ASSOCIATION OF RESEARCHERS IN CONSTRUCTION MANAGEMENT

Doctoral Workshop on Contemporary Advances in Research Methodology in Construction Management
Workshop conveners: Dr Craig Thomson, Professor Lloyd Scott, Dr Nicola Callaghan
Location: Glasgow Caledonian University, Glasgow, UK
Date: Friday 1st of November 2019

A METHODOLOGICAL APPROACH TO EXCELLENCE IN BIM ORIENTED ARCHITECTURAL EDUCATION

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INTRODUCTION

This short paper discusses the authors' current research into a theoretical framework to form a new systematic approach to facilitating the pursuit of excellence in architectural education through incorporating BIM knowledge and skills into curriculum design and delivery. The research strategy is described here about objectives, methods and outcomes with regard to generating new knowledge in BIM oriented higher education in architectural design and studies under RIBA (2013) Plan of Work, CIOB (2014) Code of Practice and HSE (2015) Guidance on Construction (Design and Management) Regulations 2015. Conclusions are drawn based on current research progress and expected outcomes, which can be useful for educators in architectural education and lifecycle oriented construction management.

BACKGROUND

BIM integrated architectural education. The construction industry is being transformed by the adoption of digital technologies such as building information modelling/management (BIM) (Azhar, 2011) and this has made challenges educators (Liu, 2012; Abbas et al., 2016; Shelbourn et al., 2017) to incorporate BIM related knowledge into current higher education practices. A preliminary literature review was conducted by the authors recently to understand the status of BIM oriented higher education. The review has several focuses, including general need and initial practice; and the following academic initiatives have given strong support to define the strategy of this research:

- ***General need.*** The need for BIM integrated higher education arises in response to the demand for digitalisation across the architecture, engineering, construction, and operation (AECO) sectors (Hjelseth, 2015), and it has been incorporated into higher education in related subjects (Clevenger et al., 2010) for students to develop skills and competence (Solnosky and Parfitt, 2015; Olugboyega and Windapo, 2019).
- ***Initial practice.*** There has been a wide range of academic practices to integrate BIM into teaching and learning in related subjects with focuses on strategy (Barison and Santos, 2010), curriculum design (Abdirad and Dossick, 2016), teaching and learning materials, methods and processes (Ozcan-Deniz, 2016), learning outcomes (Coates and Biscaya, 2018).

Research question. Despite of initiatives to adding BIM into higher education, it looks that there is currently a lack of a theoretical approach (Shelbourn et al., 2016; Boton et al., 2018; Simpson et al., 2019) to transforming practice from BIM integration to BIM orientation. This challenge has led a new research described here to focus on a framework for excellence and its implementation in BIM oriented architectural education at undergraduate level.

Aim and objectives. To answer the research question, this research aims to explore a new technical solution, i.e., a theoretical framework underpinned by a systematic approach to excellence in architectural education through a pervasive incorporation of BIM knowledge and practices into relevant curriculums and delivery processes. There are three objectives focusing on review, development and validation (See Figure 1) to achieve the goal.

RESEARCH METHODOLOGY

A research roadmap towards the goal is illustrated in Figure 1 to clarify methods, objectives, and expected outcomes. Selected research methods include questionnaire-based survey, interview, and case study; and this combination is to consolidate an inductive research that can yield dependable and useful research outcomes. It is expected that this research roadmap can support the use of Bloom's Taxonomy method (Krathwohl, 2002) and evidence-based learning to develop a new framework for BIM oriented architectural education, which can effectively facilitate the cognitive learning process for learners at various learning levels to "Remember, Understand, Apply, Analyse, Evaluate, and Create" (Anderson et al., 2001) with regard to educational objectives.

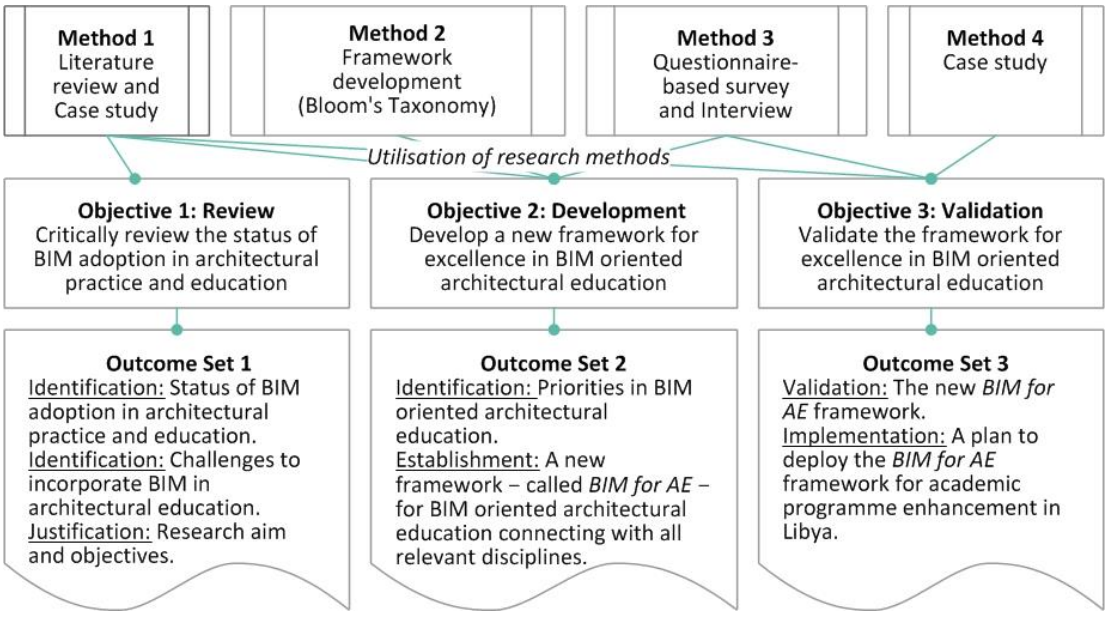

Figure 1: Research roadmap.

CONCLUSIONS

This research aims to create a new technical solution to facilitate transformation from BIM integration to BIM orientation in architectural education at undergraduate level. The BIM for AE framework can assist educators to reengineering curriculums and delivery process in architectural education in compliance with RIBA Plan of Work, which has been adopted in project lifecycle oriented construction management.

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ACKNOWLEDGMENTS

This research is funded by the Government of National Accord, Libya, and conducted in the Department of Architecture at the University of Strathclyde in Glasgow, UK.