BIM Education Framework for Clients and Professionals of the Construction Industry

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ABSTRACT

Lack of qualified BIM professionals is a key BIM challenge that affects specific organisations and on a more macro scale, individual countries. A salient solution to this problem is the provision of better BIM education. This article represents the initial work into the implementation of BIM in the Dominican Republic, a country affected by different challenges in regard to BIM implementation, with a key issue surrounding the lack of BIM education. The aim of the article is the development of a conceptual BIM education framework which suggests strategies to be implemented in Academia and the industry for the delivery of BIM education to all the construction parties involved in a project, including the client. A literature review about BIM education and training and the revision of BIM education frameworks worldwide helped in its development. The framework is beneficial to this country as it is intended to be part of a toolkit, the final outcome of a PhD research on this country. However, it can be consulted by any country or organisation interested in developing BIM education strategies.

KEYWORDS
Academia, AEC Professionals, AEC Students, BIM Education Framework, BIM Education, Clients, Industry BIM Training

INTRODUCTION

As an innovative method for the design, construction, and operation of the built environment, BIM covers a wide variety of concepts, tools, and workflows that stakeholders in the industry need to learn and implement in their projects (Succar & Sher, 2014). For a successful BIM implementation, it is essential that the members of the construction team have sufficient knowledge regarding those aspects (Suwal, Jávájá, Rahman, & Gonzalez, 2013). However, several studies have reported that there is shortage of qualified BIM professionals in the industry, which has become an important BIM barrier (Eadie, Browne, Odeyinka, McKeown, & McNiff, 2013; Gardner, Hosseini, Rameezdeen, & Chileshe, 2014; Lee & Hollar, 2013; Wu & Issa, 2013). In the same manner, training people or searching for people with BIM knowledge has represented a difficulty as to BIM implementation (Arayici et al., 2011).

BIM education is the solution to accelerate the BIM learning curve. Thus, companies can employ ready-made BIM professionals when students finish their studies (Wu & Issa, 2013). Such education

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comprises different types of BIM learning: post-secondary education, industry workshops, online media and on-the-job training (AIA-CA, 2012).

The aim of this study is to develop a conceptual framework that contains the guidelines necessary for the development of BIM education strategies in Academia and the industry to “BIM educate” the construction parties involved in a project, including the client. For this purpose, the following research question was formulated: Which strategies should be implemented to “BIM educate” students of careers related to construction, current professionals of the field and clients for a successful implementation of BIM in construction projects? This research question targets the need to educate not only students who are not professionals yet but also current professionals of the construction industry with none BIM knowledge, as well as clients who are not commonly considered when referring to BIM education.

This conceptual framework was developed as part of the PhD research “Decision support toolkit to implement BIM in the Dominican Republic.” The projected outcome of the study is a toolkit where the subject of BIM education is being considered as it plays an important role for this developing country where the implementation of BIM is in its infancy, and there is a notorious lack of BIM education.

In the following sections, a brief introduction to BIM education and training is presented. Furthermore, the research methodology provides a background of the PhD research, which adopted a qualitative approach. For the research, literature has been reviewed, and a preliminary data collection was conducted due to the lack of information about the topic in the country. Both, the literature and the preliminary data collection identified the need for a BIM education framework. The study then presents a review of the literature regarding BIM education and training, which focuses on the main BIM education providers: Academia and the industry. BIM education frameworks from different countries (Australia, New Zealand and the UK) are presented, analysed and compared. Findings of the preliminary study in regard to BIM education in the Dominican Republic are shown, and the development of the proposed conceptual BIM education framework is explained. Conclusions and further work are provided.

**BIM EDUCATION AND TRAINING**

Education is a process that implicates activities such as teaching, inducing, motivating, learning, examining, which is usually offered in schools and colleges (Oladosu, 2009). For a better understanding of the term, Jarvis (1995, in Garavan, 1997) lists its intrinsic characteristics: it must include a learning method, this method must not be an individual event, it is fundamentally humanistic, and learning must include understanding.

In regard to training, Peters (2010) includes it as one of the processes involved in getting educated. Oladosu (2009) defines it as the acquisition of skills in a particular field of specialisation which requires an exercising routine, continuous repetition and a definite end and objective. It is also important to mention that training is an activity commonly used in organisations, and can be even identified under the term “employee training” (Masadeh, 2012), which means obtaining on-the-job skills for a specific role.

Even though both terms have similarities and involve learning processes, there are differences among them. As presented in Table 1, such differences are regarding the scope, depth of the knowledge sought and the learning method applied for its acquisition.

After having a clear explanation of the terms education and training and their differences, a definition of BIM education was elaborated: BIM education is a continuous learning process that covers the knowledge required for individuals to be capable of being part and understand what a BIM process is. Such learning process needs to include the essential aspects of BIM implementation, the performance of the participants and the technical skills individuals need to acquire depending on the discipline they belong to and their role in the construction team.

BIM education and training is necessary not only within the whole construction industry but also must be directed to different levels: secondary level, undergraduate, practitioners’ site and office staff,
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