

# A Collaborative Academia-Industry Approach to Developing a Higher Education Programme in Building Information Modelling

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## ABSTRACT

Building Information Modelling (BIM) refers to a new collaborative way of working, which places a digital model at the epicentre of the construction process to inform decisions during the entire lifecycle of a project. In the UK, BIM Level 2 is now a mandatory requirement for all centrally-procured government projects. This is not the case in Ireland but there is evidence that clients are driving this transition via the inclusion of Employer Information Requirements in design-phase tender documentation. This move towards BIM Level 2 poses a number of challenges as it marks a significant shift from the way a project has been traditionally procured, designed, constructed and operated. In this challenge lies an opportunity for the higher education sector to respond by developing appropriate learning opportunities, both for students and industry stakeholders. This paper will chart how a close collaboration between the Galway-Mayo Institute of Technology (GMIT) and the RPS Group facilitated the development of a flexible higher education programme in BIM.

## KEYWORDS

BIM, BIM Level 2, Building Information Modelling, Education, GMIT, Pedagogy, RPS

## INTRODUCTION

The 2011 UK Government Construction Strategy (UK Cabinet Office, 2011) challenged the construction sector to review their business models and practices to move away from adversarial relationships to collaborative ones and to identify cost reduction and innovation opportunities within the supply chain to provide better value for money. This approach encouraged all construction supply chain stakeholders to work together, where appropriate, to provide an integrated cost-efficient solution that meets the required outcome. Central to this strategy aim was that fully collaborative 3D Building Information Modelling (BIM) (with all project and asset information, documentation and data being electronic) be an industry requirement by 2016. This target provided the UK construction sector with a four-year window to prepare for the adoption of BIM technologies, processes and collaborative behaviours that aimed to modernise working practices to improve efficiencies during each phase of the project lifecycle. This was further framed by the following ambitious targets set out in the subsequent 2025 Construction Strategy document (HM Government, 2013): reduction of 33 per

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cent in the initial cost of construction and the whole-life cost of built assets; 50 per cent reduction in the overall time, from inception to completion for new-build and refurbished assets; reduction of 50 per cent in greenhouse gas (GHG) emissions arising from built environment activities; and a 50 per cent reduction in the trade gap between total exports and total imports for construction products and materials.

In response, an Industry-Government BIM Task Group was set up to develop the necessary implementation guides, tools and industry standards and engage in continuous dialogue with public sector clients and supply chain stakeholders to ensure that the sector was prepared for the 2016 BIM deadline. This has led to a series of publications, which have: aligned BIM with the Royal Institute of British Architects (RIBA) Outline Plan of Work (RIBA, 2012); specified the information management requirements for the capital/delivery phase of construction projects using BIM (PAS 1192-2: 2013) (British Standards Institution (BSI), 2013); set out the standard protocol for use in projects using BIM (CIC, 2013a); provided best practice guidance for professional indemnity insurance when using BIM (CIC, 2013b); specified information management requirements for the operational phase of assets using BIM (PAS 1192-3: 2014) (BSI, 2014a); defined expectations for the exchange of information through the lifecycle of an asset using COBie (BS 1192-4:2014) (BSI, 2014b); provided recommendations for briefing during the design and construction phases to ensure that the design takes account of the expected performance of the asset over its planned operational life (BS 8536-1:2015) (BSI, 2015a); specified requirements for security-minded BIM, digital built environments and smart asset management (PAS 1192-5: 2015) (BSI/CPNI, 2015); provided guidance of the collaborative production of architectural, engineering and construction information (BSI, 2015b). In addition, the 2015 UK Government strategy, *Digital Built Britain* (HM Government, 2015) provided a vision of a data-enabled collaborative working environment where supply chain capabilities are maximised to reduce lifecycle costs and carbon emissions. This aims to improve asset management and form the basis of new performance contracting models utilising remote monitoring, telemetry and control systems to facilitate real-time operation integrating exciting developments in 3D printing, design for manufacture and assembly (DfMA), the Internet of Things, embedded sensors and performance data analysis.

Although this extensive development and dissemination of BIM-related documents and standards has provided some much-needed guidance for the sector, there still exists a number of unique challenges in regard to organisational culture, education, training and information management as identified by Khosrowshahi and Arayici (2012). The most recent NBS UK National BIM Survey (RIBA Enterprises Ltd., 2015) provided a more in-depth analysis of these challenges and found that: a lack of in-house expertise; a lack of training; no client demand; cost; and no time to get up to speed, were the main issues. Interestingly, despite these perceived barriers, 92 per cent of respondents stated that they expected to be using BIM within three years. This aligned with the view that BIM is the future of construction information (77% agree). However, a clear gap in understanding was highlighted with 67 per cent of respondents agreeing that the 'industry is not clear enough on what BIM is yet' and only 25 per cent stating that 'they trust what they hear about BIM'. These findings suggest that while considerable progress has been made to date, the sector is currently at the midpoint in the adoption curve (Rogers, 1962).

In Ireland, the *Construction 2020* strategy (Irish Government, 2014) recommended the implementation of a staged development programme to support companies advancing to Level 2 BIM capability. In response to this, Enterprise Ireland launched a funded BIM-Enable and Implement programme in late 2014 to provide two levels of support: a week-long strategic introductory training phase; followed by a specific company training phase facilitated by an appointed BIM specialist. The aim of the programme is to embed BIM skills, knowledge and competences across individual organisations and the whole construction supply chain. The same challenges that were identified in the UK (RIBA Enterprises Ltd., 2015) were reflected in the responses (n68) to a 2015 Construction IT Alliance (CITA, 2015) survey of Irish stakeholders where cost, no client demand, lack of in-house

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