



BIMcert News #07 January 2020

BIMcert - Developing BIM training and promoting energy efficiency for the European construction supply chain.

Breaking ground – The BIMcert Journey

Our BIM journey to date has been a long, eventful and very rewarding one for all the partners and extended network since we first targeted H2020 as the vehicle to promote our BIM work way back in March 2015.

Our goal was, and continues to be to provide an industry focused programme of progressive training materials that would address the skills needs in the construction sector enabling them to address energy challenges across the entire supply chain. The project would be delivered in a structured 'open' format and is accessible to all sections of the construction supply chain to achieve excellence, impact and sustainability.

The success of our bid for funding under call H2020-EE-2017-2017 (Energy Efficiency Call) in October 2017 was a first in many ways. It was the first H2020 success for Belfast Met and many of the project partners. Indeed it still is the first H2020 success for any FE College in the UK. This success was built on the three key pillars of the project, partnership, meeting industry need and providing open access. Testimony to our success is the breadth and depth of the BIMcert partnership.

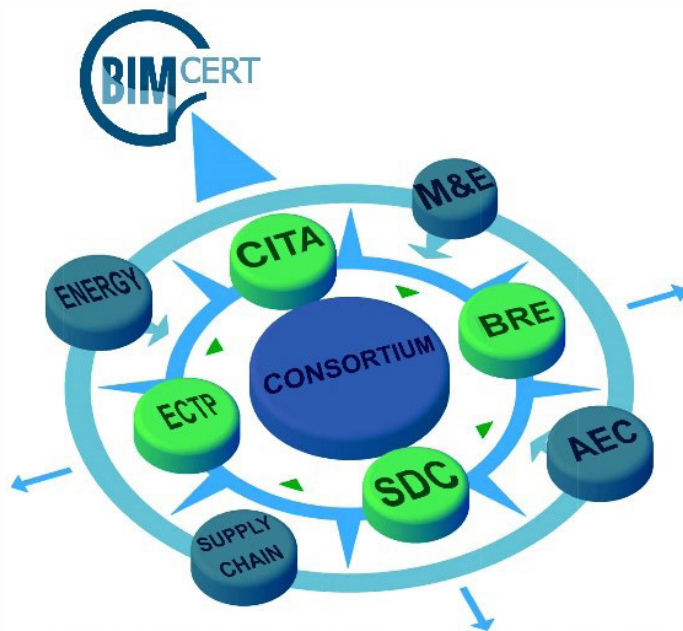
From the seven Core Application Partners (CAP), the Industry Advisory Partnership (IAP) led by O'Hare & McGovern, the Technical Advisory Partnership (TAP) led by Dr James Harty in the Copenhagen School of Design & Technology, to the wider support network encompassing many public bodies and authorities across Europe including Invest NI and Enterprise Ireland.



BIMcert Project Partners



It is this network that populated our innovative **BIMcert Strategy Compass**, providing information and advice from key target groups, alignment with industry needs, informing decision-making. Aligning strategic direction and enabling a process of continual evaluation; resulting in the development and delivery of highly successful training and delivery.



Embedding BIM skills within construction, targeting the entire design chain, material life cycles, energy production/consumption and sustainability

- Industry Advisory Panel (IAP)
- Technical Advisory Panel (TAP)
- Core Application Partners (CAP)

Technology is disrupting the construction Industry. **70% of construction** companies believe that those who do not adopt digital tools will go out of business. Data is recognised as crucial to building a smart system that supports achieving decarbonisation objectives. Data and digitalisation has revolutionised the way many sectors operate. From healthcare to finance, data is acting as an enabler for change. However the construction sector has been slow to harness that potential and in some ways, been left behind. Digital Transformation, with BIM as a key component and the enabler is helping to change things.

Transforming the EU Construction Sector to be greener, consume less energy and to reduce the carbon footprint of the sector is being driven by the twin forces of digitalisation and legislated carbon reduction targets. BIMcert has delivered ground breaking results across the construction sector. The BIMcert project has worked and contributed to achieve a positive impact in changing and upskilling the AEC sector (Architecture, Engineering and Construction Industry) and to provide a framework and tools for continued enhancement of the industry in the future.

BIMcert is providing teaching material that will help enable companies to gather, organise, store and extract value from

the data, leading to greener construction and paving the path towards net zero carbon footprints in construction.

BIMcert is a repository of accessible learning materials addressing the issue of energy usage in building and construction and how BIM can help industry become more efficient and usable by all stakeholders.

We have developed proactive industry engagement tools with bite sized training modules and blended delivery mechanisms. BIMcert targeted the core problems hindering the AEC sector towards embracing digitalisation, reducing inefficiencies, and delivering enhanced energy savings across the spectrum.

BIMcert has developed a range of online training modules specifically designed to provide: recognition of inherent skills; vocational mobility; and a potential mapping framework for a BIM learning pathway for all workers in the building supply chain, which is an alternative to the traditional offering from higher education providers, usually open only to a selected few.

The BIMcert curriculum developed within the project has focused on a holistic approach to BIM, providing upskilling to all industry from the ground up. This approach is based on the acknowledgement that BIM can only achieve full potential as an energy efficiency enabling tool if it is adopted by all stakeholders and the entire supply chain.

In recognising the impact of the BIMcert project Amandine Lacourt Project Adviser, Executive Agency for Small and Medium-sized Enterprises stated **“The BIMCert digital bite-sized training and micro-accreditation system is a powerful tool for professionals of the building value chain to get their skills recognised and valued by the market. This can be expected to give significant traction to sustainability related skills in the AEC industry.”**

In addressing the EU need BIMcert was cognoscent of the different levels of BIM maturity and implementation across European regions, and the vast difference in BIM knowledge depending on the user. Therefore the BIMcert units covered all concepts, theory, terminology, application, benefits, and standards as the foundation first step in the upskilling pathway. This approach has enabled all stakeholders to achieve a common platform, to communicate and share data under common procedures and to embrace the benefits of upskilling to improve the overall AEC (Architecture, Engineering and Construction Industry) sector.

BIMcert training modules have been developed in strides (rounds) with the 1st Stride focused on providing an awareness of how BIM can help drive and be used by the AEC industry towards achieving a more energy efficient building stock. These strides have been divided into units, which in turn have been broken down into bite-sized modules (micro accreditations). The



Using BIM to manage the Energy Cycle in construction

BIMcert curriculum framework addresses, for example:

- BIM concepts and principles, including terminology, standards, benefits and barriers, always with an approach towards linking it with energy efficiency and the goal to drive the AEC (Architecture, Engineering and Construction Industry) to produce a more energy efficient building stock and transform its own processes and procedures toward a greener workflow
- IT and digitalisation tools and procedures, to bring all workers up to speed and enable them to operate within BIM
- Practical BIM skills such as modelling and object creation, data input, interoperability, data input and sharing, information access and review, including clash detection and simulations.
- Energy and construction concepts and correlation with BIM tools and methodology, in order to facilitate and operate as an enabler of energy efficiency Modules have been organised further into training plan, to provide a structured pathway for learners, and some of these training plans and BIMcert units are recognised as a formal Qualification into a national framework.

However, BIMcert also empowers learners to create their own pathways via the micro modules, to address their own individual skills gaps, as and when they are required in their workplace therefore providing a more flexible, bespoke and personalised learning solution for the industry.

In order to address both blue and white collar workers and to make the training open, accessible and adequate as vocational training, the academic level of the training was set at EFQ Level 4. This also enabled us to facilitate suitable online assessments, which could be acceptable to awarding bodies, for accreditation and certification of qualifications.

As we now move beyond the end of the BIMcert project we have developed a comprehensive sustainability and exploitation plan, to continue on the digital transformation



Digitalisation - a vital enabler of Net Zero Construction

pathway. As part of this plan we have extended beyond the present partners and joined with several other EU BIM and digital transformation projects to form BIM Alliance. This alliance of 100 partners across 24 EU countries have shared resources to create a digital library of tools, modules and blended materials supporting digital transformation in the built environment. This alliance will continue to stimulate and support the demand for sustainable energy skills in the construction sector by providing clear upskilling transactions and recognition of upskilling performed.

A key goal for this partnership is to establish a virtual Centre of Excellence for Digital Construction. This Centre will establish a Skills Hub to deliver BIM training, accreditation, digital certification of skills and deliver our innovative EU-wide BIM Passport. It would also seek to promote and enhance the use of digital skills, share knowledge, best practice, inspire collaboration and showcase new opportunities in digitalisation of construction. Through EU-wide collaboration it would also support smart construction, Digital Technologies and High Performance Buildings. The primary aim of the Centre of Excellence for Digital Construction is to seek to inspire demand for the sustainable energy skills, by providing clear upskilling transactions and recognition of upskilling performed in the digitalization of the construction sector.

Paul Mc Cormack,
Project Coordinator
BIMcert

Technological University Dublin - BIM success at home and abroad

Among those picking up gold at the recent World Skills professional education competition in Kazan, Russia, was Ryan Dempsey from Technological University Dublin, and Luke O’Keeffe of Waterford Institute of Technology in the Building Information Modelling (BIM) contest. While not yet officially part of the competition, it is one of a group of ‘Future Skills’ trialed alongside this year’s event. The BIM competition was held in the Future Skills Zone, a specialised zone for showcases and competitions in skills, which are in demand in the era of high-tech production and digital economy.

The competition was held over three days and consisted of six modules of understanding a BIM execution plan and setting up of a common data environment, architectural modelling, structural modelling, BIM coordination, corrective modelling, and visualisation. The project was delivered using a BIM execution plan and working from CAD drawings of the design that were to be developed into a 3D model fit for construction. On the final day the model was coordinated against a supplied Mechanical, Electrical, Plumbing model, which was used to clash against the architectural and structural models with the goal of submitting a federated clash-free model to the judges.

Ryan and Luke both had the opportunity to share their experiences with a broader audience at the Construction IT Alliance (CitA) BIM Gathering held in Galway on September 26th, 2019.

The BIM Gathering had over 350 attendees with eight keynote messages and almost 50 additional presentations. The conference presented the opportunity for like-minded individuals from across the country to learn, discuss thoughts, network, share ideas, create ideas, and ignite motivation to use BIM in their everyday business.

The presentations covered a variety of BIM related topics but collectively had a common theme that BIM can deliver better project outcomes for Irish Construction. BIMcert partners Dr Avril Behan and Dr Barry McAuley both presented at the conference. Barry presented his paper titled “Improving the sustainability of the built environment by training its workforce in more efficient and greener ways of designing and constructing through the Horizon2020 BIMcert Project.”

The paper and presentation discussed how the developed training material now available on the BIMcert platform will assist in the training and education of construction professionals in more sustainable and rewarding practices. The CitA team have also published the BIM in Ireland 2019 report, which further shines a light on how the industry

continues to mature in the use of BIM. The report and conference proceedings can be purchased through CitA.

Dr Barry Mc Auley
Lecturer in Digital construction and Engineering,
Technological University Dublin



Ryan Dempsey, Technological University Dublin,
BIM student



Pictured speaking at the BIM Gathering event in Galway is Dr Avril Behan, Director and Dean of the College of Engineering and Built Environment at Technological University Dublin

Croatian construction company shows how it moved to BIM

I had the opportunity to experience the real life implementation of BIM in a small/medium sized construction company in Croatia called DOMUSplus Ltd. It specializes in the construction of prefabricated energy efficient single family homes in Croatia. I interviewed company co-owner and director Mr. Hrvoje Kuretić.



Mr. Hrvoje Kuretić, Director, DOMUSplus Ltd. Croatia.

Toni: Your company has grown significantly in the last five years?

Hrvoje: Since 2006, when Domusplus was established, we have had continuous growth of 30% annually. It has been particularly strong in last two or three years, when our capacity increased from twenty units annually to fifty or sixty. Our production isn't actually measured in number of units (family homes) anymore, but in total built area. Last year's output was 7.000 m² of houses. This year, it will be 8.000 m², and next year's goal is 10.000 m². We also built a new production facility, bought new equipment, and actually doubled our capacity compared to a few years back. Processes which took two or three days are now completed in literally two to three hours – just sending the file to the factory, having someone to feed the material in the machine which automatically draws. We employ over 50 people, which is a large number for us.

Toni: This is automated, or semi-automated production then? Have the processes in the company been structured from the beginning, or are you adapting them as you go?

Hrvoje: Two years ago, the BIM idea emerged here, and we invested in software purchase, specialized software for the production of prefabricated wooden buildings. Primary to this it was SEMA software – specialized software for wooden prefabricated houses, which covers the development of prefabricated constructions, walls, slabs, roofs. The software is linked to machines in our factory and the software investment amounts to approximately 100,000 euros and now we are seeing payback on our investment. Two years ago we initiated the project which will incorporate the entire process from the initial idea developed in ArchiCAD through Dlubal

software for construction analysis, further connected to production development software. We are using the single architectural model for construction and workshop drawings and with two clicks we can produce final plans within 30 minutes. This is still an idea but I hope it's going to become operational by the beginning of next year.

Toni: So, all the business processes in the company are connected through BIM. You connected the preliminary plan to production, cost estimates, time planning.

Hrvoje: Yes, one thing follows the other.

Toni: I know that you are building physics calculation within the national regulation. Are you preparing yourselves for energy simulations, the optimization of the building fabric regarding the energy demands? The BIMcert project addresses that particular issue in training for increased energy efficiency in the entire construction sector production chain.

Hrvoje: Regarding the thermal insulation, I don't think there is much space left for energy efficiency improvement in our buildings. Our calculations confirmed that there is no use for additional thermal insulation and thicker building fabric because the cost outgrows the benefits. The standard wall we are offering is 38 centimeters out of which 35 is thermal insulation. Thickening the insulation increases cost while the energy consumption reduction isn't an equivalent. This is where building technical systems as heat recovery or heat pumps significantly improve building energy balance.

Toni: You are using the technical systems to further reduce the energy consumption. Would it be interesting to try to reduce the insulation to reduce production costs and life cycle costs of the building?

Hrvoje: I believe this is suitable for larger buildings. Changing the production processes on single family houses isn't financially acceptable. We tried this and simulated other construction materials which might reduce the wall thickness and increase the usable building area but abandoned further research because of unavailability of materials.

Toni: How did you organise worker training and transition to BIM during the BIM implementation in the company?

Hrvoje: Initially we organized archi CAD training in a duration of 60 hours, which actually took twenty 3-hour lectures, depending on worker and time availability. We are developing templates for our houses (building fabric) which will be applied to all our projects from the beginning of next year.

Toni: Do the subcontractors require an exchange of digital information or request BIM?

Hrvoje: Generally, subcontractors don't, but designers do. We just had a meeting with mechanical engineers who are also implementing BIM and we have to work in close cooperation. They are using Revit, So, it would be good that we define penetrations through walls, beams for ventilation, other mechanical systems, and prepare for that in factory production of building components. Mechanical engineers, as I see it, will soon implement BIM, electrical engineers and others a bit slower.

Toni: You seem to be specific in having BIM implementation because your buildings are a modular product which



Example 1 - DOMUSplus Ltd

can be very well coordinated through BIM, but the final works are still open ended - I would say traditional?

Hrvoje: Unfortunately, we haven't yet met the contractor prepared to work the other way. The large construction companies and large projects have BIM as mandatory condition. Our product is single family home - we can make it without it, but we are trying to implement BIM in time and get ready for the change.

Toni: When organising the training, how did the workers react to it? 60 hours is a significant time considering the workload and their private life? How much of their own time were the workers ready to invest in learning?

Hrvoje: Exactly. A decision on training in work time or free time is always hard. Half of the team were more inclined to do the training in their free time, and the other half wanted to do it during the working hours. Finally a majority agreed on training on Friday before closing time. I'm informed that everybody used additional training options in their free time - YouTube videos, tutorials, online examples and other informal education which we sometimes don't track.

Toni Borkovic
Senior Researcher,
EIHP, Croatia.

Future Analytics trials and testing for the new BIMcert training platform a success

BIMcert partner Future Analytics launched the BIMcert webinars for trainees on November 5th, 2019 at Technological University Dublin. We have utilised our experience as Trials and Testing work package leads on various H2020 European Commission projects.

Since Autumn 2018, FAC have conducted three phases of workshops with stakeholders. Their feedback has been integrated into changes to enhance the current content, delivery approach and usability. FAC conducted three webinars for trainees presenting the BIMcert training platform, learning materials and modules adaptable to each learner's needs and career pathways.

A separate webinar for trainers was organised. Based on the end users' desire to have more interactive one-to-one discussions, Virtual Face to Face Sessions were held to give learners the opportunity to discuss doubts and queries related to the platform, modules and learning materials with lecturers from Belfast Met and Technological University Dublin.

Furthermore to ensure access to BIMcert across the supply chain, Practitioner Pop Up events were

conducted for skilled trades people in Dublin and Skopje with the view to carrying this out in Belfast, Lisbon and Zagreb. The aim is to familiarise skilled tradespeople with BIMcert, its scope and showcase the training platform as a tool for upskilling. With close collaboration with the partners, FAC have successfully concluded the Trails and Testing Work package and are now progressively completing the final review and report.

Mallika Singh
Research Officer, Future Analytics, Dublin



Skilled tradesmen at a BIMcert practitioner pop up held in Skopje, Macedonia.

Overcoming Resistance to BIM – Change Management with a BIM Strategy Roadmap

Over the past year Sarah MacLoughlin, BIM Co-ordinator and architectural technologist at Kavanagh Tuite Architects has been researching, ‘How can small to medium size companies within the AEC industry in Ireland deal with both organisational and individual resistance to the implementation of the BIM process in practice?’ Sarah who was a speaker at the CITA BIM Gathering event writes for BIMcert News:

The adoption of Building Information Modelling (BIM) in the Irish construction industry has risen from 10% in 2011 to over 70% in 2018. Where there is criticism towards BIM concerning its ability to reduce environmental impact, it is not about the ambition to adopt BIM but more so the capacity to embed BIM within the industry (NBS, 2018). The National BIM Council introduced a Roadmap to Digital Transition for Ireland’s Construction Industry 2018-2021, which defines a strategy to transform the construction industry to digital.

Research has been carried out to explore how small to medium size companies within the Architectural, Engineering, and Construction (AEC) industry in Ireland can respond to both organisational and individual resistance to the implementation of BIM processes in practice. A literature review and stakeholder interviews from organisations at various stages of implementing BIM has demonstrated that to change how the industry works there must be an overall goal to adopt BIM.

In order to achieve business goals, it is important to investigate change management processes

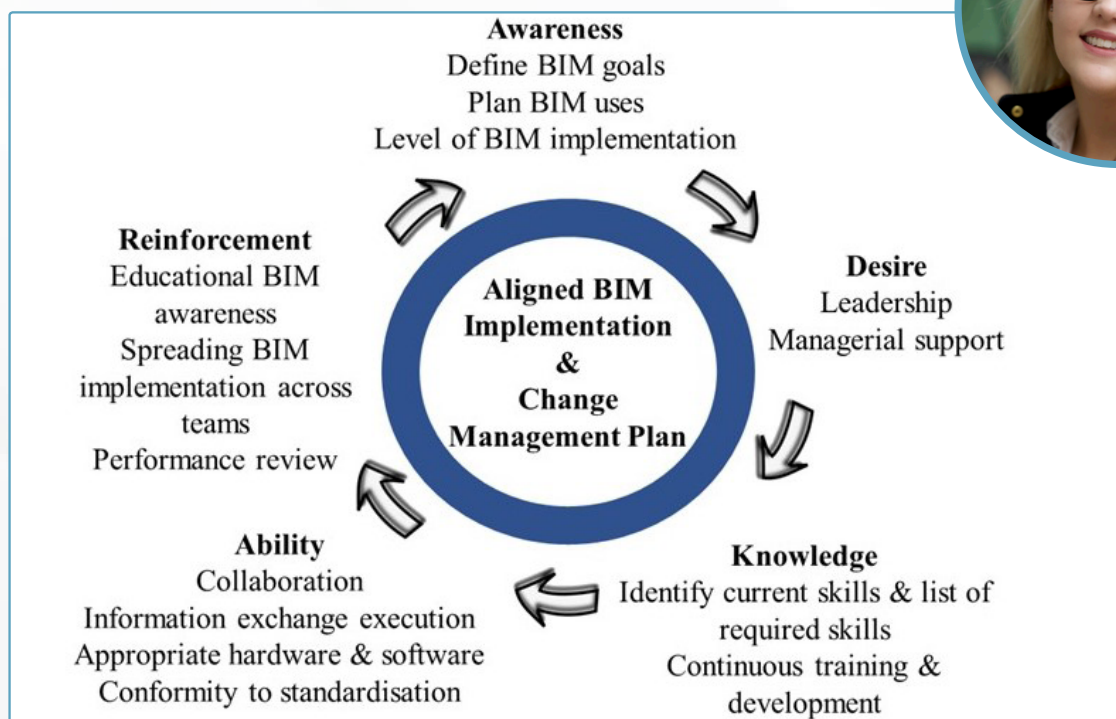
which can support the reduction of resistance from employees. While it has been found that implementation needs to come from a bottom-up approach, more importantly it is top-down from management that will make BIM practices the norm.

As a response to the industry’s introduction of BIM and the transition to digital, companies are embarking on organisational change through the review of business structures and operational strategies. To reduce resistance companies have come up with new approaches, such as introducing an implementation team, developing training programmes, and altering the organisational structure with new roles and responsibilities.

The consensus from the interviewing process outlined that BIM is a significant change to the daily operation of SME practices in Ireland, and that it is a change that must be carefully managed in order to avoid resistance. A BIM adoption roadmap that aligns change management methods with a BIM implementation plan can bridge the gap and ensure that BIM becomes commonplace within an organisation.

Sarah MacLoughlin,

**BIM Co-ordinator and Architectural Technologist,
Kavanagh Tuite Architects, Dublin**



BIMcert Key Achievements

