

The Link Between Learning Spaces and Employability Outcomes

Ratna Selvaratnam

Edith Cowan University, Australia

Universities are investing considerable funds in designing and building innovative learning spaces without knowing the positive impact on student learning and their achievement of employability skills for the 21st century. There is a possibility of designing these new generation learning spaces to enable active and deep learning approaches to be employed to improve student learning outcomes and their achievement of employability skills. This paper proposes that an evaluative framework for innovative learning spaces and tools to measure the impact of these learning spaces on students' achievement of employability skills is a worthy endeavor. Best practice innovative active learning strategies can then be identified and incorporated into a professional learning module for academics teaching in higher education. The outcomes can guide universities in developing learning spaces that maximize student learning consistent with 21st century employability skills.

Introduction

The aim of this paper is to establish that an evaluative framework for innovative learning spaces and tools to measure the impact of these learning spaces on students' achievement of employability skills is a needed research consideration. The focus would be on how interactions among students in these environments can be designed – through active learning strategies - to support the development of 21st century learning skills, including communication, collaboration, critical thinking, and creativity which are important attributes of employability.

Universities have made significant investments in their learning spaces in recent years. In many cases, new buildings have been designed with the view that students will be engaged in technology-rich, active and collaborative learning experiences. Currently, there is emerging research undertaken in the primary and secondary education sector on the impact of learning environments and spaces on learning experiences and outcomes (Byers et al., 2018). A recent study found indications of a relationship between types of learning environments, teaching practices, teacher mind frames, and student deep learning (Imms et al., 2017). However, little is known about how learning spaces facilitate active learning strategies and its impact on student learning outcomes in the higher education sector. Given employability is a key outcome of higher education, there is an important need to fill this gap in knowledge.

The purpose of re-designing the architecture around student learning has been to enable effective learning and teaching strategies to be incorporated in increasingly technology rich, and even spatially larger, learning spaces. Teaching spaces such as lecture theatres have traditionally been modelled on transmission forms of teaching. Within these spaces, teachers have endeavored to incorporate active learning strategies using technologies e.g. clickers (Trees & Jackson, 2007), and techniques such as Think-Pair-Share (Kaddoura, 2013). New generation learning spaces have increasingly replaced traditional teaching spaces and are usually enhanced with technologies that aim to support active learning and enrich the student experience. With the new affordances enabled by these innovative learning spaces comes an opportunity to incorporate additional learning outcomes including those that have been identified by employers as key 21st century employability skills (Binkley et al., 2012; Brooks, 2011; Griffin, 2015). Research is needed to fill the gap in higher education that exists in evaluating the effectiveness of innovative learning spaces facilitating active learning strategies which support student outcomes related to 21st century employability. This information will help universities effectively build new, and refurbish existing, learning spaces and help educators design innovative pedagogies. Universities will be able to ensure their learning spaces are meeting desirable learning outcomes.

Employability and 21C skills

The contemporary student learning experience incorporates a blend of online and face-to-face hybrid

Ratna Selvaratnam is Manager of Learning Technologies & Innovation, Edith Cowan University.

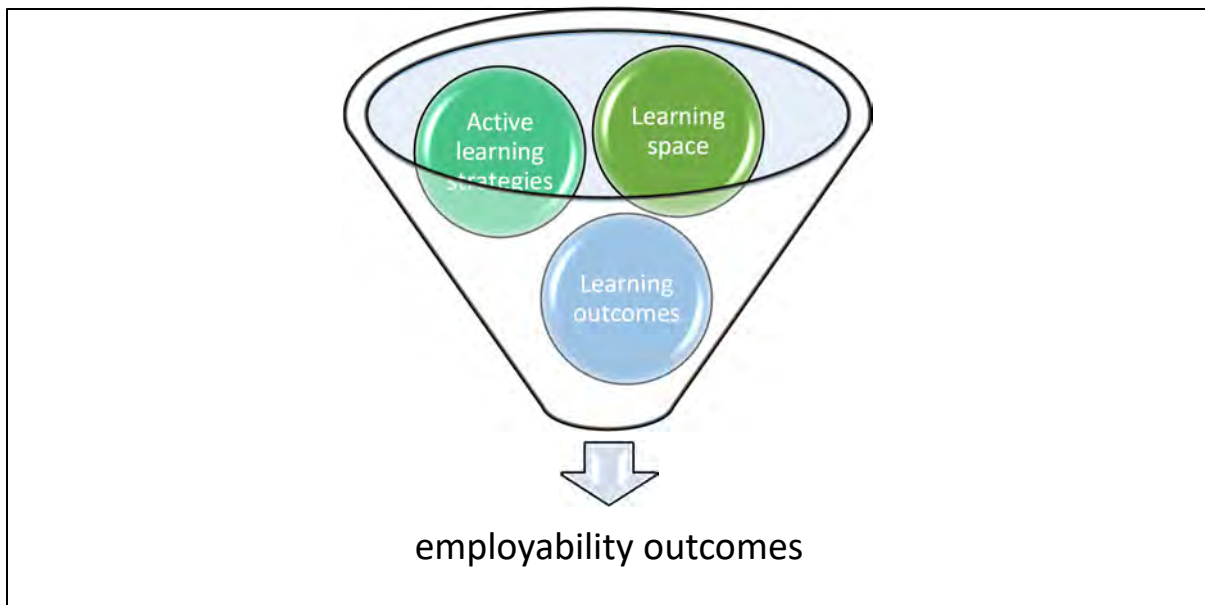


Figure 1. The relationship between active learning strategies, learning space and learning outcomes with employability outcomes

learning spaces. The flipped learning model is increasingly being incorporated so time spent actively learning in the classroom is maximised to ensure that students explore knowledge at a greater depth and in a manner that is personally meaningful (Flipped Learning Network, 2014; Roehl et al., 2013).

In parallel, employability is increasingly becoming an essential outcome of all higher education learning experiences (Knight & Yorke, 2006). Employers consistently rank their number one attribute for potential employees as strong interpersonal skills and the ability to communicate with others. The second most important is a passion and commitment to the industry students will be joining. The third is students' analytical and problem-solving skills. These outcomes have become known as the 4Cs of 21st Century learning skills: communication, collaboration, critical thinking, and creativity. Programme for International Student Assessment (PISA) recognises that collaborative problem solving, an essential 21st century learning skill, is a critical skill in education and the workforce (Binkley et al., 2012). The PISA 2015 collaborative problem-solving assessment matrix identifies three major competencies which are: establishing and maintaining shared understanding, taking appropriate action to solve the problem, and establishing and maintaining team organisation. These competencies are crossed with the four major individual problem-solving processes which are: exploring and understanding, representing and formulating, planning and executing, and monitoring and reflecting. Together, they form a matrix of specific skills

(PISA2017) which can be the focus of research with learning spaces.

Opportunities to develop employability outcomes need to be reconsidered in a time when self-employment, part-time, and short-term work is becoming common, and terms like the “gig worker” and “sharing economy” are rising in popularity (Charlton, 2015). Today's student is also having to reckon with the changes that come with the COVID-19 pandemic and acute climate crisis. In light of this high level of disruption, employability can be redefined:

Employability means that students and graduates can discern, acquire, adapt and continually enhance the skills, understandings and personal attributes that make them more likely to find and create meaningful paid and unpaid work that benefits themselves, the workforce, the community and the economy. (Oliver, 2015)

Professional currency in models of 21st Century learning need to consider legacy pedagogical approaches which are not conducive to learning for professional capability in the digital age and may prefer a range of online and face-to-face social learning strategies (Bridgstock, 2016). Overall, social skills, such as persuasion, emotional intelligence and teaching others, will be in higher demand across industries than narrow technical skills in what is termed the 4th Industrial Revolution (World Economic Forum, 2016; *The New Work Smarts*, 2017). Content skills (which include active learning), cognitive abilities, and process skills will be a growing part of the core skills requirements for many industries.

Pedagogy and space

An important gap for universities to consider is the kind of teaching and learning activities that they offer in their learning spaces and whether they take into account future needs in employability and professional currency. Learning space research is a relatively new field of study, especially in higher education (Ellis & Goodyear, 2016), and there is a gap in linking space affordances that facilitate learning strategies to employability skills. Spaces are also increasingly hybrid with physical locations having digital extensions, and vice versa, although not always with success (Ellis et al., 2018). The redesign of learning spaces is an important trend for universities to accommodate pedagogical shifts to include greater mobility, flexibility, and multiple device usage (NMC, 2017).

While the technological, spatial, and pedagogical dimensions of designing and evaluating space has generally been acknowledged as suitable practice (Radcliffe et al., 2009), many universities still deal with technology development and infrastructure separate from academic development (Abualrub & Stensaker, 2017). The Learning Spaces Collaboratory (2020) acknowledges the physical design of a space is conducive to robust learning when planners ask questions around the evidence linking learning and the physical campus, the generational gap in planning and learning between builders, and the larger contextual issues in designing learning spaces. Interestingly, there is also a lack in linking organisational administrative arrangements and networking opportunities for students from academic development (Ling & Fraser, 2014).

Research has proven that consistently well-designed learning spaces can facilitate active learning even when the implemented pedagogies may vary (Beichner, 2014) though some argue otherwise (Vercellotti, 2018). Additionally, varying levels of students' academic ability is not a factor in the overall positive effect on creativity and innovation with learning environments supporting active learning pedagogies such as co-operative, collaborative, and team-based learning (Chiu & Cheng, 2017). Further validation of the impact on student learning comes from students' positive perception that they acquire creativity and teamwork skills in such spaces (Martinez et al., 2014). Students are inspired and feel encouraged to participate regardless of their academic performance (Park & Choi, 2014).

Student agency is also a factor when considering outcomes of learning spaces. Research of students shows that being in a learning space where individuals feel confident exercising their agency through participation and recognition significantly enhances their motivation to learn. A study in 2015 considered the notion of space and its interrelationships with learning and considered how

individual learning processes are configured through three dimensions that relate to the development of agency and engagement including the potential utility of space (Kersh, 2015). Having said that, best outcomes come from students who are prepared to some degree to collaborate and who are conversant with the relevant technologies, if they are used, so as to keep the flow of learning going and to build a sense of community before/outside the learning block so that they feel connected to each other (Bower et al., 2015).

The question then arises: what is an effective or successful learning space? There has been some work done in evaluating learning spaces (Lee & Tan, 2011) with the Learning Space Rating System (LSRS) being a comprehensive tool providing a set of measurable criteria to evaluate the affordances of active learning (Elliot & Malcolm, 2011). Further, there is significant research carried out since 2008 within the emerging, evidence-based, translational design approach to learning environments research by the Learning Environments Applied Research Network (LEaRN) of the University of Melbourne (Fisher, 2016). LEaRN has also produced 13 approaches to learning environment evaluation to test whether these new environments work, and if so, in what ways (Imms et al., 2016).

However, the focus of these evaluations of learning spaces has been on usability rather than learning outcomes. In recent work, current classroom and campus designs were analysed for common themes and features in innovative spaces as a starting place for specification of design concepts and model development recognising that this in turn affects students' competence in collaboration (Lamb & Shraiky, 2013). Potential models have been proposed linking this preliminary set of design concepts to student competencies for future study on the impact of collaborative design spaces on student outcomes.

An insightful study at the University of Minnesota evidences that, holding all factors excepting the learning spaces constant, learners in a technologically enhanced environment conducive to active learning techniques outperformed their peers who were taking the same course in a more traditional classroom setting (Brooks, 2011). Positional discrimination is also reduced in collaborative spaces (Park & Choi, 2014). Further, designing or redesigning a course for innovative learning environments has a significantly positive impact on student learning on various levels of abilities (Brooks & Solheim, 2014). Hence a pedagogical shift is also important, contributing to the power of built pedagogy or how space affects teaching and learning (Oblinger & Educause, 2006). This results in responsive pedagogies allowing students to engage in a variety of learning experiences including collaboration (Imms et al., 2016).

Conclusion and recommendations

A learning environment thus needs to ensure there are collaborative affordances for it to have the impact on a students' learning which can then lead to translatable skills for employability. Attempts to create a pedagogic framework for learning spaces highlight the need for rich learning environments that reflect the real world, are interactive and collaborative, offer networking opportunities, and incorporate active learning strategies like problem-based learning (Ling & Fraser, 2014). To summarise, there is value in research which will identify the combination of suitable learning outcomes, active learning strategies, and learning space affordances which will be suitable to current definitions of employability and global contextual uncertainty including the COVID-19 pandemic. Universities and other institutions can benefit from this in designing future spaces and enhancing existing ones.

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