

BIM Education

E2 *BIM Learning Providers*

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BIM IN PRACTICE



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BIM Education

E2 BIM Learning Providers

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E3 BIM Learning Spectrum

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INTRODUCTION

BIM Learning Providers are all those who provide BIM Education, training and development: universities, TAFE, professional associations, Architecture, Engineering, Construction (AEC) organisations, registered training organisations, etc. The working group conducted an initial investigation into the current status of BIM Education within academia and across professional associations. Below is a summary of the findings which influenced this position paper:

BIM EDUCATION WITHIN ACADEMIA – UNIVERSITIES

A recent study – coupled with a literature review and international interviews¹ – indicated that most universities are yet to run fully collaborative BIM courses between students of the three AEC disciplines. However, there is an increasing number of universities around the world who are (a) either currently investigating BIM Education or (b) have actively initiated a BIM-focused, multidisciplinary educational curriculum at undergraduate and/or graduate levels.

In recent months and years, BIM concepts and tools have gradually started appearing within tertiary institutions (especially within graduate programs²). In Australia, three universities (the University of Technology in Sydney, the University of South Australia, and the University of Newcastle) are currently involved in Code BIM: Collaborative Design Education using BIM³ – an Office of Learning and Teaching (OLT) project that aims to develop collaborative programs between AEC disciplines using BIM technologies and processes.

Introducing BIM Education into academia is a difficult change process and – like any major change process – it is likely to encounter resistance. Some of the reported difficulties include:

1. The difficulty of introducing new topics into an already crowded curriculum.
2. Unfamiliarity of lecturers with BIM and other fast-paced technologies and workflows.
3. Reluctance of some lecturers to alter established teaching methods coupled with an unwillingness by some to retrain in new topics.
4. Inability to bridge the traditional educational silos of architecture, engineering and construction and deliver collaborative courses and programs.

1 This is based on a recent investigation conducted by Jennifer Macdonald, an EWG member and PhD candidate at the University of Technology, Sydney.

2 For example, refer to BIM Education programmes in the UK: MSc/Dip/Cert *BIM and Integrated Design* (University of Salford - <http://bit.ly/1H1etA>), and the recently announced *MSc Building Design Management with BIM* (Northumbria University - <http://bit.ly/1H1bhe>).

3 For more information, refer to University of South Australia, *Code BIM* project page - <http://bit.ly/sZFAR>.

BIM EDUCATION WITHIN ACADEMIA – VOCATIONAL EDUCATION AND TRAINING

BIM has a potentially significant impact on the vocational education and training (VET) sector⁴ – the sector responsible for training and retraining construction industry's tradespeople (carpentry, plumbing, painting, electrical, etc) and para-professionals (architectural technology, building design, surveying, etc). VET covers a range of qualifications from Certificate II (AQF 2)⁵ up to Advanced Diploma (AQF 6). All of these VET qualifications, the industry roles they represent and the education they require, are significantly affected by BIM technologies and workflows.

First, para-professional qualifications (AQF 4-6) have traditionally generated technician level graduates within a wide range of discipline areas. With the advent of BIM technologies, many have taken the opportunity to develop into BIM specialists within their respective fields and currently play diverse and increasingly important roles. A great number of modellers, model managers, BIM project coordinators and BIM managers have their roots in para-professional education. Also, in addition to the knowledge and skills para-professionals need to operate within their chosen specialities, VET trainees must now learn how to use data-rich models and other technologies to collaborate with their peers, tradespeople, and AEC professionals. New BIM-focused courses now need to be developed to ensure para-professionals are 'industry ready' at graduation – courses which necessarily include hands-on, collaborative and multidisciplinary project work.

Second, at trade qualification levels (AQF 2-3), the increasing availability of accurate, information-rich models is starting to impact the construction site. While many in the steel detailing and mechanical ducting professions have been using 3D CAD for many years (especially for offsite prefabrication), BIM has highlighted the need for a tighter coordination between many trades and specialties. This in turn has dramatically increased the need for highly trained technicians with additional experience in model interrogation, clash detection, construction sequencing and quantity take-off. These skills should now be included in trade certificate courses so trainees benefit from available BIM technologies and can collaborate efficiently with professionals, para-professionals, product suppliers and others within the construction supply chain.

4 The VET sector includes Training and Further Education (TAFE) institutions, Registered Training Organisations (RTO)s, Continuing Professional Development (CPD) providers.

5 The Australian Qualifications Framework (AQF) is 'the national policy for regulated qualifications in Australian education and training. It incorporates the qualifications from each education and training sector into a single comprehensive national qualifications framework.' For more information about the Australian Qualification Framework, please visit <http://www.aqf.edu.au/>.

BIM EDUCATION WITHIN INDUSTRY – PROFESSIONAL ASSOCIATIONS

Professional associations can play an important role in promoting BIM Education within both academia and industry. Some of these associations provide course accreditation, certification and/or Continuing Professional Development (CPD) programs.

To develop a better understanding of the attention professional associations give to BIM Education, the EWG conducted an introductory investigation (online and phone interviews) covering 12 associations. From this initial investigation – which focused on CPD programs - we learned the following:

1. Eleven of the 12 associations offer Continuing Professional Development (CPD) courses to their members. Of these, most indicated an awareness of BIM, three indicated that they include BIM in their learning activities (presentations by guest professionals), and one association reported that they currently offer BIM-specific training as part of their CPD program.
2. Most professional associations seem to have adopted a wait-and-see approach. Some are learning from each other – especially from those who have recently developed a BIM-focused set of deliverables and most indicated a keen interest in learning more about BIM Education.

BIM EDUCATION WITHIN INDUSTRY – ORGANISATIONAL TRAINING

BIM training within organisations is another important aspect of BIM Education. Driven by immediate business benefit, many design, construction and operation companies offer their staff the necessary training to generate and share data-rich models with their project partners. Training offered – whether on-the-job or through registered training organisations – is mainly technical,

focused on cultivating the skills necessary to use BIM's ever expanding repertoire of tools and workflows. However, other types of training are less frequently provided – training which targets the soft skills necessary to manage multidisciplinary teams and deliver collaborative BIM projects (eg, team management skills, meeting facilitation, conflict resolution).

While some organisations prefer to offer their own customised, in-house BIM training, many would argue (especially those with limited training budgets) for integrating BIM Education/training within universities so students are industry-ready by the time they enter the employment market. Others would also argue that professional associations should make available non-technical BIM training for managers and senior staff (eg, project leaders, team managers). Such training is not available on demand but through irregular BIM-focused conferences and workshops.

CONCLUSION

There are many stakeholders involved in the provision of BIM Education. Within academia, universities and TAFE institutions have already started to deliver a range of BIM course offerings. Within industry, professional associations have also started – albeit slowly – to offer BIM learning opportunities to their members through their varied CPD programs. Driven by market imperatives, AEC organisations have continued to invest heavily in BIM training with a clear focus on developing staff's technical capabilities. In summary, although much progress has been made over the past few years, much effort is still needed to extend BIM education across professional boundaries and to encourage stakeholders to embrace a more collaborative approach to BIM learning and project delivery.

Summary

- EP8. BIM adoption within industry and academia is a significant change process (technical, procedural, cultural) which requires a significant investment in systems and people.
- EP9. Accreditation and professional associations should engage with universities to develop new collaborative BIM courses or to integrate the principles and technologies of multidisciplinary collaboration into their existing curricula.
- EP10. Tradespeople and para-professionals stand to benefit and contribute to BIM and its wide-ranging effect on project lifecycle phases and construction supply chains. The VET sector should incorporate data-rich models and multi-party collaborative workflows into educational curricula and delivery strategies.
- EP11. There is need to de-mystify the BIM process and develop integrated, coordinated and viable BIM training modules delivered via professional associations. These training modules should align with university/TAFE curricular and tightly complement their educational deliverables.
- EP12. There is a need for BIM-ready graduates. Availability of adequately prepared graduates will minimise (or at least refocus) the training delivered by AEC organisations.
- EP13. There is a need for regular BIM Learning opportunities and non-technical BIM learning materials, specifically tailored for senior and executive staff.
- EP14. There is a need to consider how to assess and improve the BIM knowledge, skill and experience of current professionals, para-professionals and tradespeople.