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Designing learning spaces in higher education for autonomy: Preliminary findings and applications

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Learner autonomy underpins many of the educational outcomes at university such as flexibility, adaptability, self-initiative and self-direction. Indeed, learner autonomy is a key to life-long learning. This paper reports on research investigating the ways designers of innovative learning spaces incorporate customisable, (re)configurable and flexible features that support and encourage learner autonomy. The research aims to elicit high-level design principles that may prove useful in design for learning more generally – including design for learning in virtual and hybrid (physical and virtual) spaces. The research involved seventeen learning spaces across eight universities, observations and interviews with educational stakeholders, and architects and interior designers of those spaces. Preliminary findings suggest designers aim to empower students by providing configurable spaces fitted out with modular furniture and ubiquitous technology – emphasising choice. The paper ends by reviewing the application of these design ideas to broader problems and opportunities in 'design for learning' research and practice.

Keywords: learning space, design, higher education, autonomy, self-directed learning

Introduction and background

As universities develop and re-develop campus precincts and buildings, there is growing interest in providing common spaces for learning, and specialised, innovative spaces for teaching that meet the needs of 21st century learners. Learning space design is complex, multidisciplinary and relatively new. Since Temple's (2008) claim that it is under-researched, the area has experienced growing attention in higher education (e.g. Boddington & Boys, 2011; Boys, 2011; Radcliffe, Wilson, Powell, & Tibbetts, 2009). Quite often, this research extends to examine both the physical and digital spaces available for learning (Häkkinen & Hämäläinen, 2012; Jamieson, Fisher, Gilding, Taylor, & Trevitt, 2000; Keppell, Souter, & Riddle, 2012). The relationship between designed space and student behaviour is emerging as an important line of inquiry that contributes to broader 'design for learning' research and practice. The field of learning space design is producing some useful environments for students. However, Boddington and Boys (2011) rightly question the undeveloped theory informing the design of learning spaces, and they call for effective frameworks that support the design process (pp. xi-xii). To do this, more empirical research is needed. The research reported here investigates the ways designers of innovative learning spaces incorporate customisable, (re)configurable and flexible features that support and encourage learner autonomy, self-regulation and a sense of ownership by revealing design intentions and decisions.

The importance of learner autonomy as an educational outcome has a long history in higher education (Boud, 1981; Brookfield, 1985; Knowles, 1975; Tough, 1967). The concept of learner autonomy has a range of definitions, and is debatable as an ideal (Lewis, 1978), but remains central to contemporary accounts in learning in education and psychology (Tennant, 2012). Learner autonomy is often used synonymously with self-directed learning (Brookfield, 1985; Knowles, 1975), self-regulated learning (Zimmerman, 2002) and learning-to-learn (Hounsell, 1979), but a common theme among these terms is the ability to take responsibility of one's learning. Boud (1981) suggests autonomous learners will (a) plan learning experiences, (b) find resources required for

learning, (c) create problems to tackle, (d) choose where and when to learn, and/or (e) learn outside the confines of the educational institution (p. 23). While significant attention has been paid to the importance of autonomy in higher education, rather little is known about how to design for autonomy. The field of language learning offers some noteworthy exceptions (e.g. Cotterall, 1995). As Goodyear (2000, 2005) has pointed out, the core tools and methods of instructional design may work well in situations where outcomes can be tightly prescribed, and where learners are compliant, but they are not so useful when the learning processes and outcomes involve autonomy, self-directed learning, flexibility, creativity, adaptability, and life-long learning.

Reports on learning space design point to some key features of effective learning space. The UK's Joint Information Systems Committee (JISC, 2006) advocates that effective learning space designs are likely to assist everyone within an institution to work more productively and to produce learners who are confident, adaptable, independent and inspired to learn (p. 2). To achieve this, JISC suggest that learning spaces need to be *flexible* to accommodate both current and evolving pedagogies, *future-proof* to enable space to be re-allocated and reconfigured, *bold* to look beyond tried and tested pedagogies and technologies, *creative* to energise and inspire learners and tutors, *supportive* to develop the potential of all learners, and *enterprising* to make each space capable of supporting different purposes (JISC, 2006, p. 3). More recently, Souter, Riddle, Sellers, and Keppell (2011) suggested design principles that (a) create a sense of mental well-being, (b) recognise symmetry, harmony, simplicity and fitness for purpose, (c) create a sense of immersion and flow in learning, (d) consider the needs of cultural and physical differences, (e) offer a mixture of technological and face-to-face pedagogical resources, (f) consider affordances, and (h) enable repurposing.

Methodology and preliminary findings

Table 1 provides an overview of the sites and spaces used in this research, showing which involved observations of students' activity within the spaces and which involved interviews. The sites were not selected randomly (i.e. there is no claim that they are representative of some broader population). Most of the sites were recommended as examples of innovative spaces where it was possible to interview the architects/designers. Eight universities, located in Australia, Hong Kong and the UK, participated in the study. Seventeen learning spaces were involved. Semi-structured interviews were held with eighteen people, mostly architects and teaching and learning specialists, and some interior designers.

Table 1: Research sample of learning spaces and stakeholders

Site	Description	Observation	Interviews with stakeholders
A1	Library	Yes	Architect
A2	Library	Yes	Architect and interior designers (2)
A3	Multipurpose building		Architect
A4	Learning hub	Yes	Architect and interior designers (2)
A5	Learning hub	Yes	Architect and interior designers (2)
A6	Learning hub	Yes	Architect and interior designers (2)
A7	Library	Yes	*None.*
A8	Multipurpose building		Architect
B1	Library	Yes	Architect and librarians (3)
C1	Library	Yes	Librarian and learning space academic
D1	Learning commons	Yes	Architect
D2	Multipurpose building		Architect
D3	Multipurpose building		Architect
E1	Multipurpose buildings	Yes	Learning and teaching academic leader
F1	Multipurpose buildings		Educational development manager
G1	Library		Architect
H1	Multipurpose building	Yes	Academic leader, educational manager, e-learning advisor

Observations enabled insight into the ways innovative learning spaces are being utilised by students and helped to inform subsequent interview schedules. The interviews have been analysed using a grounded theory open coding approach (Corbin & Strauss, 1990). The following six design features emerged as contributing to learner autonomy in various ways. Each feature is discussed and illustrated with a representative quote.

1. Design for a sense of welcoming and openness while keeping a sense of security

Designers described a need for openness and transparency that connects outdoor space with indoor space, as well as new space with existing space. Openness extends to the way spaces should invite people (including the general public). However, it is important for spaces to also provide a sense of security and safety. The use of

glass allows light to spill into a space, opens it up and maintains a sense of security. Used in clever ways, glass can open spaces to reveal hidden views of gardens, landscape and other appealing sights.

> We're trying to really blend the welcome into the building through landscapes so it's a physical permeability, so you can walk in, you're welcomed in, it's not shutting you away and closing so you don't feel like you're breaking through a façade to enter the building. (Architect)

2. Design for home-like comfort

The provision of home-like comforts is increasingly used to encourage students to spend both recreational and academic time on campus in learning spaces. Amenities such as kitchens, boiling water, showers, lockers, lounges, TVs, and cafés provide comfort and function to support some basic human needs.

> You get students in there [the library] who are living in there all day and a lot of the night and they're probably spending over twelve hours a day in that library. So it starts to become their home. So you need to provide different settings – lounge settings and kitchen facilities and there's places where people can go and heat up their lunch. (Interior designer)

3. Design for way-finding

Way-finding aids in orientation and makes using a space easier. A hub, a central point of activity and special interest, may act to draw people together, and offer choices such as pathways to facilities and other spaces. Hubs also aid in way-finding or orientation in space and often extend across multiple levels in buildings.

> A hub has all these spokes and the spokes are the students walking towards the hub. (Architect)

4. Design to encourage different types of valued behaviour

Design to support a constructivist approach to learning, and student-centred, collaborative, and experiential learning has emerged as a feature in new learning spaces. Collaborative spaces are often designed for small groups and offer shared tables, large touch-screen monitors, local computers, and large writable walls. These types of spaces have various names, including learning pods, presentation pods and private study rooms. Areas for individual study, large groups and quiet reading are also common features of new learning spaces.

> They want the freedom – they want choice, right? So what does that mean? It means a choice of activity-based learning. So it's about different learning styles. We use architectural division in the space and fixed elements in the space to retain a sense of purpose around the behaviours that we were trying to promote in certain parts of each space and to at least give the university some comfort in knowing that the spaces would hold together. (Interior designer)

5. Design for balance (flexibility vs. fixed)

Designers described a balance of fixed and configurable or flexible components that enable user control and self-initiative. There are some parts of design that cannot be flexible – a fire exit, for example – and there are other fixed components that are often an integral part of a client's brief. The balance between fixed and flexible features is a challenge that requires a deep understanding of stakeholders' needs.

> If people don't have the ability to manipulate their environment then they feel constrained and disconnected from it. I think it's a balance between getting the spaces that need to be fixed in their right location, but then allowing the rest of the space to do it's own thing. (Architect)

6. Design for seamless ubiquitous computing

The prevalence of power points and wireless connectivity for students' personal computing devices is a main feature of modern learning spaces and reflects the increasing use of personal devices on campus. Power is often found at the foot of furniture, indoors and outdoors, and in storage lockers. Students', personal devices may be connected with university infrastructure such as large sharable touch-screens in collaborative settings. Advances in wireless technology enable stronger signals to reach the more isolated parts of campus and connect a greater number of devices at any one time.

Power is a massive requirement in every space in this – in the area, because people need the ability to bring out a laptop that has low charge and be able to plug it in. (Architect)

Discussion and future direction

These preliminary findings describe several key design features that enable and support learner autonomy. Boud's (1981) suggestion that autonomous learners find resources for learning, and choose when and where to learn, is *scaffolded* by the provision of open, welcoming and secure (home-like) spaces for learning (features 1 and 2). Without these fundamental features, students are more likely to go home, go to the city, or the park or café down the road. They help make the campus 'sticky'. Closely related to these human needs are spatial way-finding enablers (feature 3), such as hubs, which make finding places, facilities and tools for learning easier. Without these visual cues, navigating space becomes troublesome, which is likely to discourage students. The significance of encouraging different types of valued behaviour (feature 4) is the provision of choice, which is guided by expert advice. Choice is fundamental to the notion of taking responsibility. Fixed and modular furniture, and technology that allow students to plan and customise their learning environment (feature 5) resonates with Boud's (1981) suggestion that planning is a key characteristic of autonomous learning. This design feature provides fertile ground for students to customise their environment as they self-direct their learning. Finally, by enabling seamless ubiquitous computing (feature 6) designers encourage freedom, flexibility, independence, mobility, and agility, which are integral to empowering autonomous learners.

It is encouraging to see parallels between these preliminary findings and the reported design principles for learning spaces described earlier. The next steps in this research involve (1) completing two further iterations in the analysis of the data – axial and selective coding (Corbin & Strauss, 1990), (2) generalising the design features for application to broader design for learning, and (3) conducting retrospective interviews with educational designers to gain insight into how high-level design principles might by applied to educational design. For example, these principles could inform the design of *scaffolds* in virtual and hybrid (virtual and physical) spaces that encourage but not insist upon behaviour that underpins autonomous learning.

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