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Changing the Mindset to Encourage Innovation in Resolving Problems in the Built Environment: Exploring the Role of Online Gaming Platforms to Deliver Collaborative Learning and Teaching

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Abstract. *As educators we seek to set up meaningful graduate attributes to encourage creativity and a drive for innovation among our graduates in order to produce professionals not content with learning how to do more of the same, but who have the courage to push the boundaries of their profession and innovate. Referring to preparatory research on work in progress at Curtin University, we explored the capacity of team teaching using online gaming platform technology. We investigated the feasibility of engaging teams of students in practical applications of theoretical concepts of communicative and collaborative planning and decision-making, along with the dynamics and politics of community consultation in a pluralistic society. We ascertained the potential of developing students' interpersonal and intercultural skills to develop collaborative partnerships through engagement with fellow students and a wide range of stakeholders/partners, simulating real-life situations using serious gaming platforms. It is contended that through a collaborative and experiential learning-approach to teaching and by employing state-of-the-art online gaming/teaching platforms, we could enable students to deal with real-life issues in simulated and sufficiently supervised conditions to encourage creativity and risk taking. This would encourage students to strive for creativity in solving contextual problems in their search for innovative solutions to complex and wicked problems. It is also contended that state-of-the-art delivery of curricula could free up academics during teaching sessions to concentrate on inspiring students to explore innovative and creative solutions for these problems.*

Keywords. *Creativity, innovation, collaborative learning and teaching, online gaming platform, wicked problems.*

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Abstrak. *Sebagai pengajar kita berupaya membentuk lulusan yang berkarakter dengan mendorong upaya kreatif dan inovatif pada siswa sehingga terbentuk lulusan profesional yang tidak hanya ahli dalam melakukan hal yang sama secara berulang, tetapi juga memiliki keberanian untuk berinovasi dan mendobrak batas-batas profesi mereka. Mengacu pada*

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persiapan pekerjaan yang sedang berjalan di Curtin University, kami meneliti kapasitas pembelajaran berkelompok dengan menggunakan platform teknologi permainan daring. Kami menyelidiki potensi pelibatan kelompok-kelompok siswa secara langsung dalam penerapan konsep teoetisi perencanaan komunikatif dan kolaboratif, serta pengambilan keputusan dalam dinamika dan politik musyawarah pada kelompok masyarakat yang bersifat majemuk. Kami meneliti bagaimana potensi pengembangan keterampilan interpersonal dan interkultural masing-masing siswa dapat berkontribusi dalam pengembangan kemitraan kolaboratif melalui pelibatan antar sesama siswa dengan berbagai pemangku kepentingan dalam simulasi situasi kehidupan nyata menggunakan platform game yang serius. Melalui pembelajaran dengan pendekatan yang kolaboratif dan eksploratif, serta pemahaman pengalaman pengajaran menggunakan platform teknologi permainan daring, siswa diharapkan sapat lebih memahami maslaah di lapangan. Dalam kondisi yang disimulasikan dan diawasi dengan baik, siswa didorong untuk lebih kreatif dan berani dalam mengambil risiko. Kondisi ini diharapkan mampu mendorong siswa untuk berupaya lebih keras untuk memecahkan masalah kontekstual secara kreatif dan menemukan solusi yang inovatif untuk masalah yang kompleks. Penyampaian materi kurikulum dan pengalaman tentang pembelajaran dengan platform teknologi permainan daring ini diharapkan memberi kebebasan yang lebih bagi pengajar untuk fokus pada siswa yang menginspirasi dalam lebih menggali solusi yang inovatif dan kreatif untuk masalah tersebut.

Kata kunci. *Kreativitas, inovasi, pembelajaran dan pengajaran kolaboratif, platform game online, masalah kompleks.*

Introduction

Planning academics in our field seek to keep track of rapid changes occurring in the built environment driven by the global economy and a rising critical awareness of global environmental issues. In recent years, global competitiveness and changes brought about by rapid technological advancements have presented a range of challenges concerning cities, such as climate change and global warming; poverty and housing affordability; and ageing and growing populations. These challenges require innovative design solutions to create workable and desirable urban environs (Pinnegar, Marceau, Randolph, 2008; Newton 2008; Brunner and Glasson, 2015; Khan, Brunner and Gibson, 2017). Australian cities, like those in other parts of the world, face significant built environment challenges. Whilst not all these challenges are new, many have not been critically experienced in the Australian context previously, or at least not at such scale or complexity (Brunner and Glasson, 2015).

For the planning profession to remain relevant, planning educators need to take into account new forms of industrial production and marketing, changes in the workplace, disruptive technologies, transformations of social values, and lifestyle preferences. Issues and challenges brought about by rapid changes need to be understood and theorized to facilitate professionals in the conception and implementation of their solutions. This requires planning curricula to be informed by technological advancement and innovation that occur against the backdrop of ever-changing economic and geopolitical developments.

Unfortunately, however, a cursory look at many world cities reveals that much of the change unfolding on a daily basis along various dimensions is poorly reflected in how planners conceptualize, imagine, design, and create solutions for city living. This poses a challenge to urban planning programs to not only respond to the prevalent economic, social and environmental realities but also to engage meaningfully with citizens in searching for effective

and acceptable solutions. In contrast to doing more of the same, planning educators need to promote creativity and encourage the quest for innovation to turn the challenges confronting cities into opportunities. Yet, according to Brown and Katz (2011): "It is hard to imagine a time when the challenges we faced so vastly exceeded the creative resources we have brought to bear on them" (p. 3).

This paper looks at some of the various challenges affecting how the city in the globalizing world functions and how it is conceived, focusing on some pedagogical and practical problems this raises for planning educators. It also takes stock of the challenges faced by universities to remain relevant in the face of disruptions presented by the rapid developments in information and communication technology (ICT), a major driver of globalization, and the changing expectations of students entering universities.

The paper first looks at some characteristics of cities and how the way cities are perceived have changed over time. It provides a cursory analysis of the current developments that redefine the city seen from a disciplinary perspective and the challenges they present for planning academics seeking to ensure that future professional planners can relate to reality with the courage to be creative and seek innovation to ensure the evolution of ideas and the city form. This paper advocates the incorporation of the strengths and weaknesses of collaborative learning and teaching into local planning studios by taking students out of the classroom to engage with the community. This paper contends that there is a need for adopting such approaches in order to reduce the theory-practice gap and to enhance students' engagement with the community and the city.

The narrative then looks at the challenges being faced by universities due to digital disruption brought about by phenomenal advances in ICT and globalization, referring to some specific initiatives being contemplated at university-wide level at Curtin University. The argument explores how the current challenges faced by the university can be transformed into opportunities to encourage creativity and stimulate a drive for innovation among planning students to realize relevant and meaningful attributes of work-ready graduates. This paper highlights the need to change the approach to planning education in order to produce professionals who are not content with learning how to do more of the same, but who have the courage and skills to push the boundaries of their profession and innovate. A case example is shared to illustrate the use of an online team-based learning platform developed by Curtin University to run local planning studios.

From Industrial City to Global City

Cities – More than Containers for Innovation

Cities have a fairly long history, with the earliest traces dating back thousands of years. Hall (1998) traced the role cities have played historically, describing them as providing an 'innovative milieu' and serving as crucibles of creativity, innovation, social organization, and economic progress. Fishman (1999) notes that for Hall the "final aspect of urban creativity lies in 'the creation of an urban order', the innovative use of the resources generated by the urban economy to provide a decent life to all residents." The future role of cities could be summarized as the facilitation of urban creativity and innovation, which should be aimed at generating greater social benefit.

The industrial revolution brought about capitalism and delivered the industrial city to the world. Florida *et al.* (2016) refer to Schumpeter's (1934) work, pointing out that early studies on capitalism focused on innovation and entrepreneurship in firms and among individuals rather than the cities and regions that housed them. According to Florida *et al.* (2016), "recent research finds that innovation, entrepreneurship and creativity are social processes that involve groups of people and build off one another historically." The key processes that motivate technical advancement, economic growth and human progress are not just the product of "forward-looking individuals and leading-edge firms, but of cities and urban regions". Cities do not merely serve as containers for innovative activities, but are "actively involved in the generation of new ideas, new organizational forms and new enterprise" (Florida et al. 2016, p. 87).

Referring to Jane Jacobs (1969), Florida *et al.* (2016) re-emphasize the role cities play in promoting innovation and economic development by bringing together the required diversity of economic assets and actors. They note that with the coming of 'knowledge-based capitalism' or globalisation, it is now argued that "the city and the region have emerged as the key organizing unit for innovative activities, bringing together the firms, talent and other regional institutions necessary for them" (Florida *et al.* 2016, p. 87). They go on to make the case that it is "the city or region itself that lies at the very heart of the processes of innovation and entrepreneurship" (p. 88).

Importance of Placeness in Global Cities

Globalization has impacted cities by ushering in new ways of producting spaces, flows of information and consumption patterns. Castells (2000) refers to the advent of factors and material arrangements related to the technological infrastructure of information systems, telecommunications and transportation that enable social practices to occur simultaneously in non-contiguous territories. These cause changes of lifestyle preferences and dealings within the community, generating various forms of stresses within the urban fabric that tend to strain and distort the functions of urban form and the built environment. There have been fears that a "new spatial division of labour" imposed by globalization would create 'placelessness' in the city (Friedmann 1986: 318). Others, including Saskia (1991) and proponents of nested-city theory such as Hill and Fujita (2003) emphasize the continued importance of 'placeness' resulting from an area's social and civil societal setting and socio-demographic context on a city-region's development pattern in the globalized world (Jacobs 2016, p. 90).

These changes, brought about by the drivers of globalization, need to be understood and given proper expression in the design of the built environment. The shaping of the various contexts within cities by the play of global forces remains a poorly understood phenomenon. There is a need to understand how local contexts are being shaped and how the communities contained therein are influenced as city administrators seek to ensure the city's competitiveness in the global network. To ensure their curricula remains informed, planning schools must strive to widely engage with the city and its citizens who experience these changes and react to current realities.

Ineffective Response to Rapidly Changing Realities of the City

An Out of Touch Urban Discourse

Adam (2012) notes that while society has experienced significant and rapid changes, the state of architecture profession and prevalent urban development does not reflect "the momentous

political and economic shifts" reported daily in the media (Adam 2012, p. 2). He claims that the architectural practice of 1990s continues to remain largely unchanged, dominated by high modernism, and glass towers and iconic buildings continue to be constructed (Adam, 2012). Adam notes a significant disparity between contemporary architectural description and theory and "the way that most people conduct their lives in the modern world – the people that occupy the buildings, the people who commission the architects and urban designers, the people who see the buildings and occupy the new places." In other words, Adam suggests that the buildings and places that society demands and provides resources for are not adequately reflected in the professional and theoretical discourse of architecture (Adam 2012, p. xvii).

Adam's observations serve to remind planning academics that changing political and economic realities of today's cities need to be reassessed. In a similar vein, Newton notes that urban planning and development paradigms that dominated the 20th century have been replaced by new concerns focused on sustainability. Newton contends:

> to be sustainable, 21st century cities need to be able to appropriate from a pipeline of innovative technologies, products, designs and processes that can be substituted for those currently in operation that are beginning to show signs of failure. (Newton 2008, p. xiii).

He lists multiple threats to sustainability of Australian cities that have converged, such as peak oil, climate change, water supply issues, biosecurity issues, and notes a growing recognition of the need to adopt urban planning and design for more resilient cities. Newton maintains that while the required technology already exists, the "challenge becomes a matter of how the knowledge that underpins the implementation of these sustainable technologies can be effectively adopted by cities." (Newton 2008, p. 3).

This again highlights the challenges that exist for educators to prepare future professionals that are not content with doing more of the same.

Wicked Problems Inhibiting Innovative Solutions

A major inhibitor of creativity and innovation among planners preventing successful adoption of existing technologies could be the fear of experimentation. Among other reasons, the prevalence of wicked problems in urban design related professions seriously discourages innovation. Rittel and Webber (1973) state that wicked planning problems tend to be "essentially unique" (p. 141) and their solution is a "one-shot operation" with no opportunity to learn by trial-and-error (p. 139). Roberts alludes to a wide range of potential drivers that make it difficult to resolve wicked problems. These include, "the expansion of democracy, market economies, privatization, travel and social exchanges" that tend to highlight differences in values; "technological and information revolutions" that dramatically increase the number of "active participants" that seek to engage in problem solving; and "organizational decentralization, experimentation, flexibility, and innovation" promoting changing organizational culture within institutions (Roberts, 2000, p. 2). The movement from government to governance over the past few decades spurred on by globalization and neo-liberalism has also encouraged participation in decision-making by new actors comprising civil society (Khan, George and Brunner, 2015).

Complex wicked problems need to be understood within their context, where their complexity and uncertainty requires solutions created consensually through collective knowledge and wisdom and shared risk-taking by all stakeholders to justify experimenting in the pursuit of innovative solutions. Providing students the opportunity to deal with real-life problems of real communities in simulated conditions that closely reflect reality is widely understood to be

important, prompting planning academics to incorporate various approaches. These include site visits, study tours, internship placements, and work-integrated learning. There is a long tradition of conducting local planning studios through collaborative learning and teaching, wherein students are taken out into the community to understand the planning issues faced by communities within their context. This is understandable, as collaborative learning and teaching initiatives run along the principles of collaborative planning. However, notwithstanding the positives, such initiatives still do not encourage the students to opt for learning through repeated trials and experimentations without fear of adverse consequences, including concerns about completing assessable tasks in a timely manner.

A Collaborative Approach to Teaching Planning

Collaborative Planning

Planning is a relatively new profession with a long-standing debate about the role of the planner and a concern about the gap between planning theory and practice. Around the mid-20th century, Charles Lindblom pointed out discrepancies between what comprehensive-rational planning theorized and the practice of muddling through that was adopted instead by practitioners. Kaufman and Howe's (1979) extensive survey of practitioner planners in the US revealed that most planning practitioners saw themselves as a hybrid between a technician (dealing with procedural aspects of planning) and a politician (dealing mainly with the substance of planning), reporting that they assumed these different roles as required.

The advent of post-modernism brought into the debate the role of communication and inclusivity as fundamental principles of planning, inspired largely by Habermasian concepts of ideal speech and communicative rationality. Planning theory has since promoted communicative and facilitative approaches to planning, such as collaborative planning. Proponents of collaborative planning seek to involve the community and other actors or stakeholders in decision-making, not merely to seek their cooperation but to develop mutually beneficial partnerships that could generate synergies (Innes and Booher, 2010; Innes and Booher, 2003). Collaboration requires all partners to value and respect the contribution each one makes.

In theory, collaborative planning is an effective means of bringing stakeholders together to resolve planning issues and to enhance deliberative learning (Healey, 1998; Innes and Booher, 1999; Margerum, 2002). Collaborative planning relies on effective communication that allows planners and the community to approach the problem from the same perspective of learning and discovery. It also tends to remove notions of hierarchy or expert status assumed by planners by demystifying the process. Collaborative planning can be seen as an effective means of re-establishing the links between theory and practice in the global world reality. This approach to planning emphasizes enhanced learning through collaboration with citizens and various stakeholders. The planner's role as an expert is mostly replaced with that of a moderator and facilitator who pursues consensus through effective communication and dialogue between partners on equal footing. Unfortunately, however, collaborative planning is rarely realized in practice (see for example Swain and Tait 2007; Kumar and Paddison, 2000). A major hindrance is a lack of resources to meet the logistical costs to carry out such time-consuming processes.

Collaborative Learning and Teaching in Planning

Faludi (1987) notes: "Much concern is expressed about the academician-practitioner gap…. Planning education owes society effective, as well as educated, practitioners. So planning

academics should debate the challenges of practical decision-making, even more so than the functions of planning in capitalism" (p. 84).

The case for linking planning education with practice is well-established (Gunder, 2002; Auffrey and Romanos, 2001; Minnery. 2000). Integrating planning practice and planning education helps to address the needs of the employers, the community and the profession. Minnery (2000) argues that incorporating practice in planning education can provide the students with the opportunity to understand the work environment and help to improve the planning system, contribute to developing and enhancing planning theories based on practical experiences, and fulfill the needs of the community and profession. Gunder (1998; 2002), similarly argues that planning education should promote students' understanding of human values, local truths and power in day-to-day life of professional practice while developing their creative abilities.

Benefits from using a collaborative approach in the professional context have thus also been extended to planning education and teaching with positive results. Teaching in collaboration with external actors provides positive learning opportunities for students through exposure to actors in different contexts and to real-life politics (Khan, 2008). Social interaction resulting from collaboration could therefore lead to advanced cognitive development, promoting higher academic achievement (Bosworth and Hamilton, 1994; Bruffee, 1999; Haynes, 2002).

Participating students have been reported to pick up numerous skills useful to planners, such as those related to interpersonal dealings, group building and group management, inquiry, conflict resolution, synthesis and presentation of information (Bosworth and Hamilton, 1994). More significantly, in holistic terms, collaborative teaching/learning is believed to better prepare students for the 'real world' by teaching them the craft of interdependence (Bruffee, 1999).

There are many benefits associated with the collaborative approach to planning education that places academic learning activities in a real setting similar to what practitioners may find themselves in. It offers a pragmatic way to address the theory-practice and academic-practitioner gaps by incorporating community engagement into the curriculum, providing opportunities for learning-by-doing exercises for students. One of the most important assumptions underlying collaborative learning is that "knowledge is created through interaction, not transferred from teacher to student" (Enerson et al., 1997, p. 54). In planning education, this allows students to take the initiative in undertaking community engagement exercises in real-life contexts while still having access to academic supervision and guidance, either from the group body or the lecturer, as required.

Collaborative learning is ideal for local planning studios, engaging external actors or stakeholders within student teams that have been assigned specific tasks. These external actors serve as local resource persons that students engage with to capture local knowledge and develop sensitivity and respect for community values. Carried out at sufficient scale, such tasks could create a channel to bring into academic discussion local contextual differences and how they could be accommodated in developing a broader response to common issues faced by the city.

Collaborative learning and teaching initiatives that take students out into the community to experience real-world contexts yields many benefits (Khan, 2008; Khan, 2006; Bajracharya and Khan 2003). Despite their attractiveness in delivering planning studios, they are seldom implemented at any significant scale or frequency. The main reasons that inhibit the adoption of

collaborative planning are the many logistical issues and resource implications associated with it. These relate to practical matters such as scheduling and organizing site visits and meetings, attending to safety and security concerns of students, the requirement of forward planning to build community components into unit outlines, juggling timetable schedules to match university requirements and community availability, and accommodating last-moment change requests by external parties (Khan, 2008; Khan, 2006; Bajracharya and Khan, 2003).

Another limitation of this approach has been that the study areas covered have been relatively small to allow sufficient intensity of engagement and depth of analysis by student teams. Even when a number of student teams are organised to work independently on defined tasks, logistical limitations of maintaining academic supervision require the teams to be located in relatively close proximity.

A Case for People-Centred Approach to Teaching Planning Theory

Tertiary education providers who aim to produce graduates that could be leaders in their profession need to design both content and delivery of learning that is not only relevant to the current reality but also useful in the future. While the planning school curricula continuously strive to ensure that professional practice is reflected in the curriculum and professional planning institutes press for it, the scholarly content largely reflects planning theory. The currently prevalent wide gap between theory and practice in built environment planning brings into question the relevance of the professional praxis to societal demands, thereby threatening the future relevance of the profession.

Jacobs makes a strong case for integrative and trans-disciplinary theoretical approaches to understanding cities and urban development. He goes further to suggest that they should also be "practitioner and people-centered, rather than scholar-focused". He contends such approaches will greatly benefit the citizens, i.e. those living and working in urban areas as well as those studying them (2016, p. 93).

It is contended that collaborative learning and teaching is ideally suited to provide such an approach to planning education. By requiring students to engage with citizens, including community members, politicians and interdisciplinary experts, as they learn to deal with planning issues, students can be enabled to conceptualize the city and its issues from the perspective of the people who live there and whose lives are shaped by the social, economic and environmental contexts that the city provides. This could also encourge students to understand city dynamics at the level of individual connections that citizens and various actors create among themselves.

Current Opportunities and Possible Resolutions

While the gap between planning school curricula and planning practice needs attention, planning schools also have to contend with changes resulting from challenges faced by their universities in face of rapid changes or disruptions. The advent of the digital age has ushered in phenomenal technological advances, replacing processes associated with gradual and continuous improvement by 'digital disruption'. This new reality of digital disruption has brought forth major changes in the way things are done as "digital technologies and business models affect the value proposition of existing goods and services" (http://searchcio.techtarget.com). Leaders in tertiary education provision realize the gravity of the situation and the relevance of digital disruption to the education sector. "Digital disruption

in all sectors of the economy and the globalization of higher education represents an opportunity for creative response by universities – or else a threat for those who cannot adapt" (Downie, 2017).

In this section, the response of Curtin University to digital disruption is briefly presented. Curtin University has long been engaged in online delivery of units as part of Open Universities Australia (OUA), a consortium of six Australian universities, and also on its own. Almost all of these units also continue to be offered internally in the traditional face-to-face format. Curtin offers online courses in urban and regional planning, construction management and architecture through OUA among many other offerings.

One of Curtin University's major responses to digital disruption and the overall affects of globalization has been the launch of 'Curtin Challenge', an initiative focused on finding ways to personalize learning and assessment that can be delivered at scale. This represents a strategic planning decision to tackle digital disruption in all sectors of the economy and especially the disruptions brought about by globalization of higher education.

The university identified several factors that prompt urgent responses. Firstly, as a service provider (of education), universities need to match students' expectations, which have changed significantly because of the developments around them. Students now entering university expect personalization of their learning experience because they are accustomed to receiving personal attention and having the power of control over their decisions in most other aspects of their globally connected lives. Compared to older generations, they are more used to personalized and customized service. Some examples of such personalized rather than mass-produced services in the digital arena include Über, Amazon, Netflix, Facebook, etc.

The second reason is that the scale of the delivery and assessment of learning and teaching needs to be significantly enhanced. Existing universities need to prepare mechanisms that can handle scale because the global demand for access to higher education is growing. As the British Council has observed: "By some estimates, even if India succeeds in its target of 30% [gross enrolment rate] by 2020, 100 million qualified students will still not have places at university." Even at global scale this is a significant number to cater for. International students not only account for a significant proportion of earnings for universities in developed countries, especially English-speaking ones such as Australia, they also significantly contribute to the national economies of countries that attract these international students. This fact assumes greater significance as government support for universities continues to shrink.

The third reason is that we need new approaches to prepare students for a future workplace that is radically changing. Increasingly, employers want people who can provide evidence that they can:

1. think for themselves and are self-starters;
2. use technology to creatively solve complex problems;
3. work with and lead others to get things done;
4. communicate effectively;
5. empathize with and meet the needs of others with cultural sensitivities.

There is an expressed realization at Curtin that to produce graduates for the future we need to design learning for the future. Emerging business and social realities demand that higher education be agile and innovative in order to create employable graduates who are

entrepreneurial and self-sufficient. From the university's perspective, the following developments have changed the ground rules for the survival of universities:

1. Higher education faces diverse competition. New mechanisms are needed to remain relevant in an increasingly competitive market. Traditionally established global brand universities like Harvard and Stanford now offer low-cost courses in the shape of massive open online courses (MOOC) allowing large-scale interactive participation and open access through the internet. Online learning now uses personalized badged micro-degrees and 'mix and match' programs for future students, undergraduate students and working professionals. Meanwhile, global corporate business giants like IBM and Microsoft have begun to offer in-house degrees.
2. Massification of all knowledge and services is transforming business processes. In bringing knowledge and services to mass audiences through the Web, the way of doing business is being transformed. Über, for example, does not own any cars, yet provides more rides than local taxis in many cities, by connecting riders to drivers in a brand new way. Amazon did not grow its business by creating and owning the production of goods, yet it connects buyers to products worldwide, around the clock. This massification has already hit the education sector and, therefore, higher education needs to learn from examples of such emerging business models and create new ways to connect learners to knowledge.
3. Global and virtual work teams now dominate the landscape. Advances in ICT and their large-scale adoption in the workplace has given a new meaning to working from remote locations. It has become increasingly common for some employees to never meet the key people they work with every day. Many stay at home to play their role in the business. People who know how to self-organize and inspire and work with others are increasingly needed.
4. There is an enormous diversity among students and potential students with a wide range of needs. Curtin recognizes the need and demand for engaging, flexible and interactive online learning experiences. There are massive numbers of diverse, globally dispersed students whom traditional educational program delivery does not suit, whether they are working part-time or full-time, caring for children and parents, managing a career, or balancing many life and work pressures while studying. Effective integration of formal and informal learning experiences could ensure the achievement of a combination of skills required by graduates are achieved, ensuring a new vision of graduate employability.

Curtin University's Response

Curtin Challenge is a platform designed to provide self-directed, personalized learning at scale with automated feedback and assessment in real-time at the point of learning. The platform has the capability to identify and track who does the work on a team to promote individual responsibility among participants. It can also engage students in peer feedback to help develop critical thinking and reflection skills among team members as they work towards solving a variety of common challenges.

Curtin Challenge captures the collaborative actions and products of learners and teams. It promotes active engagement to enable deeper learning, evidence of which is captured through a complex analytics engine. The system has already been piloted and proven to deliver the learning experience in the co-curricula space, delivering support and training as part of informal learning.

Currently there are three 'Challenges' offered by Curtin University: 'Leadership', 'Careers' and 'English Language Proficiency'. Each Challenge comprises 12 to 14 modules that each take about an hour to complete and can be stopped and started at any time. Each module includes around five interactive and engaging activities. Students enrolled in these Challenges have completed over 186,000 activities. Over 10,000 modules have been completed in the Careers Challenge while around 22,000 modules of the Leadership Challenge have been completed since its launch in 2014. Because of the massive scale of uptake, the cost of delivering these learning experiences amounts to 'pennies per student' (Khan, Brunner and Gibson, 2017).
The Challenge is part of Curtin's digital learning and teaching ecosystem, which includes EdX and Blackboard delivery systems and is supported by the university's Analytics Insight team as well as the UNESCO Chair of Data Science in Higher Education Learning and Teaching. Many courses at Curtin, including those related to the Built Environment program, such as urban planning, architecture and construction management, offer core units both in face-to-face and online modes of delivery. The platform allows lecturers to author their own customized Challenge modules and activities from within their online units already on Blackboard. Challenge has also been fully integrated with EdX and uses CISCO Spark for collaborative communications to enhance the MOOCs offered by Curtin to take advantage of personalization and team-based learning features.

In essence, the Curtin Challenge platform integrates gamified learning and allows the university to provide quality co-curricula activities that strengthen the employability and global leadership capabilities of its students to produce industry-ready graduate.

Relying on 'Challenges' to Deliver Collaborative Teaching

The Curtin Challenge is now prepared to deliver formal learning to engage students in both individual and team-based learning and build graduate employability skills for jobs of the future. At this stage it is being introduced into established university courses that would be most suitable to incorporate capstone and other team projects that could most benefit from the platform's affordances.

This section seeks to make the case for urban planning studio units to use the Challenge platform taking into account the nature of the subject matter and theoretical debates and issues related to the theory-practice gap in the discipline discussed above. The urban and regional planning course was among the earliest courses at Curtin to be offered online through the Open University Australia (OUA), soon followed by other Built Environment courses such as Construction Management, Architecture and Interior Architecture. There is also significant experience with employing collaborative learning in urban planning by engaging students with real-life projects in the community. It is contended that urban planning studio classes could naturally exploit the advantages that the Challenge provides on an online gaming platform, particularly where students are located across the globe, such as in the OUA delivery model.

The challenge-based digital 'gamified' online platform is well-suited to run urban planning studio units. Research is needed on whether the platform helps overcome some of the logistical restrictions that prevent wider use of collaborative learning and teaching using traditional modes of delivery. The platform allows sensitivity to pedagogical nuances while delivering a richer learning experience to participants who set out to gain specific learning outcomes.

By enabling students to interact with counterparts located elsewhere in the city or overseas, the Challenge can simulate global workplace conditions. Working in teams with a diversity of perspectives is enhanced due to a wider array of personality types, disciplines, organizational

cultures and socio-cultural norms. It also allows academics and experts (and potentially the community and political decision-makers) to be stationed at remote locations in relation to the students. Local contacts, such as resource persons or various stakeholders who agree to be involved in working teams, are also not required to relocate to contribute to studios. This could effectively introduce experts who have faced different scenarios and arrived at different solutions to add their knowledge into the game and thereby into the education of the students.

A 'Challenge' may be constructed as a simulation of typical professional group problem-solving processes in urban design, bringing the attendant benefits of simulations, one of which is referred to as 'time dilation' for its ability to speed up or slow down the natural speed of processes. Since repetition is a critical part of learning, the experience of many cycles and trials through time dilation can speed up the process of developing expertise (Ifenthaler & Landriscina, 2014; Mislevy, 2011). This allows students to try out numerous alternative solutions, which would be impossible in the real world. A process that could take years can be sped up to take place in a matter of minutes or hours. Conversely, a process that happens very quickly can be slowed down and examined in slow motion. With the capability to incorporate numerous reiterative decision-making cycles at various stages of the exercise, the students and stakeholders could verify and ratify decisions by individual team members before moving on to the next level of problem-solving and decision-making. It could thus provide participants the luxury of making and learning from mistakes, including those resulting from technical shortcomings or misreading of stakeholders' needs, aspirations and priorities.

The use of the Challenge platform for teams of urban design, architecture and planning students could also serve to highlight and reveal the tyranny of incremental decision-making, where small individual decisions made independently of each other or at various stages can produce unintended outcomes of extremes. By generating scenarios based on multiplication of various dimensions of small impacts of isolated decisions made by individuals across various stages of negotiated decision-making, the Challenge could require individual participants and the team to realize the cumulative impacts each decision could lead to and work out ways to avoid unacceptable outcomes by changing priorities and/or finding room for compromise. The Challenge platform can facilitate the illustration of principles and objectives of strategic planning that sets out a long-term planning vision for our community in the future and the need for short-term and medium-term initiatives that need to be in place to get us there. In the process, it can reinforce strategic planning's basic decision-making cycle, which features monitoring and review of outcomes and realignment or resetting of directions. Records of all communications between team members and products or outputs by each member are easily accessible and printable as reports. This feature aligns well with the focus on documentation of decision-making and justification of decisions as required in any governance structure to demonstrate accountability and transparency.

Designing challenge-based learning for urban planning is envisaged as a collaborative team-based effort involving technical staff, such as people skilled in dramatic narrative, mechanics of game-like interactions and rewards, digital-media artists and communicators, and people who can use computational science tools for algorithms and visualizations (Gibson, Aldrich, & Prensky, 2007). For the academic content, planning academics will engage with experts from associated disciplines and local resource persons such as politicians and residents relevant to the specific studio exercise. The mission of such a team when creating challenge-based learning experiences is to create a digital learning space where trans-media engagement (Passalacqua & Pianzola, 2011) and multi-disciplinary thinking can evolve through a highly participatory experience shared by those who take up the challenge.

The digital teaching structure thus created will see collaboration among interdisciplinary subject-matter experts working with learning-experience designers and technical teams. The instructors, including academics and experts, will construct studio exercises in the shape of a Challenge, embedding key ideas, essential questions, resources, and evaluation criteria. The main contribution of the academics/experts will be upfront in setting up the problem and the basic resources that allow participating teams to be self-guided toward the desired end goals. At this stage extensive collaboration will be sought with technical experts including gaming designers to structure the various stages and progression paths for the tasks comprising the studio exercise.

The Challenge format also has the flexibility to allow other resource persons or experts (community members, industry representatives or participants from governance structures concerned with the resolution of the problem) to be invited to become involved if called on by a group that is undertaking the challenge. This empowers the team to further customize their approach to resolve the problem that they set out to solve.

Conclusion

It has long been realized that planning schools must ensure that their curriculum deals with reality and can prepare graduates that are ready to go beyond doing more of the same. Students need to be exposed to the settings they are being trained to shape. They need to be given the opportunity to engage with the community they aim to serve as professionals. In order to build the required graduate attributes and professional skills and values, wherever possible students should be provided learning experiences that encourage them to experiment, explore and innovate in simulations of reality.

Current and updated knowledge should be created to inform planning curricula. The gap between theory and practice needs to be reduced by ensuring that the theory is informed by reality, or more specifically, the changed reality. This is essential in ensuring students and future professionals are adequately informed and able to play a leadership role in transforming society and culture.

While collaborative learning and teaching is a tried and tested method to bring theory and practice closer together and connecting future planners to reality, they put unsustainable demands on university resources that continue to shrink. Disruptions due to rapid-pace changes ushered in by globalization underscore the necessity of planning school curricula to connect with the changing physical, cultural and social contexts and the community they influence. Planning academics could use these engagements and interactions with real-life contexts to inform planning theory while equipping future professional planners.

As universities are being forced to adapt to digital disruptions that require fundamental shifts in the approach to deliver courses, it is imperative that the challenges are turned into opportunities for innovation. The success of co-curricular courses in the Curtin Challenge shows how ICT advancements and value-changes in the younger age cohorts because of that can be harnessed to reach diverse and dispersed students at very little cost per student. This paper explored the possibilities of how the Challenge's online gaming platform can serve as a mechanism to offer collaborative learning and teaching experience to students working in online teams while engaging with experts and local resource persons. This should enable the university to offer meaningful, engaging collaborative planning experiences in close simulations of real-life contexts. This paper described the potential of using the online gaming platform to deliver local planning studios along collaborative learning and teaching principles while avoiding logistical

and resource investments associated with its conventional delivery. By entering or altering a few parameters, the established Challenge framework could allow numerous planning problems to be addressed in a simulated context that closely reflects complex reality without requiring significant technological changes. 'Challenge' based planning studios could thus be created to deliver collaborative learning and teaching to explore solutions of planning problems in local settings from various actors' points of view. They would also simultaneously serve to promote the soft skills and develop interpersonal and intercultural sensitivity among students, i.e. the type of skills that are now being emphasized in the workplace.

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