptual framework of BELLCURVE recognises the interwoven nature of governance, curriculum and funding, and therefore will inform and guide the future stages of the research accordingly.

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