

**CHOB****E**

Council of Heads of the Built Environment  
Heads of Department of Construction,  
Property and Surveying

@iBEE2019

**Digital Futures? Built Environment 4.0  
Innovation in Built Environment Education  
Conference 2019  
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4/5 July 2019**

Abstracts iBEE2019  
Book of Abstracts

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# Abstracts iBEE2019

## Presentations.

Dr. Kevin Thomas, Teesside University.

PropTech in the Curriculum – an Easy Fit?

It is difficult for those working in the sector to go through a day without hearing reference to PropTech and technological change is taking place at an unprecedented level with increased investment and rapid advancements. RICS has therefore identified PropTech as a strategic initiative and there is already evidence of disruption, the majority of it positive, within the profession. Teesside University, along with a number of other stakeholders, undertook a survey in 2018 on behalf of RICS looking at its adoption and wider understanding within the sector. This presentation will consider the results of that survey and the implications for built environment higher education. There is a need to ensure that our graduates are “future fit” and have appropriate employability skills and attributes but this development around PropTech appears to fall into the education/training debate. It will also consider current technology and products that can be introduced into curriculum to expose students to those most commonly used.

Chris Mason, University of the West of England

Would building and property students’ benefit by having access to recorded lectures (lecture capture)?

There is a recognition that how university students engage with their studies is changing. Leadbeater et al (2013) state that the use of lecture capture (LC) as a supplement to lecture attendance is popular with students. Wylie’s article (FT 5<sup>th</sup> March 2017) considers the use of virtual classrooms for on-line MBA courses. A conclusion that could be drawn from the article is that in the medium-term virtual classrooms maybe more mainstream.

This research considers building and property students’ use of LC. Is the simple recording of a traditional lecture or tutorial to attending students the most appropriate method? The research acknowledges and considers the different motivations students have for using LC. This may be particularly pertinent to students where English is their second language. With this in mind the questionnaire was designed to establish this important fact.

The main aim of the research is to consider the hypothesis that all building and property students would benefit from having the ability to review lectures and tutorials. An understanding of how specific student groups use lecture capture will contribute to the formulation of a university’s digital learning environment strategy.

Emma Mulliner, Yog Upadhyay, Tasnim Ahmed, Eamonn Kirke, Prof. Shiv Prasad Singh, Dr. T. P. Singh, Liverpool John Moores University and Amity University

Teaching law to non-law students

Law is often taught as part of built environment programmes, as well as on many other non-law degree programmes. However, teaching law to non-law students can present unique challenges. Research suggests that non-law students often struggle with understanding sophisticated legal principles and terminology, the amount of reading required (Allen, 2007; Kariyawasam & Low, 2014; Monseau, 2005) and may not necessarily have the same intrinsic interest in the subject as law students (Allen,

2007; Owens & Wex, 2010). This can sometimes lead to low levels of student engagement, performance and satisfaction in law subjects.

Accordingly a small research project was initiated within the department of the built environment at LJMU, which aimed to explore the issues around the delivery of law modules to non-law students and identify areas for improvement. This was conducted as part of a curriculum enhancement internship. An online survey was utilised to gather the perspectives and approaches of academics from several Universities across the UK. This was followed by a survey conducted with built environment students at LJMU, to gather opinions on their experiences and preferences with regard to delivery and assessment of law subjected. This involved gathering student views on how digital technology can be utilised to enhance their learning experience. The findings of the surveys will be discussed and compared, with recommendations for practice provided.

**Dr Hamid Jahromi, University of Westminster**

**Innovative Active Learning in Built Environment Education through Game-based Learning and VR**

Student engagement is the key to their success in higher education and it is crucial that learning activities are innovatively designed to maximise this. Indeed, It is of vital importance to engage in innovative development, design and delivery of degree programs in built environment education that i) encourage and support high quality teaching, ii) make sure that teaching is informed by research and best practice iii) facilitate practical training which is applicable to teaching built environment to better equip the students dealing with the complex and dynamic facets of the modern construction industry.

Here, innovative “Active Learning” strategies, such as game-based learning and problem-based learning using Virtual Reality (VR) in Built Environment education are presented and their effectiveness is investigated. This is based on Constructivism learning theory which is a paradigm where the learners are an active constructor of their cognitive knowledge of the subject and the teachers are active facilitators in this process. Where, learning is rather an individual learner (or a group of learners) actively constructing meaning and designing order out of existing pool of knowledge, range of facts, explanations, scientific experiments, etc.

The innovative game-based learning strategies proposed here are based on experimental learning/gaming model which is based on experiential learning theory. The importance and benefits of providing the learners with clear objectives, challenges and instant feedback that are linked directly to their level of skill and knowledge is discussed. In this context, the possible application of BIM and VR in facilitating Built Environment education is discussed.

**Emma Love, Birmingham City University**

**An Analogue Alternative**

The built environment is fully committed to the new chapter of this digital world. As educators we also embrace technology through our commitment to BIM and a whole host of new technology to support our students to enter the industry with competent skills. But is it time to completely rely upon technology? Are we removing the opportunity for creativity?

This presentation will look at an analogue approach taken to deliver residential surveying and building pathology to give students the opportunity to return to a creative base. This approach produced some outstanding work from students and a follow up survey asking them, this generation of millennial students, about their experience, also produced some interesting data.

I will share my use of Rich Pictures and my findings, from the student cohorts, with others to see if there is still some benefit to retain a non-technology approach in the education of the future built environment students and ask the question – is analogue really dead?

[T. E. Butt; A. Macfadyen; J. Khaliq; H. M. Gouda, Northumbria University \(in Newcastle\) and University of Wollongong in Dubai, Australia](#)

Industry Placements in the Built Environment – ‘Internal’ and ‘External’ to a University

This paper contains a number of real-world, authors’ first-hand experienced case-studies which describe how industry placement opportunities can be generated and delivered both external and internal to universities in an innovative manner. The first-hand experiences in this regard at Northumbria University will be shared regarding overcoming shortage and/or ‘infeasibility’ issues around industry placements for students by creating consultancy projects ‘in-house’ i.e. within the university. Some of these experiences fall in the Built Environment in general, while others, specifically in digital engineering such as BIM/M (Building Information Model/Management).

Furthermore, the paper presents an innovative conceptual model (developed by the authors) describing potential of universities to operate more productively along the three dimensions of ‘Teaching’, ‘Research’, and ‘Commercial, Enterprise and Consultancy (CEC)’ in varying combinations. On one-to-one basis, the model is also mapped against the three contemporary ‘gauges’ of Higher Education Institutions (HEIs) including TEF(Teaching-Excellence-Framework), REF(Research-Excellence-Framework) and KEF(Knowledge-Transfer-Framework), respectively.

The paper illustrates ways in which the aforesaid three dimensions can feed to and off each other – universities ‘hitting the three birds with the same stone’. An account of some of the challenges in balancing these and a number of other implications is also addressed. For instance, funding arrangements/possibilities; differences between under- and post-graduate students; preparing students for professional presentation to international-exposure / global audiences; first building confidence via subjecting to ‘in-house’ university audiences and then external. This will demonstrate avenues to employing the three-faceted model for more effective and efficient contribution to the student experience, student outputs and internationalisation.

[Nick Moore, University College of Estate Management](#)

Developing Future Online Education for the Built Environment

With online and blended education proposed as a more mainstream delivery approach, this presentation will provide a case study of online education practice at UCEM, and an overview of the current review of its education provision.

In the last four years UCEM has pursued an online-only delivery approach to its built environment programmes. During this time, it has learnt a series of lessons from delivering online modules to cohorts of up to 600+ students. There have been

successes and failures, with data analytics providing insight into students' patterns of study. Module tutoring models have gone from small group support with assigned tutors, to large groups with teams of tutors, through to the introduction of specialist facilitators supporting study on all modules. UCEM now has 4000+ students studying roughly 50:50 on UG/PG built environment degrees.

In a transformational project, UCEM is revising its semester delivery and proposing a new pedagogical approach to online learning. The new Student-Outcome Led Design takes a personalised student approach, centred on assessment-first principles. UCEM is aiming to design an engaging participatory approach with greater levels of online assessment, and active study support. This takes best practice research, which is then allied to our internal practice-based observations, to enable a much greater level of student success.

Lessons learnt at UCEM will provide valuable insight into successful online built environment education for the future.

### Aled Williams, University College of Estate Management

#### UCEM Centenary Projects for Good: The Built Environment for the Future

As UCEM celebrates its centenary year, it has partnered with NUS to support our student and alumni community, to create positive changes for sustainability within their workplaces. 'Projects for Good' is a professional development opportunity in which support is provided to identify, develop and implement a sustainability project. It involves seeking to undertake a socially, environmentally or economically sustainable project, supported by a coach from UCEM or NUS.

This initiative seeks to demonstrate the ongoing impact UCEM students and alumni are having in built environment industries across the UK and around the globe. The intention is for the cohort to share back the results of their projects, through short videos, case studies, blog posts, and photographs at the end of their projects.

The session will update in light of current 'Projects for Good' developments, sharing lessons learnt and how to replicate in other education providers.

### David Dowdle, University of Salford

e-Learning: Quick and Easy Vs Slow and Challenging. An initial examination of learning curve, speed of production and 'pedagogic effectiveness' in the development of e-Learning activities using a series of commercially available software tools.

There are a multitude of commercial software packages that can help a subject matter expert (SME), i.e. an academic, create what might be termed e-Learning activities. This presentation reports the initial subjective analysis of student perceptions of the pedagogic effectiveness of e-Learning activities developed using several types of e-learning development software. The software tools range from Microsoft PowerPoint, PowerPoint Conversion add-ons and simplistic templates to complex, fully interactive, simulations and scenario-based learning activities.

The 'Quick and Easy' approaches using Powerpoint, etc., have relatively short learning curves, are quickly developed thus reducing academic costs, and range in cost from free to expensive (£1000 plus) but can be viewed as producing 'low level' (Level 1) activities in terms of pedagogic effectiveness. In contrast the simulation and



scenario tools have longer learning curves, take time to develop thus increasing academic costs, and they are in general all expensive, but they have the ability to produce 'high level' (Level 3) activities in terms of pedagogic effectiveness.

This research used a group of first year student volunteers to view a range of activities and provide feedback based on several pedagogic criteria. The initial research has produced a time/cost/quality analysis with the aim of optimising learning curve and development costs Vs perceived pedagogic effectiveness

**Dr. Mohammad Mayouf, Birmingham City University**

Embedding the BIM Process within the Construction Curriculum: A holistic approach using Rich Pictures

As a process, and a major technological transformation, Building Information Modelling (BIM) continues to take a more predominant role within construction projects. BIM has promoted an improved set of mechanisms that provided better coordination, overcoming various complexities, and better handling of data/information. Many of these mechanisms, although advancing in terms of application and capability, are shifting many construction processes to become more automated. This can result in lack of understanding the role of different stakeholders within the 'process', and instead focus on the 'application' side of technology. This is considered to be a significant issue, as current construction curriculums have embedded the use of different BIM-based technologies in order to cope with the current pace of industry. Hence, holistic understanding of the 'process' is required in order to place the appropriate bolts in the right order. This research aims to provide a holistic approach on understanding the BIM process using rich pictures so that it can be embedded more effectively within the construction curriculum. Evidence was attained using questionnaire survey with students and the use of rich pictures developed during in-class seminar sessions. The findings illustrate that rich pictures supported capturing many of the stakeholders-related complexities that are encountered within the BIM process. These complexities include workflow, information management, application of technology and soft skills. Findings imply the need to embed different requirements and considerations as part of the curriculum, which depends on the nature of profession (e.g. construction manager, building surveying, etc.) as well as the level in which the students are being taught at.

**Tony Burke, University of Westminster**

Curriculum design for a digital future: bridging the academic- vocational divide in undergraduate construction and surveying courses

At a time when our industry is subject to such disruptive technological change, universities are under pressure to ensure that they produce graduates equipped for the industry of the future. Historically, course teams designing undergraduate construction and surveying courses have had to find a balance between the academic and vocational demands placed on them. On the one hand they are expected to provide students with the knowledge and skills they will need to be able to make an immediate contribution in the workplace. On the other hand, they must facilitate the intellectual development expected of a degree-level education. In the face of such rapid technological change in the industry, universities must consider whether the relative balance in their courses is appropriate.

This presentation will provide an overview of research conducted into the factors which influence curriculum design process for undergraduate construction and



surveying courses. Data was gathered from interviews with senior academic staff at seven English universities where construction and surveying degrees are offered. Cultural-historical activity theory was used as a theoretical framework to analyse the data. The findings highlight inherent tensions between the demands of the professional world and the norms of higher education. The implications of those tensions for both the academic identity of construction and surveying and the status of the professions are considered.

### Sonya Meekel, Dublin Institute of Technology

The importance of “Soft Skills” education and development within construction management programmes.

Employers have indicated that students are often not prepared for the workplace and call on universities to produce more employable graduates (Barrie, 2006; Kember & Leung, 2005) by providing transferable skills that can be taken into the workplace (Smith, Clegg, Lawrence & Todd, 2007). According to Harvey (1997) employers need people who can work in teams, exhibit good interpersonal skills, communicate well and who have an understanding of work culture. Perhaps simplistically employability is the relationship between present and future industry demands for specific labour (as knowledge and skills), and concomitantly, the labour an individual has to offer (cf. Fugate, Kinicki, & Ashforth, 2004).

85% of this T&D investment is spent on job specific training, also referred to as hard skills including: mandatory and compliance training (health and safety), processes, procedures and business practices (inductions), new technologies etc. (Ref: NSSA-UK) national soft skill association in the UK.

This is very surprising because:

1. A recent study published in the Harvard Business Review suggests that business success is in fact 85% determined by emotional intelligence rather than intellectual intelligence.
2. In the past century (100 years!) research has shown that employers have been more concerned about the lack of soft skills among their staff. (Study: Charles Riborg Mann, 1918)

A report published by Development Economics Ltd on behalf of McDonald's (UK) suggests that by 2020 over half a million UK workers will be significantly held back by lack of soft skills – an issue that is forecast to affect all industry sectors (Development Economics). Emotional intelligence (also referred to as 'Soft Skills') is considered the single best predictor of employee performance in the workplace and the strongest driver of Personal Excellence as well as Leadership Capability Development ([www.td.org](http://www.td.org)),

So,

- Why do companies continue to invest 85% of their T&D budget in hard skills (only determines 15% of success)?
- Why do companies not invest 85% of budget in soft skills (which determines 85% of success)?

## Jane Stonehouse, Northumbria University (in Newcastle)

### A picture paints a thousand words

The BRIDGE Project (Building Routes into Degrees with Greater Equality) is a project Northumbria University launched in 2017 together with Gateshead College and Derby College, which has been a research programme investigating why there are low numbers of women, people from disadvantaged backgrounds, ethnic minority groups, people with disabilities, mature and part-time students enrolling on construction-related degree courses.

There have been moves to address the rising demand for current and future diverse skilled workforce within the construction industry, however, even with the various interventions, the uptake is still low. Some reasons for the low uptake in the industry in general has been attributed to the perceived image or stereotypes associated with the industry. Improving the image is therefore important to attract a diverse workforce to the construction industry.

A study was undertaken to evaluate the images projected from a Built Environment and Construction perspective to young people and the general public. This was done through the internal audit of the marketing materials and six course modules of the Chartered Surveyor Degree Apprenticeship at Northumbria University.

Further to the study, a Good Practice Guide is currently being finalised to ensure good practice materials on imagery are developed and adopted across the marketing and teaching materials of not only the Chartered Surveyor Degree Apprenticeship but all courses within the Department of Architecture and Built Environment at Northumbria University. In an evolving digital world with instant access to information this will ensure that the right images of the construction industry are portrayed.

## Ellyn A Lester, Stevens Institute of Technology, Hoboken, NJ, USA

### Digital Striations: Preventing Disconnects in PhD Research

Doctoral training in the Built Environment requires that candidates and supervisors adapt to rapid technological change. This typically means familiarity with the latest software packages, equipment, and data gathering techniques, but the reality may be more mundane. In this most applied of fields, candidates that exhibit fundamental disconnects with industry practice may be side-lined, regardless of prodigious skills. While they might embody the latest computational or modelling techniques, academia is doing a disservice to PhD students and postdocs when the research they pursue and the processes they employ do not align with current industry practice.

A recent tenure-track candidate's presentation evaporated when responses during the question and answer portion called into question the candidate's basic understanding of the industry. The prima fascia conclusion of the audience was that the research was invalid due to limitations introduced by proprietary software, poor selection of industry-related parameters, and obvious omissions of fundamental best practices that prevented interpretation of the results. Using a case study approach, this presentation will explore how industry involvement by mentors or industry reviewers in the earlier stages of research could mitigate such fundamental flaws before they striate the research in ways that are unrecoverable.

Adrian Tagg, University of Reading

Audio Capture.....is anyone listening?

Posting lecture slides and audio files to an online portal often means the complete course content is readily available to students. At a time when student attendance or engagement is of concern and with the course content fully accessible; what is the incentive for students to attend lectures?

Louis Spring, University of Westminster

The rank and file in higher education – aligning with a digital future

At the heart of education are learning spaces and environments and over the last decade there has been a continued growth in virtual learning in Higher Education. We have witnessed the embedding and implementation of virtual learning environments in HEIs in our bid to enrich pedagogy, understand and improve student participation and engagement, and overall student experience and satisfaction. One human resource employed in this quest, is the 'rank and file' academic in the form of module leaders and/or coordinators who implement these digital learning spaces and environments, in varied ways. Module Leaders are having to develop digital expertise on-the-go to enable learning spaces and environments that provide active teaching and learning opportunities for Built Environment disciplines. Module Leaders need to ensure that virtual learning environments provide both practical and theoretical experiences that are safe and secure; reduce plagiarism and create wholesome assessment regimes for staff and students.

The minimum requirement of Digital futures is that the transformation enables richer and active experiences within virtual learning environments that facilitate pedagogy but also provide the academic, administrative and management roles and responsibilities of module leaders to be aligned to create the efficiencies, efficacies and effectiveness to satisfy the requirements of the future demands of UK higher education institutions and Schools like Applied Management.

The relevance of this presentation will be to explore how module leaders can create innovative solutions and opportunities to learning spaces and environments to align and support the academic and administrative roles and responsibilities.

Nurulaini Mohd Hafir and Tim Lees, University of Reading

Professional Identity and Attitudes towards Sustainability for more Sustainable Practices

The role that built environment can play in a more sustainable future is increasingly well understood and the importance almost universally accepted. Current literature has paid attention to the economic, political and technological changes that underlie this approach. The role of education in these changes is often assumed as a lever for change with the sustainable education literature focusing on the abc (attitudes, behaviour and choices) of individuals. This paper adopts a different approach. Drawing on the sociology of profession literature (Abbott, 1998) to uncover the importance of professionals meeting the normative expectations of their profession, i.e. to serve their client and the public, on the impact on sustainable practice. By exploring the experiences of current and future professionals, this research highlights how their experiences are not homogenous and that, while some will be universal (notion of the profession), others will be contextually specific (level of exposure,

involvement or engagement). The work draws upon 40 interviews conducted across four groups of aspiring or practicing quantity surveyors: New students, final year students, novice practitioners, and chartered surveyors.

[Katy Hicks, Arcadis](#)

Consultant 4.0

Following research for my dissertation into the effect of Industry 4.0 on the role of a quantity surveyor and project manager, I will present the idea of “Consultant 4.0”. This examines how the role of a consultant (umbrella term including QS / PM) will change with the industrial revolution and increased digitalisation. I will explore the idea of implementing digital competency frameworks (based on CITB’s) across the industry to assess the current level of digital skills and the impact of data analytics on the roles mentioned above. This would then focus on what skills the industry is looking for based on my research and how could higher education assist with teaching the new generation of consultants.

The iBEE2019 theme is directly linked to my research, the concept of industry 4.0 (built environment 4.0) is relatively new to construction and is yet to be fully explored to reap the benefits.

[Professor Mike Riley and Alison Cotgrave, Liverpool John Moores University](#)

Learner Digital Engagement – 2 years on

LJMU requires all students to participate in its learner digital engagement monitoring to ensure students achieve academic success through full engagement with their studies. It is recognised that monitoring engagement, although not necessarily monitoring attendance, aids in the recognition of students who are at risk of non-completion. This should be a valuable tool in assisting tutors to identify students at risk of disengaging and to effect appropriate pastoral care and support provisions.

The information collected by the University via the Digital Learner Engagement (DLE) platform is intended to provide student-centred, ‘real-time’ information relating to programme engagement that will enable relevant staff to identify students at risk of withdrawal and to intervene, as appropriate, to re-engage and support students with their programme of study.

The LJMU Learner Engagement Dashboard draws together data from a range of existing sources and presents it in a single place. The dashboard includes student information extracted from the student record held by the Institution, and provides a measure of student engagement derived from:

- how often students use Canvas
- book withdrawals from the Library
- use of the University’s e-books and journals
- use of the University’s network printers
- frequency of log-on to one of the University’s computers, or connection using off-campus software
- attendance at timetabled activities

The LDE platform was introduced as a pilot two years ago. This paper reflects on the process of its development, implementation and effectiveness two years on.

Louise Kirsten, Sheffield Hallam University

"The power of the pen in a technological age"

How many times have you been lecturing to a room of students, explaining detailed facts, providing innovative ideas or discussing complex problems and yet notice that fewer than 10% of your audience have been making any notes on your lecture?

Is the art of taking notes lost to the existing and future generations of students or are they note taking in a different way, i.e. using technology? Therefore, has the power of the pen lost its benefits when compared to technology and what is its role in the digital age?

This presentation will consider the art of note taking and why the author still believes that there is room for the traditional hand written approach within a digital environment.

There is no doubt that technology is being used by some students to take notes in the class room, the use of the iPad, iPhone, tablets and laptop computers have all grown in popularity in recent years. However, are these digital tools as effective as the traditional approach or do they provide distractions from valuable note taking which ideally should aid understanding and learning.

Note taking is not just about writing down everything that the lecturer is saying. It is more nuanced. Research into this area by the Norwegian University of Science and Technology identified that the long hand method of taking notes using a pen deepens the mind's ability to retain and process information. Their research at the University aimed at looked at the differences in brain activity between taking notes by hand and typing into a computer.

Their research findings suggest that the use of pen stimulates the cognitive processing of the mind and thus aids learning in a more effective way. As Pallasmaa argues, we think with our hands, and "ultimately the body and senses play a crucial role in memory and creative work", through helping us to focus on being fully present in the moment. Effective learning requires that full, embodied commitment. The pen gives us this power.

Eamonn Kirke and Sian Dunne, Liverpool John Moores University

University Staff Perspectives on Student Mental Health and Well-Being.

The 2016 House of Commons Report 'The Equality Act 2010' acknowledges that disabled people find their life needlessly restricted by the feature of the built environment and higher education is one of those areas of restriction. The context of higher education is not only limited to the physical disability but also related to other aspects including mental health and mental well-being. Whilst the Government has enacted necessary legislations including the Special Educational Needs Disability Act (SENDA, 2001), which came in force from October 2005. The SENDA, along with the Disability Discrimination Act 2005, places a positive equality duty on all public sector institutions including higher education institutions. There has been some research on the status of disability education in other sectors but much less research has been conducted in terms of the relationship between the disability and built environment education as a discipline particularly in how well academic staff feel

able to offer the necessary emotional and practical support to students struggling with mental health issues/concerns.

Therefore, this paper looks into the implementation status of the positive equality duty across the built environment higher education sector in order to evaluate the effectiveness of teaching disabled students in Built Environment, analysing the available literature in this area and also looking at competencies of academic staff to support student needs. An online survey among the students and teaching staff within the UK higher education will be conducted and the data collected will be analysed and compared with the existing literature in the area. This paper will contribute in the original thinking of the problems and prospects of teaching disabled students in built environment discipline.

### Professor Nick Morton and Wil Vincent, Birmingham City University

‘Nudging’ student behaviours: the use of bespoke app technology to encourage student engagement and communication

Framed by the digital, mobile, always-connected world which our students inhabit, this presentation considers the role of disruptive, app-based technology in enhancing student engagement, communication and support. We will reflect on an ongoing project at Birmingham City University, delivered in partnership with an external tech start-up through an application called *University Assistant*.

The app is billed as a one-stop place for information, advice, and support – the ‘personal tutor in your pocket’; in other words, we are challenging the norm for student interactions by ‘meeting students where they are’.

Our paper considers three key themes. First, the ability to ‘nudge’ student behaviour through in-app notices and notifications. Next, the ability to react to student engagement patterns and behaviours through real-time data, and thirdly, the potential to empower more effective student communication before the point of academic / personal crisis.

Launching the app produced some spectacular results, with 97% uptake amongst incoming full-time students and 5000+ clickthrough’s to carefully curated, student-friendly articles. By March 2019, first-year student withdrawals were running 21% lower than in 2017/18.

We will review a clear set of outcomes:

- Students communicate more when using relatable technology;
- Timing of interventions is crucial;
- Notifications and nudging doesn’t automatically translate to engagement. We need to understand data in context, to react to specific barriers to retention.
- Student questions don’t change. The threshold of asking for help however is lowered.
- By having smaller, more impactful conversations, we keep students away from the academic and personal ‘cliff edge’



## Workshops

Jeff Kim, Ben Farrow, Richard Burt, Tom Leathem, Eric Wetzel, McWhorter School of Building Science

Bringing the construction site into the classroom

Providing students with High Impact Educational Practices within the McWhorter School of Building Science is a top priority. One of the most beneficial experiences for students to correlate the classroom learning to the field is visiting active construction sites. Although our School does a number of these visits within the curriculum, these visits can be costly, logistically difficult, and often limited to upperclassman where class sizes are smaller. Our proposed workshop will present a mechanism to bring the active construction site to students by using data capture and virtual reality in a toolkit that faculty can access to conduct virtual site visits. The technology now exists that allows us to create the construction project field trip using a three-dimensional virtual environment. The workshop will demonstrate the use of some of the data capture equipment, together with the equipment and associated technologies used to view the virtual environments. The workshop will also address the processes used to develop the toolkit including:

- Hardware and Software Vetting.
- Training and Development
- Media Gathering and Processing
- Technical Development and
- Piloting and Quality Assurance
- Delivery and Storage
- Knowledge Sharing, Cross Training, and Lessons Learned

This initiative is a clear response to the rapid technological change in data capture technology and virtual reality viewing platforms. The workshop will demonstrate how the use of these technologies can have a significant role on how we teach built environment higher education students.

Ben Farrow, John Tingerthal, Jim Sullivan, David Gunderson, Tom Leatham, Daryll Kysar, Associated Schools of Construction

Construction Expertise Exchange

In an effort to enhance construction curriculum development, the **Construction Expertise Exchange** was developed by the Education Committee of the Associated Schools of Construction (ASC) in partnership with Procore Technologies. Topic areas are developed and moderated by construction educators and industry experts to provide current state-of-the-art advice in construction education curriculum for faculty who are developing new courses or are updating current courses. Topics include both construction subjects and pedagogical techniques. The “exchange” is hosted on a platform developed by Procore. Opportunities exist to expand the depth and breadth of curriculum topics and to address specific issues relevant to industry and academia in this online platform. Our proposed workshop will present the platform, demonstrate its specific use, and explore future collaborative opportunities using the Construction Expertise Exchange.

The workshop will also address the process used to develop the Construction Expertise Exchange including the following:



- Collaborative effort of academia and industry
- Platform development
- Implementation
- Technical Development and Quality Assurance
- Knowledge Sharing, Cross Training, and Lessons Learned

The workshop will demonstrate how impactful partnerships can influence and improve construction education across the globe.

## Mark Shelbourn & Lloyd Scott, University of Salford & Technological University of Dublin

### Educating for Digital Futures – exploring the challenges

Built Environment graduates of the future will need to be highly technical, adaptable, good communicators and lifelong learners. This goal provides the modern academic with many challenges. Commentators proffer that the current model of pedagogy, which is at the heart of the modern higher education experience, is becoming obsolete. Using digital technologies has the potential to create the opportunity to develop skills, competences and understanding that graduates now require. The holistic, digital approach to the design, construction, production and operation of buildings is likely to require changes in the way the process is arranged, resourced and managed in the future. There will be a different kind of professional in the next five years whose education will be required to permit them to make the many connections in thinking and actions required to solve complex problems in a digital age. Future built environment graduates will challenge the conventional ways of the past and use their creative and innovative capacities. Using digital technologies, it is now possible to embrace new collaboration models of learning that change the paradigm in more fundamental ways. But this pedagogical change is not about technology per se, it is about a change in the relationship between students and teachers in the learning process.

This workshop explores the possibilities of how digital technologies are being used in the classroom to provide graduates of the future with the experiences needed for the new digital world of the built environment.

## Dr. Ezri Hayat and Dr. Sergio Rodriguez, Teesside University

### Industry 4.0 and its rapid changes: How should university design and deliver the teaching and learning process?

As with other sectors, the industry 4.0 has also changed the way a construction project is delivered, mainly through rapid advancement in digitisation of the supply chain and associated processes. No longer are construction companies competing among themselves, but also with other sectors such as IT and manufacturing. Digital technologies such as Artificial Intelligence (AI), Virtual Reality (VR), BIM, and 3D printing are developing in a rapid pace, forcing construction companies to '*adapt or die*'.

Such rapid advancement in the construction technology consequently exposes the academia to challenges that are growing at a rate that may not exist previously. In undergraduate degrees where curriculum are designed for 3 or 4 year study period, students are now exposed to risk of having their skills and knowledge obsolete by the

time or soon after their graduation. At worst, not long after they completed a particular module.

It has been a standard practice for universities to continuously updating their curriculum to be aligned with the relevant industries. How such updates could and should be absorbed and transferred to the university graduates in this industry 4.0 era, is a question raised in this workshop.

The workshop will be delivered in two sections. The first section will prompt discussion on identifying the challenges faced by the universities as a result of industry 4.0. The second part will focus on how the teaching and learning process should be designed to ensure that skills and knowledge of the graduates are updated and relevant with the industries.

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