Chapter 12
The Evolving Integration of BIM Into Built Environment Programmes in a Higher Education Institute

Mark Kelly
Galway-Mayo Institute of Technology, Ireland

Mark Costello
RPS, Ireland

Gerard Nicholson
Galway-Mayo Institute of Technology, Ireland

Jim O'Connor
Galway-Mayo Institute of Technology (Retired), Ireland

ABSTRACT

The recent publication of the Roadmap to Digital Transition for Ireland's Construction Industry 2018-2021 clearly identified training and education as key priorities in the development of core BIM competences to stimulate the transition towards a more collaborative digital working environment. It identified an urgent need for a consistent and coherent digital experience for students in Irish education and industry to help grow capacity and maturity in the use of BIM and other innovative techniques. The higher education sector has a vital role to play. Key to this will be ensuring appropriate graduate knowledge, skills and competences, ongoing professional development and upskilling of higher education staff, and significant collaboration with industry. This chapter will present a best practice example of academic-industry collaboration, which resulted in the delivery of a flexible Level 8 programme for industry, the implementation of a BIM strategy within an academic context, and the establishment of a focused research group, which is currently engaged in ongoing applied research.

INTRODUCTION

The World Economic Forum (2016) has identified the need for the construction sector to drive a transformation that will initiate a mindset 'breakthrough' in relation to technology, materials, and tools; processes and operations; strategy and business model innovation; people, organization, and culture; industry collaboration; joint industry marketing; regulation and policies and public procurement. The World Economic Forum (2018) also presents a vision of 'building in a virtual world' where automation, robotics, connected systems and cloud technology permeate daily life and industries of all kinds resulting in digital technologies replacing manual work and Artificial Intelligence (AI) led design and engineering processes creating 7D lifecycle asset models including 3D object data, scheduling (4D), cost (5D), sustainability (6D), and operations and maintenance (O/M) (7D). Building Information Modelling (BIM) is identified not only as a key enabler for collaboration and efficiency but also as a facilitator to utilize other exciting technological applications (3D printing, robotics, augmented and virtual realities and artificial intelligence) in these possible future scenarios. The digital transition presents enormous challenges for the built environment sector, which are further accentuated by the ongoing talent shortage resulting from a failure to innovate, competition from other industries, conservative work cultures and ongoing image difficulties (World Economic Forum, 2018). Historically, the hesitation to fully embrace change and innovation has seen productivity stagnate and even decrease over the past 50 years (World Economic Forum, 2017). In Ireland, the recent publication of *Building Future Skills: The Demand for Skills in Ireland's Built Environment Sector to 2030* (National Skills Council/Expert Group on Future Skills Needs, 2020) has clearly identified the increasing importance of BIM and digital construction (including virtual, augmented or mixed reality; mobile technology; smart sensors; artificial intelligence, blockchain, drones etc.), which is creating an urgent need for additional upskilling and retraining to respond to these trends. The report found that the top three roles that were most difficult to recruit were Quantity Surveyors, BIM Operators/Experts and Mechanical or Electrical Engineers.

However, evidence suggests that the recent evolution of digital technologies and applications has begun to facilitate a move towards a more efficient and collaborative way of working. In Ireland, the government set out their strategy (in November 2017), for the increased use of BIM on a phased basis in the design, construction and operation of public works projects (funded up to 2021) through the public capital programme. The subsequent publication of the *Roadmap to Digital Transition for Ireland's Construction Industry 2018-2021* (National BIM Council, 2017) clearly identified training and education as key priorities in the development of core competences to enable this transition towards a more collaborative working environment. It identified an urgent need for a coherent, consistent, and seamless digital experience for students in Irish education and industry to help grow capacity and maturity in the use of BIM and other innovative techniques. Subsequent government strategy documents including the *Project Ireland 2040 National Development Plan 2018-2027* (Irish Government, 2018) have specifically highlighted the role of BIM and other technologies as key drivers to improve productivity and efficiencies in the construction sector. The higher education sector has a responsibility to respond to these trends, particularly in relation to graduate competency, knowledge, and skills. Higher education can also facilitate fertile learning spaces to experiment with and explore possible digital futures to lead this transformation. Key to this will be ongoing professional development and upskilling of higher education staff across all built environment disciplines and significant ongoing collaboration with industry. This chapter will firstly provide an overview of national BIM drivers and international BIM educational efforts to date. It will then chart the evolution of an academic-industry collaboration over the past seven years, which

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