DEVELOPMENT OF A PROFESSIONAL DOCTORAL PROGRAMME IN BUILT ENVIRONMENT TO ENHANCE SOCIETAL RESILIENCE TO DISASTERS

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ABSTRACT

Integrating disaster resilience into education is a key factor for reducing the adverse impact of future disasters. This paper in this context presents the methodology of developing an innovative professional doctoral programme (DProf) that integrates professional and academic knowledge in the built environment to enhance societal resilience to disasters. The DProf programme addresses the career needs of practicing professionals, particularly those in, or who aspire to, senior positions within the construction industry and caters for the researching professional. In developing the DProf programme, a detailed market needs analysis for built environment stakeholders to increase societal resilience to disasters was conducted capturing inter-disciplinary needs across a range of stakeholders and countries. A series of semi-structured interviews on current and emerging market needs with members of six built environment related stakeholders, namely, local and national governments; community; NGOs, INGOs and other international agencies; academia and research organisations; and private sector facilitated the aforementioned analysis. Qualitative data analysis techniques were employed in analysing the interview data. The findings of the interviews revealed the current and emerging needs and skills of the six stakeholders related to built environment professionals towards enhancing social, economic, technological, environmental and institutional dimensions of disaster resilience of societies. These findings were used to develop the appropriate learning outcomes and the content of taught and research components of the DProf programme.

Keywords: *Professional Doctorate, Disaster Resilience, Built Environment.*

1. INTRODUCTION

The need to improve the capacity and capability of the built environment professionals' in enhancing disaster resilience of societies was highlighted by Siriwardena et al. (2013), Thayaparan et al. (2015), Perera et al. (2016) among others. They suggested the need of continuously updating the skills and knowledge of construction professionals, in order to contribute effectively to disaster resilience. The professionals in the construction sector play an important role in disaster resilience and management and it is, therefore, important to design educational and training courses to enable them to successfully fulfil this role (Witt et al., 2014). This is corroborated by Bosher et al. (2007) that risk and hazard awareness training needs to be integrated systematically into the professional training of architects, planners, engineers, developers, among others. In addition, the Sendai framework for disaster risk reduction (2015-2030) has identified the need for enhancing the capacities of relevant stakeholders and industries. The framework suggested to "build the knowledge of government officials at all levels, civil society, communities and volunteers, as well as the private sector, through sharing experiences, lessons learned, good practices and training and education on disaster risk reduction, including the use of existing training and education mechanisms and peer learning" (UNISDR, 2015).

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Thus, the role of Higher Education Institutes (HEIs) in enhancing the disaster-related knowledge and skills of construction professionals is highly recognised (Thayaparan et al., 2015). For instance, HEIs are expected to contribute to both theory and practice in the development of societal resilience to disasters through the development of curricular and modules to update the knowledge and skills that employees have obtained in the past. Against this backdrop, doctoral education is identified as one of the methods in upgrading the knowledge of the construction professionals in this regard.

Professional doctorates emphasise the importance of a connection with practice through the research topic (Lee et al., 2000). For instance, United Kingdom Council for Graduate Education (UKCGE) (2002) describes professional doctorate as "a programme of advanced study and research which, whilst satisfying the university criteria for the award of a doctorate, is designed to meet the specific needs of a professional group external to the university". Council of Australian Deans and Directors of Graduate Studies (1999) describes the professional doctorate as "a program of research and advanced study which enables the candidate to make a significant contribution to knowledge and practice in their professional context [and] … more generally to scholarship within a discipline or field of study". Fenge (2009) asserts that central to the heart of the DProf is professional practice, which encompassed the developing of professional knowledge and a focus on developing practice. Thus, professional doctorates can be distinguished from other types of doctoral degrees based on its specific focus on knowledge-in-use for professional practice (Lester, 2004).

Doctoral degrees have been part of HEIs ever since the first was conferred by the University of Paris in the middle of the twelfth century (Noble, 1994). Thereafter the doctorate was adopted at universities across Europe (Bourner et al., 2001). For six centuries, professional doctorates in theology, law and medicine were pre-eminent. By contrast, the modern Doctor of Philosophy, the PhD (or DPhil), originated at Berlin University in the early part of the nineteenth century. It then spread across the German universities, attracting students from many other countries, notably the USA (Gregory, 1995). The 1990s was the decade when the professional doctorate came to England (Bourner et al., 2001). In the USA, the first Doctor of Philosophy was conferred in 1861 (Yale University). About 60 years later, the Doctor of Philosophy degree finally came to Britain (Simpson, 1983; Winfield, 1987). In 1920, the first Doctor of Philosophy degree was awarded by an English university (a DPhil in science by the University of Oxford). At about the same time, the first professional doctorate (a Doctor of Education-EdD) appeared in the USA, being awarded at Harvard University in 1921 (Bourner et al., 2001).

In 1990, the Australian Higher Education Council of the National Board of Employment, Education and Training advocated that Australian universities should develop professional doctorates. By 1996, 29 universities had introduced professional doctorates, and over half of Australia's 38 universities had developed EdDs (Bourner et al., 2001). As at 1996, professional doctorates were available in education, business, law, psychology, health sciences, humanities, design, and architecture (Poole and Spear, 1997). In 1992, England introduced professional doctorates about 60 years after the USA at a traditional and research-oriented institution, the University of Bristol (Westcott, 1997). The same 1992, the Doctor of Engineering (EngD) was started in the UK, at the University of Warwick, the University of Manchester Institute of Science and Technology (UMIST)/ the University of Manchester and the University of Wales (Bourner et al., 2001). The 1990s saw English universities offering professional doctorates in a range of subjects, as presented in Table 1.

Table1: Trend of professional doctorates across subjects at 1 January 1998 in the UK (Source: Bourner et al., 2001)

Subject/title of award	Short form of the title most often used	Number of universities	Number of programmes
Doctor of Education	EdD	24	29
Doctor of Medicine	MD	18	20
Doctor of Clinical Psychology	DClinPsy	17	19
Doctor of Business Administration	DBA	9	9
Doctor of Engineering	EngD	8	8
Doctor of Psychology	DPsych	4	4

Doctor of Educational Psychology	DEdPsy	4		4
Doctor of Musical Arts	DMA; AMusD	2		2
Doctor of Architecture	DArch	2		2
Doctor of Veterinary Science	DVet Med; DVSc	2		2
Doctor of Dental Science	DDSc	2		2
Doctor of Public Health	DrPH	1		1
Doctor of Counselling Psychology	DCounsPsy	1		1
Doctor of Occupational Psychology	DOccPsych	1		1
Doctor of Clinical Science Psychotherapy	DClinSci Psychotherapy	1		1
Doctor of Psychoanalytic Psychotherapy	DPsychPsych	1		1
Doctor of Theology	ThD	1		1
Doctor of Fine Art	DArt	1		1
Doctor of Work-based Learning	DProf	1		1
			Total	109

As shown in Table 1, 109 professional doctorate programmes in 19 subjects were available in English universities at the start of 1998. Since 1998, there has been a continued growth in the most popular areas for professional doctorates including education, clinical psychology, and business administration together with new additional professional doctorate programmes in finance, pharmacy, social work, humanities, and built environment. It can be deduced that the growth in professional doctorates has not been confined to a few subjects but has encompassed a wide and growing range of subjects.

The proliferation of professional doctorates has been remarkable in the USA, UK, and Australia. In the last decade, it has begun to attract the attention of higher education scholars and researchers (Kot and Hendel, 2012). For instance, a number of studies have been published on professional doctorates in the UK (see Winter et al., 2000; Bourner et al., 2001; Hoddell et al., 2002; UK Council for Graduate Education, 2002; Scott et al., 2004; Lester 2004; Park 2005; Powell and Long 2005). In Australia (see Maxwell and Shanahan, 1997, 2001; Evans 2002; McWilliam et al., 2002; Maxwell, 2003; Neumann, 2005; Stephenson et al., 2006; Lee et al., 2009). However, no studies have been conducted across the globe to present a broader picture on the expansion of professional doctorate programmes in disaster resilience in the built environment. It is against this backdrop that a major initiative on a professional doctorate in disaster resilience in the built environment was launched by the EU-funded research project, CADRE (Collaborative Action for Disaster Resilience Education) aims to develop a professional doctorate to integrate the professional and academic knowledge of the construction in developing societal resilience to disasters.

This present study builds on the work by Malalgoda et al. (2015), Malalgoda et al. (2016), Perera et al. (2015), Perera et al. (2016) that identified the current and emerging needs and skills, and knowledge gaps of construction professionals and other stakeholders including communities affected by disasters towards enhancing social, economic, technological, environmental and institutional dimensions of disaster resilience of societies. This study, therefore, presents the methodology of developing an innovative professional doctoral programme (DProf) that integrates professional and academic knowledge in the built environment to enhance societal resilience to disasters. It is believed that this study would be of great value to HEIs considering in offering a professional doctorate programme in disaster resilience. Also, the methodology used to develop the professional doctoral programme (DProf) in this study can be applied to any professional doctorate programme in HEIs and thus, benchmark future studies.

2. THE NEED FOR PROFESSIONAL DOCTORATES IN DISASTER RESILIENCE IN THE BUILT ENVIRONMENT

Disaster resilience and management is a multi-disciplinary subject area and multi-stakeholder efforts are required for successful implementation. The main stakeholders include national and local government institutes; NGOs, INGOs and other international organisations; academia; the private sector; and

community. These stakeholders demand a certain level of knowledge and skills to fulfil their organisational needs in developing societal resilience to disasters. Thus, it is important that capacity is developed for modern design, planning, construction and maintenance that are inclusive, interdisciplinary, and integrative. In achieving this, it is proposed to develop an innovative professional doctorate to integrate professional and academic knowledge in the construction industry to enhance societal resilience to disasters. By developing a professional doctorate (DProf) programme, it is expected that issues such as complexity and multi-disciplinary nature of the subject; lack of industry involvement; and lack of research and development activities on disaster management by built environment professionals could be successfully addressed. This section highlights the significance of DProf programme to construction professionals in developing societal resilience and therefore several salient features are identified as follows:

Contribution to theory and practice: Within the context of disaster resilience and management, more applied research is required in order to develop the construction industry with necessary capacities to plan, design, build and operate resilient structures to increase societal resilience to disasters. One of the aims of a DProf programme is to integrate professional and academic knowledge in the selected discipline. It will provide opportunities to the candidates to undertake the research in the workplace and to select a topic, which has a direct effect on improving the professional practice, related to the host organisation where successful completion normally leads to professional and/or organisational change. It will, therefore, strengthen not only the academic knowledge and cooperation between the universities and industries but also the concerns, capabilities, and expectations of the relevant stakeholders related to disaster resilience and management. As such, professional doctorates are very much appropriate to the construction sector in developing societal resilience to disasters. It will make a research-based contribution to practice within the context of upselling construction professionals with disaster resilience expertise.

Career needs of practicing professionals: One of the main disadvantages of traditional doctorates is that it is not very attractive to the practicing professionals. For instance, traditional doctorates more often contribute to the theory of knowledge and as a result, is not much popular with the practicing professionals in the construction sector. This is corroborated by Bourner et al. (2001) that professional doctorates are attractive to those who aspire their own personal development and a commitment to furthering the cause of their profession. Therefore, developing a professional doctorate will address the career needs, and will upgrade the knowledge and skills of practising professionals working to make societies more resilient to disasters. It is expected that DProf programmes will attract learners from the construction industry to develop solutions to their labour market demands through doctoral studies.

Collaboration: DProfs promotes collaboration between HEIs and industries, which are key stakeholders in disaster resilience and management. The collaboration is further supported by facilitating cross-institutional supervisory teams and working groups. It is expected to improve the quality and relevance of DProf programme through active cooperation between HEIs and partners from outside academia, including construction professional bodies, local/national/international bodies, and social partners.

Customisable: In serving the needs of various stakeholders, it is proposed to develop a professional doctorate with a generic framework, which enables a wide range of professionals from the public, private and voluntary sectors to negotiate programmes that are customised to the needs of their own professions and organisations (Doncaster and Thorne, 2000) serving to reduce the risk of disasters. It is expected that all construction professionals serving all of the stakeholder groups attached to disaster resilience and management will benefit from the developed programme.

Lifelong learning and continuous professional development: The DProf is intended to be a form of in-service professional development. Construction professionals will, therefore, benefit from the proposed professional doctoral programme, which will provide opportunities for learners to access lifelong, learning in increasing societal resilience to disasters. Therefore, developing an innovative professional doctorate will address the requirements for lifelong learning and will enhance not only academic knowledge but also the concerns, capabilities, and expectations of the relevant industries and communities. In turn, this will create the necessary intra Industry, Community, and University feedback and feed-forward mechanisms to enable effective lifelong learning.

3. PROGRAMME DEVELOPMENT METHODOLOGY

Development of the programme involves a substantial level of research activities to study and analyse market needs in order to capture the labour market requirements for disaster resilience and its interface with the construction industry and its professionals. The first phase of research involved capturing the needs of five stakeholder groups associated with disaster resilience and management as well as current and emerging skills and ultimately competencies, applicable to built environment professionals towards enhancing societal resilience to disasters (see Malalgoda et al., 2016; Perera et al., 2015; Perera et al., 2016).

The data collection and analysis framework of the study is presented in Figure 1.

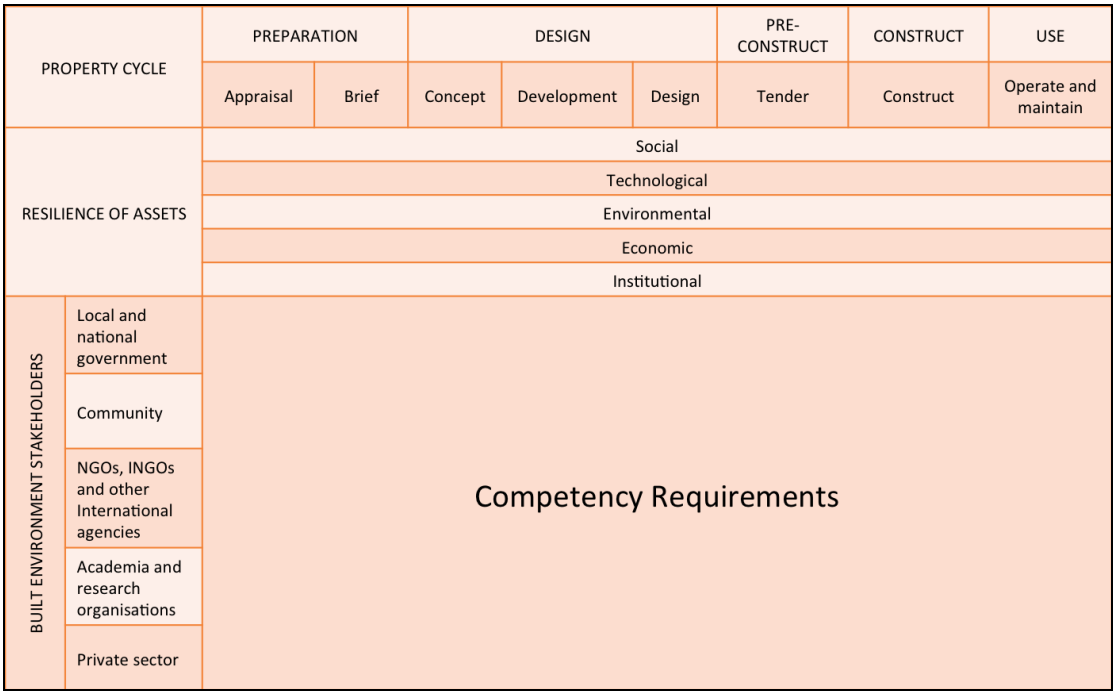

Figure 1 : Framework for data collection and analysis

As shown in Figure 1, the initial framework is a three-dimensional framework consisting the following parameters.

Built environment stakeholders: National and local government organisations; Community; NGOs, INGOs, and other international agencies; Academia and research organisations; and Private sector.

Dimensions of resilience: Economic Resilience; Environmental Resilience; Institutional Resilience; Social Resilience and Technological Resilience.

Stages of property lifecycle: Preparation Stage; Design Stage; Pre-Construction Stage; Construction Stage and Use Stage.

The framework was developed through an extensive consultation process and was refined with the emerging literature findings and with the opinion of stakeholders who has been interviewed to capture the labour market demands in the construction industry to increase societal resilience to disasters. Eighty-seven semi-structured interviews were conducted with national and local government organisations; community; NGOs, INGOs and other international agencies; academia and research organisations; and the private sector in all five partner countries. The details of the interviews are presented in Table 2. The interviews were aimed at capturing the needs of five stakeholder groups associated with disaster resilience and management as well as current and emerging skills and ultimately competencies, applicable to built environment professionals towards enhancing societal resilience to disasters.

Table 2: Interviewees profile

Stakeholder group	Number of interviews	Nature of Interviewee
National and local government	20	Managerial level employees at government agencies and council employees engaged in disaster management and resilience planning
HEIs and research organisations	21	Senior academics and researchers working in the field of disaster resilience
Private sector	19	Senior employees from private sector companies such as directors and managers of insurance companies and construction companies
Community	15	Community representatives comprising disaster affected community members, recovery coordinators, and former and current council members
NGOs/INGOs	12	Representatives of Disaster Management related INGOs and NGOs such as programme managers, research officers and technical advisors
Total	**87**	

Separate interview guidelines were prepared for each stakeholder to match their circumstances. The interview guidelines were prepared to capture the above issues and the guidelines and a study brief were sent to the interviewees prior to the interview. At the start of the interview, the interviewer introduced the research topic and the aims and objectives of the study in order to give a clear picture of what is expected from the interviewee. This allowed the interviewees to answer the questions more appropriately.

During the interviews, the interviewer asked questions based on the interview guideline, however, the process allowed the interviewee to elaborate on the other issues which were relevant to the study. This process allowed interviews to progress in a more proactive manner where the interviewer was able to capture data more relevant to the study. The interviews lasted between 55 minutes and 80 minutes. Most of the interviews were audio recorded using a digital voice recorder with the consent of the interviewees. Audio recording helped the researchers to transcribe interviews accurately and provided the opportunity to fully concentrate on the interviewee during the process. In addition, all key points were written down during the interview in order to avoid any issues arising from technology failure. All the interviews were then transcribed using MS word and this process allowed the researcher to use direct quotations from the interviewees when presenting the data; all of which increased the reliability and validity of the research findings.

The data gathered from respective interviews were subsequently analysed by the CADRE project partners that conducted them. The analysis was done using NVivo (version 10). The themes that emerged from the interviews conducted within each stakeholder group were collated. Similar nodes were merged after combining all the nodes created by respective partners. The themes were presented under two main headings i.e. Needs and Skills. The category “Needs” covers the stakeholder requirements that emerged from the interviews as well as the demands specifically made by interviewees. Also, what the interviewees believe should be in place while professionals relate with them to enhance societal resilience were categorised under the heading “Needs” in the analysis. During the interviews, some set of skills were displayed by professionals while serving to reduce the threats posed by natural and human-induced hazards, and some that are desired by interviewees emerged. These set of skills were categorised under the heading “Skills” (see Malalgoda et al., 2016; Perera et al., 2015; Perera et al., 2016 for details). The interviews generated a long list of needs and skills with respect to the property lifecycle stages under the respective dimensions of resilience. Finally, the identified needs and skills were combined ‘like-for-like’ to produce the broader level of knowledge gaps in disaster resilience.

4. DISCUSSION

The knowledge gaps identified through the interviews could be broadly categorised into two groups. They are built environment specific knowledge gaps and knowledge gaps which are commonly related to any discipline in disaster resilience. Some of the key knowledge gaps identified are, Governance, legal frameworks and compliance; Business continuity management; Disaster response; Contracts and procurement; Resilience technologies, engineering and infrastructure; Knowledge management; Social and cultural awareness; Sustainability and resilience; Ethics and human rights; Innovative financing mechanisms; Multi-stakeholder approach, inclusion and empowerment; Post-disaster project management; and Multi-hazard risk assessment.

These knowledge gaps form the basis for the initial programme specification for the proposed DProf programme. Based on these, a structured DProf programme will be developed to reflect how the construction sector and its professionals can contribute to achieving resilience. In addition, these study findings will be used to develop the appropriate learning outcomes and the content of taught and research components of the DProf programme in disaster resilience.

5. CONCLUSIONS

The professional doctorate in disaster resilience in the built environment is designed for practitioners associated with disaster resilience in the built environment. The programme is offered to learners from the construction industry, to develop solutions to their labour market demands through doctoral studies. This is an alternative form of doctorate, which allows students to contribute to knowledge and practice without undertaking a traditional research degree. The degree will facilitate students to reflect on a different element of their professional career while making a substantial contribution to the improvement of their professional practice. Successful completion of the degree will lead to professional and/or organisational change that is often direct rather than achieved through the implementation of subsequent research findings. The programme will address the career needs, and will upgrade the knowledge and skills, of practising professionals working to make communities more resilient to disasters, and particularly those in, or who aspire to, senior positions within their profession. The education and training delivered will be more relevant to the world of work, which is vital for the labour market and for people's employability. It will further broaden and deepen the employees' understanding of the disciplines in which they are studying, upgrade their skills, promote inter-disciplinary working, and provide them with appropriate transferable skills. It is believed that this study would be of great value to HEIs considering in offering a professional doctorate programme in disaster resilience. Also, the methodology used to develop the professional doctoral programme (DProf) in this study can be applied to any professional doctorate programme in HEIs and thus, benchmark future studies.

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