

BIM Education

*E1 BIM Education &
BIM Learners*

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BIM IN PRACTICE



Australian
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BIM Education

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INTRODUCTION

BIM is a wide array of evolving technologies, processes and policies. Identifying how to best teach or learn about BIM is still being explored by a great number of industry stakeholders. After much discussion, the BIM Education Working Group (EWG) adopted two complementary objectives. The first objective is to deliver a **Collaborative BIM Education Framework**. The second is to deliver a **BIM Education Position Paper** (this document) which describes the working group's position. Both objectives aim to:

- instigate an in-depth discussion with both academia and industry
- connect with other groups, both in Australia and internationally, engaged in developing complementary educational deliverables
- lay foundations for further work by AIA/Consult Australia and their future BIM Education partners

With the limited time and resources available to this Group, we've chosen to focus on identifying a foundational part of the Collaborative BIM Education Framework – defining the BIM Learning Spectrum (refer to **E3 – BIM Learning Spectrum** as part of this series of documents).

UNDERSTANDING BIM EDUCATION

BIM Education is the process of learning¹ the sum of conceptual and practical knowledge relating to BIM technologies, workflows and protocols. Underlying BIM Education are many technical (eg, data management), procedural (eg, team collaboration) and regulatory topics (eg, risk management). These topics need to be:

- integrated within educational curricula
- made readily available to practicing professionals

Such a broad **BIM Learning Spectrum** would serve current professionals, future professionals (current students) and the teachers/trainers who educate them (collectively referred to as **BIM Learners**).

WHY IS BIM EDUCATION IMPORTANT?

BIM Education is an effort that ranges from spreading basic awareness about BIM risks and benefits to solidifying specialist BIM knowledge and skills. BIM Education facilitates collaboration between project participants of all disciplines – and across all project lifecycle phases. BIM Education is the main communication method to spread technology-enabled, process-driven and policy-encouraged advances in design, construction and operation of facilities. It empowers current and future generations of industry practitioners to achieve increases in productivity, reduction in waste and fulfilment of an aesthetic and sustainable future.

As discussed in several national reports and international guides – refer to the *National BIM Initiative*², *BIM in Australia Report*³ and *Impacts of Building Information Models*⁴ – BIM Education is a foundational activity, a critical need for both industry and academia, and a priority due to the apparent skill shortage in this sector in Australia.

BIM plays a key role in facilitating more effective collaboration across disciplines during the full lifecycle of a building project. This relies on accurate exchange of 3D model data and associated information, either through the use of compatible proprietary software applications or the use of an open BIM standard like Industry Foundation Classes (IFC). At present this is based on file exchange, but in the future it is clear that shared BIM database servers will play a more significant role in supporting collaborative processes. This leads to a growing need for industry practitioners to be educated about collaborative work practices and processes that make use of BIM technologies. This should become a core component of professional design and construction education. It follows that Collaborative BIM Education is best developed in a cooperative manner involving all stakeholders, whether universities, TAFE, professional training associations, accreditation bodies and AEC organisations (referred to collectively as the BIM Learning Providers).

The BIM Education Working Group strongly believes that there is a great opportunity for academia and industry to work together to develop BIM curricula that reinforce the value of BIM within the collaborative work practices. We see that a cooperative approach to developing and delivering BIM Education to students and professionals would be a great benefit to the industry.

1 Refer to Bloom's Taxonomy (http://en.wikipedia.org/wiki/Bloom's_Taxonomy) for a wide definition of learning and learning objectives.

2 The National Building Information Modelling Initiative: *Volume 1 Strategy - A report for the Department of Innovation, Industry, Science, Research and Tertiary Education*, (2012) prepared by buildingSMART Australasia, but at the time of writing, not yet released publicly.

3 *BIM in Australia*, a report prepared by Star Monde on behalf of AIA/Consult Australia who conducted a number of BIM/IPD forums across Australia in October/November 2010

4 *Productivity in the Buildings Network: Assessing the Impacts of Building Information Models* prepared by the Allen Consulting Group and submitted to the Built Environment Industry Innovation Council (BEIC) in October 2010

WHO IS A BIM LEARNER?

BIM technologies and workflows affect all those involved in the design, construction and operation of facilities, ranging across design professionals, managers and tradespeople. In this position paper, we refer to all those who want to learn about Building Information Modelling – in its widest definition – as BIM Learners.

BIM Education focuses on individual learning as opposed to organisational learning. This distinction is important as most BIM guides and national workshops focus on standards, legal implications and success stories. With the exception of training focused on technical tasks, the learning needs of individual users in the midst of this BIM-led industry transformation are not well supported. This is specifically true for a great number of individuals within both industry and academia.

Within industry

- Employees of small organisations with small training budgets – these individuals will have to depend on unstructured learning from ad-hoc sources (eg, learning from internet postings, attending user-led groups, etc).
- Employees of single-discipline organisations – these individuals will need structured guidance to develop and extend their collaborative BIM skills.
- Team managers and project leaders who require – due to the nature of their roles – adequate BIM knowledge in how to manage the deliverables of staff under their guidance.
- Managers and senior managers who are tasked with leading their organisations through the ever-changing BIM landscape.

Within academia

- Students of universities/TAFE institutions who are yet to embrace BIM Education – these students may want to prepare themselves for a working environment where data-rich models and multidisciplinary collaboration is fast becoming the norm rather than the exception.
- Lecturers within universities/TAFE institutions who are yet to embrace BIM Education – these lecturers may wish to expose themselves and then their students to BIM tools and workflows.
- Deans, heads of schools and directors who are tasked with leading their schools and departments – in response to industry’s requirements – to keep abreast of collaboration technologies and workflows.
- Accreditation boards which are tasked with reviewing and accrediting universities/TAFE courses and programs.

The above simplified list highlights the varied nature of BIM Learners and their equally varied requirements. In essence, every individual who needs BIM technologies, workflows and protocols within any construction sector, at any position or role, or within a university, TAFE or AEC organisation, is a potential BIM Learner.

CONCLUSION

The accelerating proliferation of BIM within the Construction Industry prompts current and future professionals to continuously learn new technologies, workflows, and protocols. Industry stakeholders – whether they are professionals, academics or tradespeople – need to unceasingly match their knowledge and skills with evolving market requirements. All need to learn and all need to educate others.

BIM Learning includes all those affected by BIM concepts and tools; whether they are students or teachers within tertiary institutions; professionals within AEC organisations; or tradespeople on the job site. BIM Education is the sum of all these individual learners, the BIM topics they need to learn and the learning materials they require.

Summary

- EP1. BIM Education is the shared responsibility of academia and industry
- EP2. BIM Education addresses the requirements of current professionals (irrespective of formal qualification), future professionals (students) and their teachers/trainers
- EP3. BIM Education encompasses all modes of BIM Learning (tertiary courses, industry workshops, online media and on-the-job training)
- EP4. BIM Education ranges from spreading awareness to developing highly specialised skills

- EP5. BIM Education should be made available to all those who need it in formats which are mindful of their respective disciplines, specialities, roles, education and experience levels
- EP6. Collaborative BIM Education should be developed and delivered collaboratively
- EP7. Every individual within the construction industry is a potential BIM Learner, and every BIM Learner is a potential BIM Learning Provider