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Citation: Cooper-Cooke, B., Sutrisna, M., and Olatunji, O.A 2020. Innovation in the globalised world: educating future building professionals. *Construction Economics and Building*, 20:3, 56-61. <http://dx.doi.org/10.5130/AJCEB.v20i3.7410>

ISSN 2204-9029 | Published by UTS ePRESS | <https://epress.lib.uts.edu.au/journals/index.php/AJCEB>

GUEST EDITORIAL

Innovation in the globalised world: educating future building professionals

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DOI: [10.5130/AJCEB.v20i3.7410](https://doi.org/10.5130/AJCEB.v20i3.7410)

Article history: Received 30/08/2020; Revised 02/09/2020; Accepted 04/09/2020; Published 15/09/2020

Background

The 42nd Australasian Universities Building Education Association (AUBEA) conference was hosted by Curtin University in Singapore in 2018. It was considered a significant success. Eighty-nine papers by approximately 70 authors or more were accepted; and were published in three volumes, one for each of the streams of the conference: *Innovation, Technology and Sustainability*. Participants attended from 32 universities across 14 countries. The purpose of this Special Issue is to further disseminate innovations in building education and practices on the back of the highly successful conference by showcasing some papers from the *Innovation Stream*. Authors whose works featured in the Stream were selected carefully and were invited to develop their papers further for a special issue of *Construction Economics and Building*.

This Special Issue can be considered very timely. Although back in 2018 when AUBEA conference took place, COVID-19 pandemic had not happened, the impact of the pandemic is now incontrovertible. At the time of this publication, definitive cure has not been found and many countries have struggled to recover. About 25 million cases have been infected by the virus globally. Death toll is now close to 1 million. World economy is very likely heading into a historic recession. It is understandable many current views are unequivocal to conclude the road to a full global recovery is a long and daunting one [see Baldwin and Mauro, 2020]. Similarly, the practice of teaching and learning is not left out in this: educators have had to

find innovative ways to convey knowledge and reach their students over a distance. They have had to situate learning to inspire hope at a time when fear and uncertainty trouble the heart of many. In such an extra-ordinary time, there are opportunities for re-inventing, such that the lessons of today would inform the strength of tomorrow. Whilst online learning is not strange to construction and building education, the situation of COVID-19 requires construction educators to innovate further. They have had to cope with rapid changes, in which educators and students must benefit from resilience and resourcefulness. This includes finding the right balance between blended pedagogies and situated distribution. It is vitally critical that the construction management discipline is positioned to contextualise innovation appropriately so that the accelerated innovations stemming out from COVID-19 situation are neither taken for granted nor misunderstood.

In a broad context, innovation has been approached with some apprehension and reluctance within the construction industry (Tatum, 1987, Kumaraswamy and Dulaimi, 2001, Ozorhon, 2013). There are historical and current demands by governments for industry, and more specifically construction, to improve productivity and client satisfaction (Blayse and Manley, 2004, Miller et al., 2009). According to Kumaraswamy et al. (2004), innovation is one way the construction industry can achieve this. With a focus on science, research and innovation, and to compliment the governments other investment in this area, in 2015 the National Innovation and Science Agenda (NISA) was launched, committing \$1.1 billion over four years (Department of Industry, 2015). A recent report by Australia's Productivity Commission (2017) notes "the importance of the education sector for Australia's future prosperity" (p.5). The report emphasises government's recognition of additional benefits enjoyed by the greater community in the form of innovation, technology diffusion and organisational learning that flow on from education providers other than those enjoyed by students.

Similarly, the Organisation for Economic Co-operation and Development (OECD) (2015) notes "innovation needs a strong and efficient system for knowledge creation and diffusion that invests in the systematic pursuit of fundamental knowledge, and that diffuses knowledge throughout society" (p.3). For greater clarity, what is innovation and what has innovation got to do with construction education at a time like this? Amabile and Pratt (2016) define innovation as the successful implementation of creative ideas within an organisation. Similarly, a popular definition of innovation is provided by the OECD's Oslo Manual (2015): "the implementation of a new or significantly improved product (good or service) or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations" (p. 16). In defining the centrality of this Special Issue, we align with OECD's Oslo Manual to adapt the definitions in considering scholarly contributions that demonstrate the additionality of innovation in construction education, including scholarship in the areas of 1) new products and services, such as a new syllabus, textbooks or educational resources; 2) new processes for delivering their services, such as the use of Information and Communication Technology (ICT) in e-learning services; 3) new ways of organising teaching and learning activities, such as ICT to communicate with students and parents; and 4) new marketing techniques, such as differential pricing of postgraduate courses.

Papers

From a pool of 27 papers, six articles have been redeveloped, reviewed and accepted for inclusion in this Special Issue.

The first paper by **Zhang, Duan, Wei and Shane** aligns their work with previous work of Kim-Soon et al. (2014) who outline the importance of industry collaboration to education providers; in that, the linkage with industry allows for real world projects to be shared with students, as a vehicle for teaching and learning, and for research. This article explains how China's University-Enterprise-Cooperation (UEC) or Industry-University Partnerships (IUP) policy helps construction education providers to achieve their industry collaboration objectives. It unveiled that UEC in China has increased however there appeared to be little quantitative statistical analysis undertaken on UEC research progress and trend in China. By examining 300 scholarly papers from the China National Knowledge Infrastructure (CNKI) database, they investigated the status of UEC in China, key research themes that have emerged in UEC studies as well as the research methods frequently used. The research found a steady increase in UEC studies since 2007 and a significant increase in 2016-17. Course development and practice resource development are the two primary themes covered, whilst elaboration methods and case studies are the two main methodology areas. A key highlight from this paper is that universities globally have innovatively adjusted the way education is delivered by developing new processes and partnerships with industry to meet the ever-changing needs of society. The statistical analysis conducted on a Chinese knowledge database is insightful in showing robust methods to identify trends in University-Enterprise-Cooperation. In addition, the two research themes analysed, elicit a whole range of themes yet to be researched in this area

The subsequent paper from **Ullah, Sepasgozar, Tahmasebinia, Sepasgozar and Davis** examines the impact of students' attendance, sketching, visualization and tutors experience on students' performance. This is timely, considering the recent backdrop of COVID-19 pandemic. Teaching academics across the world have been required to move their units of study from a face-to-face environment to an online environment. What may have taken years for a University to achieve through a planned process has been done within a number of weeks, although with room for improvements (Zimmerman, 2020). There has been much debate regarding the link between student attendance and performance. For example, Cutler et al. (2016) argue attendance to both lectures and tutorials is highly important if students want to have a strong chance of passing their units of study. This paper investigated sustained student academic performance, and the relationship between attendance (engagement), sketching, visualisation and tutor experience in a Building Structures unit making up part of a course in Construction Management. It revealed primary factor that matters in regard to student attendance is engagement, irrespective of the learning environment whether it is face-to-face or online.

Online environment provides a host of opportunities for educators with numerous software applications that can be used for learning and teaching. The next paper from **Kamardeen and Samaratunga** looks at personalised learning and whether this can be aided by the use of an online platform, "DigiExplanation". The study surveyed a cohort of first year students undertaking a unit of study in construction-related degree. The students were required to use "DigiExplanation" platform to address questions raised in an assessment brief. The aim of this research was to see if this platform was an effective way to aid personalised learning within the arena of construction education. While it was noted that the findings of the research may not be generalisable to other subject areas, they provided an insight into what could be achieved using such a platform. Some of the positive results reported include stimulated student collaboration, knowledge building, teamwork, and an engaging way to learn. This approach to personalised learning in a group assessment offers the use of new educational resources using information technologies and enabling students to use this platform to deliver their

assessments. Bringing this into the context of our current situation, this is a platform in which students can be supported to meet the learning outcomes while being in isolation.

In a family setting, games have been put to use not only to have fun but also as a way to learn (Caldwell, 1998). In this era of computer-generated virtual environments, there is greater appeal for people to find a good game that is fun and engaging. The subsequent paper by **Tews, Skulmoski, Langston and Patching** takes gaming to another level – the gets-serious level used in an educational setting. The research investigates the use of gaming and serious games within PMI accredited Project Management courses globally to determine the extent of gamification, and survey student experience in participating in these games. Similar to the findings in Ullah et al. (2020), it is reported in this article that participants of gamification had increased engagement and participation among a range of other benefits. Another aspect surfaced as a potential benefit is the opportunities to providing students with real-world scenarios in a fail-safe environment. Whilst this research revealed that gaming in this environment is at a rudimentary stage, it was also found promising.

Pitting wits against a computer game is a challenge, undertaking this with others as part of a team can be fun. Such environments help ‘gamers’ to develop other skills and abilities and to increase their personal capacity. The fifth paper by **Smallwood and Allen** investigates new entrant students commencing a Construction Management degree and how their behaviour could be primed from the start to improve their ability to manage themselves and aid their capacity to study, undertake assignments and projects. These were believed to have a knock-on effect on improving student participation, retention and pass rates. This study reports on how a university provided a one-day team building exercise, based around the Amazing Race television game, for First Year students in a Construction Management degree. The team building exercises focused on student’s ability to strategise, plan, evolve tactics, and take action. Some weeks after undertaking the team building exercise, student participants were surveyed. Whilst forming the basis for a longitudinal study of the study group, there have been some positive findings confirming a team-building exercise type described in their research can have a positive effect on student’s ability to manage themselves, grow resilience and seek appropriate motivation to succeed.

The final paper by **Ruge and Mackintosh** shared the experience of developing and facilitating two professional development workshops using an innovative approach, to aide teaching academics, within the Built Environment disciplines, through collaborative reflective practice of learning and teaching to develop their own Teaching Philosophy Statements (TPS). A TPS is a way for lecturers to record their personal career development and professional achievements through the combined development of personal teaching philosophy, scholarly research and reflective practice for continuing personal and professional development. It is prudent to note for discipline focused teaching academic, Australian government funding in Universities is primarily focused on supporting research outputs from disciplines and this has left teaching-focused academics within a discipline with little or no requirement to produce research output with a problem. In this article a move was advised to include scholarship of teaching and learning (SoTL) into the teaching quality standards as a way of addressing this issue and for universities to provide award schemes to recognise the teaching achievements of teaching-focused academics. Whilst the workshops enabled teaching staff to develop their TPS and teaching profile, interdisciplinary sharing of teaching and learning practice, for the first time was recommended, which highlighted the importance of critical thinking and reflection to support the development of a shift in teaching approach. An interesting proposal that is both strategic and innovative was also

forwarded in this paper in regard to professional development of teaching staff in built environment programs.

In conclusion, the guest editors would like to show their appreciation to all the authors for their contributions to the conference and also to the Special Issue. We also thank the conference sponsors and everyone who assisted in one way or the other to make the 42nd edition of AUBEA such a significant success – invited speakers, organisers, volunteers, reviewers, and not least important, Curtin University for all the support given. The 42nd edition of AUBEA recorded its success, and its imprints are very much visible in how providers of building education are best prepared for uncertain times: work with the industry, engage students with technologies, assist students in their new-found environment as well as empower and enable staff to continuously develop through an appropriate recognition of their work. Whilst providing strong guidance under current COVID-19 situation, these guiding principles will endure beyond our recoveries.

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