Chapter 8
Integrated BIM Education in Construction Project Management Program

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ABSTRACT

The construction industry is currently struggling due to the ever-increasing complexity of a building and the highly fragmented nature of the construction industry. In response to the current problems, building information modelling (BIM) has been adopted to improve productivity and deliver a quality building to a client. The academia also has been striving to embed BIM education into the exiting curriculum to accommodate the needs of the construction industry. However, BIM is currently taught as a simple design tool rather than a methodology to improve productivity in construction projects. Although there have been various attempts to integrate BIM courses into the existing curriculum, a lack of research has been conducted regarding how BIM adoption and implementation strategy should be utilized for a BIM integrated curriculum. Thus, this chapter will provide insights for updating and developing BIM courses.

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INTRODUCTION

Customer requirements for a building have become more complex and bespoke in its design and materials as well as sustainable attributes related to operational energy consumptions. In order to cater for these requirements and complete a project successfully, effective integration of various construction information such as design, engineering drawing, and energy analysis, and coordination of project management information such as project management plan, quality assurance, and cost and time management among key project participants are more essential than ever. To determine the most affordable building design financially and environmentally, diverse information such as design, costs and environmental impacts of construction materials should be collected and integrated from the outset of a project among key project stakeholders. However, the current practice in the construction industry seems to be challenging to effectively and efficiently cope with the ever-increasing complexity of a project due to the highly fragmented nature of the construction industry and a lack of knowledge and skills of construction personnel to manage stakeholders' requirements.

In response to the current problems, Building Information Modelling (BIM) has been recognized as an enabler that can improve the productivity of a construction project by facilitating collaboration among stakeholders. BIM is defined as an information management system to integrate and manage various construction information throughout the entire construction project life cycle based on a 3D parametric design to facilitate effective communication among project stakeholders to achieve a project goal(s) in a collaborative manner (Kim, 2014). BIM is currently regarded as a major paradigm shift in the construction industry as it is a catalyst for changes of process and culture that requires more integrated approach than before (Hannele et al., 2012). Consequently, various researchers increasingly study a way of utilizing BIM to improve productivity in the construction industry, and the governments mandate the BIM use for the public construction project in the US, UK, Singapore, and South Korea, which is called 'government push and industry pull strategy'. As of 2015, the BIM adoption status indicates approximately 60% in North America, Europe, and Oceania (Jung & Lee, 2015).

The current construction industry is more leaning towards the digitalised Architecture, Engineering, and Construction (AEC) practice due to the BIM capabilities named 'nBIM capability' as a project facilitator that attract the construction industry to adopt BIM in various construction projects over a life cycle effectively and efficiently. nBIM capability can be explained as 3D BIM for visualization of design intent, 4D BIM for project scheduling based on 3D visualization, 5D BIM for project cost management, and 6D BIM for facility management during maintenance and operation phase of a building. Thus, it is evident that the construction industry