Collaborative BIM Learning via an Academia-Industry Partnership

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ABSTRACT

This paper focuses on a joint academia-industry Building Information Modeling (BIM) partnership in Ireland. The partnership was based on €3 million design and build project that was developed via a tender process in late 2012 using ‘traditional’ technology (including 2D CAD). The successful tender was led by Clancy Construction and their team gave the tender information to Waterford Institute of Technology for a student BIM project to be completed in the second semester of the 2012/13 academic year (January to May). The students were a mix of Architectural Technology, Construction Management and Quantity Surveying. As part of their scheduled semester modules they developed a BIM model of the proposed building. The industry partners continued to develop the ‘real’ design and build project in parallel with the student BIM project. At the end of the semester a full presentation by the students of their project was made to the design and build team. The paper reviews the general context of BIM in AEC Education and the associated role of academia-industry partnerships. An overview of both the industry design and build project and the student BIM project is also included and the associated lessons learned are identified. The paper concludes with an overview of the 2013/14 BIM related plans at Waterford Institute of Technology, including the extension to the academia-industry partnership agreement for everyone’s benefit.

Keywords: AEC Education, Building Information Modeling (BIM), Case Study, Industry-Academia Partnership, Ireland

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INTRODUCTION

With the increasing adoption of Building Information Modeling (BIM) throughout the global Architecture, Engineering & Construction (AEC) sector, stakeholders in the Irish construction industry are beginning to recognize the potential of this important technology. For academia, this has led to a growing requirement for educational institutions to prepare their students to have a sufficient level of knowledge of BIM. However, one of the main challenges of introducing BIM into the undergraduate curriculum is that historically, AEC professionals have been educated in isolation from one another. In terms of the broader scope of IT in AEC education, Thomas (2004) discussed the educational challenges of integrating a variety of people, processes and technologies, concluding that “students in different disciplines should be encouraged to mix, undertake group assignments, share digital information and generally appreciate the potential contribution of other disciplines to the AEC industry.” In addition to these challenges, the general consensus is that there are two issues requiring consideration for the integration of BIM into the educational curriculum; training students in the use of BIM software applications and appreciating the integrative and collaborative potential of BIM between the various AEC stakeholders. It is against this backdrop that an industry-academia partnership was formed between Waterford Institute of Technology (WIT) and Clancy Construction led design and build team to learn about BIM.

In January 2013 WIT was approached by the Managing Director of Clancy Construction with a general remit of exploring the potential of BIM within their organization. Initial discussions revealed that whilst Clancy Construction were aware of the increasing importance of BIM throughout the global construction sector, they had little prior knowledge of its specific capabilities from a contractor’s perspective. A project that the company had recently been awarded was identified as a suitable test bed for the potential of BIM. The Enterprise, Research & Development (ERD) Centre is a €3 million design and build project on the outskirts of Clonmel in County Tipperary. The scope of works includes 1500m² of classrooms, offices, laboratories, meeting rooms and a café. Clancy Construction and their selected architectural consultants RKD’s design proposal was selected by the client at the end of 2012 and work began on developing a full design in early 2013. Staff involved in different AEC programs in the School of Engineering at WIT agreed to develop a project brief for students of Architectural Technology (AT), Construction Management & Engineering (CME) and Quantity Surveying (QS). The main goals of the brief were to improve the student’s use of BIM-related software (e.g. Revit, Civil 3D and Navisworks), integrate the different disciplines to enhance their understanding of each other’s roles, and explore the potential adoption of BIM by Clancy Construction, thus addressing the issues identified previously by Eastman et al (2011) and Barison and Santos (2010).

In addressing these issues, this paper commences with a review of previous BIM educational initiatives between industry and academia, followed by an overview of the Design & Build project and a review of the approach adopted by WIT in completing the student BIM project. The main lessons learned for both industry and academia are then reflected upon and future plans for progressing this partnership and BIM education at WIT are identified.

BIM AND AEC EDUCATION

It is clear that Universities and Institutes of Technology have a significant role to play in the successful adoption of BIM by the national and global AEC industry. The need to ensure that graduates at all levels have the specific skills sets for a BIM enabled world presents many challenges to those involved in higher education. While the adoption of the new software into the curricula for each individual discipline may be relatively straightforward, achieving
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