Physical and Virtual Learning Spaces in Higher Education:

Concepts for the Modern Learning Environment

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Chapter 15
Re-Imagining Teaching for Technology-Enriched Learning Spaces:
An Academic Development Model

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ABSTRACT

New technology-enriched learning spaces are a focus of institutional investment to address the identified shortcomings of traditional teaching and learning environments. Academic development, an area that has received little attention in this context, can be designed to provide strong opportunities for university teachers to re-imagine their teaching for these new spaces while also building their leadership capacity. This chapter discusses challenges that teachers face in transforming their teaching practices and proposes a model for academic development to support this. Two case studies demonstrate the flexibility and efficacy of the model and provide pointers for further adoption in the higher education context.

INTRODUCTION

This chapter highlights the need for a stronger focus on academic development to enable teachers to re-imagine their teaching for technology-enriched learning spaces. In order to assist academics to adapt to new teaching and learning environments a translation process is required. This process should include identifying the opportunities offered by technology-enriched formal learning spaces for teachers' own contexts and re-designing student learning with peer support and review. Specifically, the model outlined here seeks to improve support for academic teachers in the design of pedagogical activities for technology-enriched learning spaces while simultaneously building leadership capacity to sustain change at local disciplinary levels.

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BACKGROUND

In recent years the higher education sector has recognised that the spaces within which university teaching takes place can have a major impact on student learning.

The spaces in which we work, live and learn can have profound effects on how we feel, how we behave, how we perform ... spaces can also limit the possibilities of our activity, restricting us to old modes of working and thinking (Watson, 2007, p.260).

Consequently, many universities have realised that in order to promote more active, student-centred teaching and learning activities, different physical and virtual spaces are required to those traditionally available in most higher education institutions. Accordingly, sizeable investment is being made in designing and creating technology-enriched formal spaces across higher education institutions (Oblinger, 2005; Watson, 2007). These spaces are innovative physical learning environments equipped with a wide-range of technology tools and are designed to support new ways of teaching and learning. While there are significant differences in the types and purposes of the spaces being provided, common characteristics that define these innovative formal spaces are:

- the use of technology to support learning and teaching activities and
- the requirement for flexibility; and increasingly adaptability.

These new technology-enriched learning spaces are designed and built to support active, social, collaborative and independent learning. Consequently, these spaces, which offer a rapidly expanding range of technologies and configurations, confront traditional assumptions about teaching and learning. In turn, this creates challenges for teachers working in these new spaces to re-imagine their teaching, learning designs and practices and actively promote more student engagement in the learning process.

Physically, these new learning spaces are usually visually attractive, designed for a range of educational purposes and equipped with state-of-the-art technologies. However, there is reportedly some tension between the desire to justify the expenditure on these new spaces in terms of enriched student learning, and the support of innovative teaching and learning practices (Pearshouse, et al., 2009). While the spaces have been designed with a view to transforming student learning and knowledge creation (Punie, 2007), little attention has been given to helping mainstream university teachers to transform or re-imagine their teaching practices in ways that these spaces and technologies can afford. When confronted with these new technology-enriched spaces, many university teachers feel ill-equipped to re-imagine their teaching practices so have reservations in relation to the commitment required to capitalise on the affordances enabled by these spaces. Furthermore, a focus on research in the promotion processes of many higher education institutions leaves little time to develop new pedagogical understandings and skills to effectively utilise technology-enriched learning spaces. University teachers require opportunities and time to reconcile their pedagogical beliefs, beliefs about technologies and the pedagogical affordances inherent in these spaces with their pedagogical contexts (Steel, 2009a). A crucial part of this re-imagining process is to create opportunities for teachers to rethink their learning designs so that they can effectively harness the potential teaching and learning opportunities offered by these spaces.

THE COMPLEXITIES OF RE-IMAGINING TEACHING

A significant problem for higher education institutions is that the complexities involved in changing

educational practices for these new technology-enriched spaces are often overlooked in terms of both leadership and academic development. Such a change requires an equivalent shift in teacher and student roles and relationships and is not necessarily comfortable or economic for many university teachers. As with any change to daily practices, people need to be convinced of why change should take place (Vrakking, 1995) and inspired and supported to make that change. Providing opportunities for 'supported mutual introspection' (Carew, Lefoe, Bell, & Amour, 2008) through peer review processes is one approach to motivating academics to undertake changes to their teaching practices. Building leadership capacity throughout this process addresses the continuing need for academic leadership development in higher education, particularly in relation to teaching and learning practices. Academic development programs need to explicitly promote the development of leadership skills necessary to undertake the 'radical change to the status quo' required to effect new teaching and learning practices (Lefoe, 2010).

Leadership as a Critical Component

Leadership is crucial to ensuring that university learning and teaching change initiatives have the best possible chance of success. However leadership capacity development is an area of higher education that has been ad hoc, particularly beyond the realms of management and administration (Lefoe, 2010). Changes in teacher practices require different levels of distributive leadership that can empower, enable and support teachers while appreciating and engaging with their cultural codes and assumptions. Leadership is needed at various levels to enable university teachers to be part of the vision for change and to help teachers address the challenges that they face personally, as teachers, and as part of a cultural organisation.

Universities are places of great teacher diversity (Steel & Levy, 2009) as well as homes to many disciplinary and faculty-based cultures. Teachers hold different beliefs about their disciplinary knowledge, how it is taught, how students should learn and the role and value of technology. Their beliefs and teaching practices are also influenced by institutional and local teaching cultures. These cultures represent differing and sometimes conflicting interests, disciplines, beliefs and values. From a cultural perspective, these are "the informal codes and shared assumptions of the individuals who participate in an organisation" (Tierney, 1996, p. 372). They can also be expressed in relation to educational practices such as those that might take place in new learning spaces. Trowler and Cooper (2002) suggest that these cultures can be understood within the notion of teaching and learning regimes (TLR). TLRs comprise an interrelated collection of local "rules, assumptions, practices and relationships related to teaching and learning issues in higher education" (Trowler & Cooper, 2002, p. 221). For example, negativity around changes to practices can be derived from the local rules around what comprises appropriate teaching practices (Sahin & Thompson, 2006). Expectations around transforming teaching practices can be at odds with local TLRs. Thus, there is a need to build capacity for educational leadership at local levels and with teachers who are privy to those codes and also open to moving beyond them. Some have suggested that distributive leadership, as a mechanism for the sharing of knowledge, practice and reflection on practice, can be an effective collegial tool for moving teaching and learning innovations forward (e.g. Knight & Trowler, 2001; Lefoe, 2010). Distributive leadership offers distributive power sharing in order to transform TLRs and help colleagues re-interpret teaching practices meaningfully in connection with cultural rules and assumptions for new technology-enriched learning spaces. This kind of distributive leadership can be further strengthened by the involvement of academic developers as both colleagues and partners in initiating and supporting change and learning. The benefits of

these kinds of collegial-partner leadership roles lies in the ability to meaningfully interpret local TLRs through localised leadership in partnership with higher education researchers and specialists (academic developers).

Staff development is a critical part of any change process. Changes in learning and teaching methods can require significant changes in both academic and support staff roles. In order to enable staff to get the most out of their new roles there need to be development opportunities made available (JISC, 2009).

The field of academic development has recently been described as 'elastic practice' (Carew, et al., 2008) because academic developers are able to draw on a 'toolkit' of theories, strategies, techniques, ideas, values and experiences in order to respond to the varying contexts they work within. Across the discipline of Higher Education they are leaders, educational researchers, practitioners, scholars and change agents whose role, in part, is to stimulate the kinds of academic conversations and reflective practices that underpin pedagogical growth and transformation. Academic development is a more valued and valuable experience when integrated into a distributive leadership environment that forms constructive partnerships with faculty-based leaders, senior management and leaders in related areas (such as IT and support). As Kotter (1996, p. 6) suggests, without "a sufficiently powerful guiding coalition" change initiatives experience "countervailing forces" such as tradition, self-interest and passive resistance.

The Need for Academic Development for 21st Century Learning

With the current demands placed upon university teachers for technology-enriched 21st Century learning and purpose-built 21st Century learning spaces, the need for academic development strategies to enable academic teachers to move forward, are critical (Hughes, 2009). As Diaz et al. (2009), point out, while academic development needs are not new, new areas of need are emerging:

21st-century faculty ... will need support in new areas as well: keeping up with an increasingly technological workplace, developing ways to further integrate technology into the instructional experience (p. 48).

Hooker, (2008), suggests that while technologies provide many opportunities for teachers they also create many challenges. Not only do teachers need to be able to develop the technical skills to use the new technologies effectively, they also have a need to consider the pedagogical aspects of using these tools. Academics can be sceptical of the stated learning benefits of using technologies in teaching and learning largely due to the overwhelming emphasis on the technology in contrast to any overarching pedagogical framework (Waldron, Dawson, & Burnett, 2005, p. 4). As part of the process of developing skills and identifying affordances in relation to the use of ICTS, Hooker, (2008) quoting Papert (1990), emphasises the importance of providing "opportunities for teachers to reflect on their practice as they make use of the technologies so that they can become *active generators* rather than *passive consumers* of knowledge" (p. 2). However, to become active generators, strategies need to be formulated that enable academics to overcome critical issues in relation to their ability to rapidly and effectively adopt pedagogically appropriate technologies for a range of teaching and learning contexts in higher education. Indeed, the identified need for improved ICT skills amongst academic teachers is critical in overcoming the 'digital divide' in the provision of higher education in a 'web 2.0 world' (Hughes, 2009). However, further to this, Young (2008) highlights the importance of not losing sight of the 'endgame' and cautions that the key focus of academic professional development needs to be the enhancement of student learning. With that

in mind we need to consider how we can assist teachers to "develop increasingly sophisticated and complex conceptions of teaching so that they might more readily think about teaching in new ways" (Young, 2008, p. 42).

As new learning and teaching spaces are usually designed with pedagogical transformation in mind, context-specific academic development needs to be integral to the development and implementation of new technology-enriched learning and teaching spaces. Academic development strategies need to address local TLRs, personal belief systems and help teachers renegotiate their pedagogical vision and student-teacher roles and relationships. Teachers need convincing of how these spaces can be used with different technologies to positively influence student learning. Furthermore, academic development opportunities need to be targeted at better equipping teachers to identify the affordances and constraints of these spaces and technologies in relation to their belief systems and the pedagogical and cultural contexts they operate within.

Persistent Issues Around Technology Adoption and Integration

While not focused on learning spaces in particular, technology adoption and integration into university teaching and learning practices continues as a persistent issue. Although various technologies have been widely available for some time and promoted for their ability to transform learning, this promise has not yet been realised (Hedberg, 2006). There are a number of recursive and interactive factors that influence teachers' decision-making around technology use. These include teachers' own pedagogical beliefs and beliefs about the value and application of technologies as well as their own cultural and pedagogical contexts. Successful academic development for effective technology integration into teaching and learning needs to be cognizant of the multiple aspects of the teaching and learning environment and provide a number of strategies and approaches.

Diaz et al., (2009), in a recent study into the professional development needs for 21st century teachers, found that successful models for 21st century academic development require flexibility and multiple approaches that should:

include mentoring, delivery in a variety of on-campus and off-campus formats (face-to-face, blended, online, self-initiated/self-paced), and anyplace/anytime programming to accommodate just-in-time needs. Faculty members are learners with needs and constraints similar to those of students. Support programs must be valuable, relevant, current, and engaging. They should also demonstrate best practices in providing a participatory, facilitated learning environment (p.5).

Jonas-Dwyer and Pospisil (2004) also suggest adopting a holistic approach to academic development for preparing academics for teaching the rapidly growing numbers of millennial students now attending university. They highlight the importance of developing more student-centred approaches and aligning such approaches both with the needs of the teachers and the needs of the institution. In addressing the complexity of teacher needs, Jonas-Dwyer and Pospisil (2004) propose that an appropriate model should assist academics to "develop a greater awareness of student needs and learning styles, teaching styles, educational design, and to increase their technology skills" (p.202) and that the model should include the following seven factors:

1. Consideration of the university's strategic direction
2. Awareness of the current and evolving academic/university culture within the university
3. Knowledge of the students' characteristics

4. Encourage teachers to be aware of their own preferred teaching style and philosophy and to experiment with other approaches
5. Encourage teachers to become conversant in applying educational design principles, or engage expert educational designers to assist
6. Consider technological innovations
7. Investigate the university's infrastructure to establish feasibility (p. 204).

This model recognises the complexity of the context within which academic development occurs and the need to respond to a broad range of issues. The model also suggests the importance of teachers recognising their approach to teaching and learning and consequently considering new ways of teaching with technologies.

The recognition of the importance of teacher beliefs as part of professional development program is essential (Steel, 2009a; 2009b). In particular, a professional development model for teaching with technology should acknowledge that teachers' prior experiences with technology along with their beliefs in relation to technology in teaching and learning are of critical importance and can have a significant impact on the ways in which teachers use technologies in their classrooms. Steel (2009a), discussing the complexities of technology adoption, proposes that "even if teachers are confident and proficient in their use of technologies, this does not mean that they believe they are valuable tools when used for educational purposes" (p. 399). Further, a significant predictor of teachers' technology uptake and use is the beliefs that teachers hold about their application in their educational contexts (Mahdizadeh, Biemans, & Mulder, 2008; Miller, et al., 2003). Therefore teachers require opportunities to surface and resolve tensions across their own belief systems and practices in relation to their own pedagogical context, their belief systems and the technologies on offer (Steel, 2009a). These are essential elements in any academic development approach designed to sustain transformative practices in technology-enriched learning and teaching spaces.

Pedder and colleagues (Pedder, Storey, & Opfer, 2008) in their study that explored different stakeholders view of what constitutes successful professional development for teaching and learning with technology in schools found that both teachers and leaders found similar approaches of value. School leaders felt that professional development activities that enabled learning through experimentation and practice in the classroom, reflection, student and peer feedback and participation in teacher networks promoted successful outcomes. Teachers valued opportunities for classroom experimentation and practice and being able to make changes based on student or peer feedback. Significantly both groups identified the importance of peer feedback and opportunities for practice.

Many professional development approaches, strategies and programmes advocate the value of peer learning. As Eisen (2001), points out:

Peer learning is a model well suited to the development of professionals, who are no longer novices, because it promotes sharing of partners' experiences through action and reflection (p.31).

Peer learning is defined as "voluntary reciprocal relationships between individuals of comparable status, who share a common or closely related learning/development objective" (Eisen, 2001, p. 32). Boud (2001), also considers reciprocity in his definition of peer learning. He takes the view that "peer learning needs to involve reciprocal interaction between participants. Peer learning should be mutually beneficial and involve the sharing of knowledge ideas and experience between the participants" (p. 3). While reciprocity is common across definitions of peer learning, Topping (2007) introduces the notion of active helping. "Peer learning can be defined as the acquisition of knowledge and skill through active helping and supporting among status equals or matched

companions" (Topping, 2007, p. 631). Approaches to peer learning that provide constructive feedback and suggestions could be considered as 'active helping'. The P2P project (2006) which explored peer learning across schools in several European countries found that professional development that involved peer learning had a positive impact on student learning. This reflects Young's (2008) injuncture, that academic development activities need to keep a focus on student learning. This focus on student learning needs to be at the forefront of any potential solutions or recommendations to dealing with the complexities inherent in the development and implementation of new learning spaces.

Academic Development for Learning Spaces

Currently there is very little literature relating to what constitutes effective academic development activities to support teacher practices in new learning spaces. While universities are enthusiastic about building new student-centred and technology-enriched learning spaces, there is less emphasis on how teachers are helped to re-conceptualise their learning designs for these spaces. The juncture between learning spaces, learning design and teacher beliefs is an under-theorised area that is pivotal to future space developments and successful student outcomes in these spaces. However in spite of this limitation, work in relation to supporting the adoption and integration of technology into higher education and schools provides useful models and insights that can be considered in relation to developing professional development approaches for new learning spaces.

The limited work that is available in relation to academic development for learning spaces highlights the complexity of the issue. In a recent (extended) blog comment, Long (2009) refers to the issue of timing as a key aspect of successful academic development for learning spaces. Long makes the important point that academic development activities for learning spaces need to be implemented at an early stage in the space development process.

What absolutely CANNOT happen regarding professional development for these spaces is to wait until they are built (blog comment, Long, 2009).

However, in the majority of cases, preparing teachers to engage with new spaces is seldom considered prior to the completion of the space. Further, Long suggests that one-off professional development activities delivered by an expert, while they have their uses, falls well short of meeting the complexity and diversity of teachers needs in relation to learning spaces. Consequently, he suggests a multi-faceted model that allows for:

real time modelling of good (and new) practice, team teaching, real time support, group work, mixed groupings, lead lessons, small group work with the whole team working, learning and gaining confidence together. This is not a one hour session – this takes some days to really embed in, along with return visits (blog comment, Long, 2009).

The Challenges of Teaching in New Learning Spaces

Taking into consideration the multiple complexities and challenges associated with teachers translating their practices for technology-enriched learning spaces it is surprising that so little attention has been focused on academic development to assist teachers to transform their practices for these spaces. Approaches are needed that assist teachers to recognise both the pedagogical and other affordances and constraints of the technologies and spaces relevant for their own teaching context. Figure 1 summarises teacher challenges that need to be addressed through academic development strategies. In addressing these challenges, it is possible to harness the benefits of distributive

Figure 1. Challenges of teaching in new learning spaces

leadership in partnership with academic development while being respectful of local cultural perspectives (such as TLRs).

This diagram highlights recurring challenges that teachers face when confronted with new technologies and learning spaces. It also emphasises the heightened significance of teachers as designers of student learning in these innovative technology-enriched learning spaces. These elements are further explored below.

Pedagogical Beliefs and Beliefs About Technologies and Spaces

Teachers' pedagogical beliefs about teaching, learning and the use of technologies are highly influential technology practices (Bates & Poole, 2003; Park & Ertmer, 2007; Steel, 2009a). Consequently, academic development programs that encourage re-imagining teaching practices for new teaching and learning environments need to start making teachers' beliefs systems explicit. Teachers' pedagogical beliefs and their beliefs about the value, use and role of technologies and new

learning spaces are highly influential on the way teachers conceptualise their teaching practices for these new spaces. Furthermore, using these spaces often involves a shift away from teachers' usual educational practices and teacher beliefs can act as a filter to change (Yerrick, Parke, & Nugent, 1997). Therefore opportunities to discuss and explore these beliefs should be considered critical to translating practices for new spaces.

Contemporary design of physical learning spaces is often underpinned by the assumption that they will be used in ways that are student-centred rather than teacher centred. Some teachers hold pedagogical beliefs that are more aligned with teacher-centred practices while others may not have experienced using the spaces and/or technologies to express their pedagogical beliefs. How a teacher conceptualises these roles internally has implications for their educational practices, use of technologies and for student learning. Even when a more student-centred learning design is developed, teacher-centred approaches may prevail.

Indeed some teachers may not see a role, or any value, in using the spaces or the technologies in their teaching. While this may well be justifiable, models for academic development need to provide opportunities for teachers to make their beliefs explicit in order to properly explore the affordances and constraints of the spaces and to reconcile their beliefs with the possibilities that may be identified as part of the academic development process.

Pedagogical Vision for Use of Technology-Enriched Spaces

Given that most teachers are unfamiliar with the ways that new technology-enriched spaces can be used for teaching and learning, teachers need time and scaffolding to develop a pedagogical vision. Developing a clear pedagogical vision enables teachers to convey the relevance of their use of spaces and technologies, and consequent pedagogical changes, to students. Learners need to understand how their learning is meant to occur through their use of these technology-enriched spaces. As with any learning design, students are likely to engage if they are clear about how learning tasks are linked to their academic success.

In an examination of educationally sophisticated technology-using university teachers, Steel (2009b) found that the interrelationship between a number of factors contributed to a strong pedagogical vision for technology use. These factors were derived from the fact that these teachers held coherent pedagogical beliefs and were well equipped to draw on their beliefs about technologies, the characteristics of their pedagogical contexts and their experiences with technologies to help them identify the affordances and constraints of technologies that they needed to resolve in practice. For mainstream teachers, there is benefit in guiding them to consider these kinds of linkages and experiences. A good way to start conceptualising a pedagogical vision is for teachers to explore examples of how other academics are using technology-enriched spaces, to have exposure to pedagogical models that convey possibilities and to test and modify ideas in a safe peer-supported environment.

Discipline, Curriculum and Assessment Agendas

Translating curriculum and assessment to blended and online models is inherently problematic. Academics are prone to transporting their existing practices to new environments (Kirkup & Kirkwood, 2005) and need encouragement and support to change their curriculum and assessment practices. Academic development programs need to assist teachers in identifying uses of spaces and technologies that solve teaching and learning problems inherent to their particular disciplines. Examples of well structured technology-enriched learning designs from a variety of disciplines can provide teachers with

models to assist them to change their curriculum approaches to take advantage of the affordances offered by these environments. Opportunities to test these models in their own contexts and to receive constructive feedback from peers can strengthen teacher's confidence to change their curriculum practices.

Student Profiles, Needs and Challenges

Modern teaching and learning environments are characterised by student diversity. Curriculum design that addresses the diversity of student needs and characteristics, can promote student engagement and retention. However adequately preparing students for these new learning environments is a critical part of the challenge (Kennedy, et al., 2009). In preparing teachers to use these new learning environments consideration needs to be given to the digital literacy of students, the wide variation they present in this regard and ways in which this might effectively be addressed. Furthermore, teachers need to develop skills in assisting students to understand what learning means in a 'web 2.0 world' (Fitzgerald et al., 2009; Hughes, 2009). Students' ability to learn with technologies is a key aspect of these environments. Overlooking this can result in poor student learning outcomes in these new spaces (Kennedy, et al., 2009). Additionally, these new learning environments can mean changes in the ways in which students participate in learning activities creating feelings of isolation, alienation and anxiety. Academic development programs need to provide opportunities to explore these issues and find strategies to address them.

Pedagogical Effectiveness vs. Real Constraints of Pedagogical Context

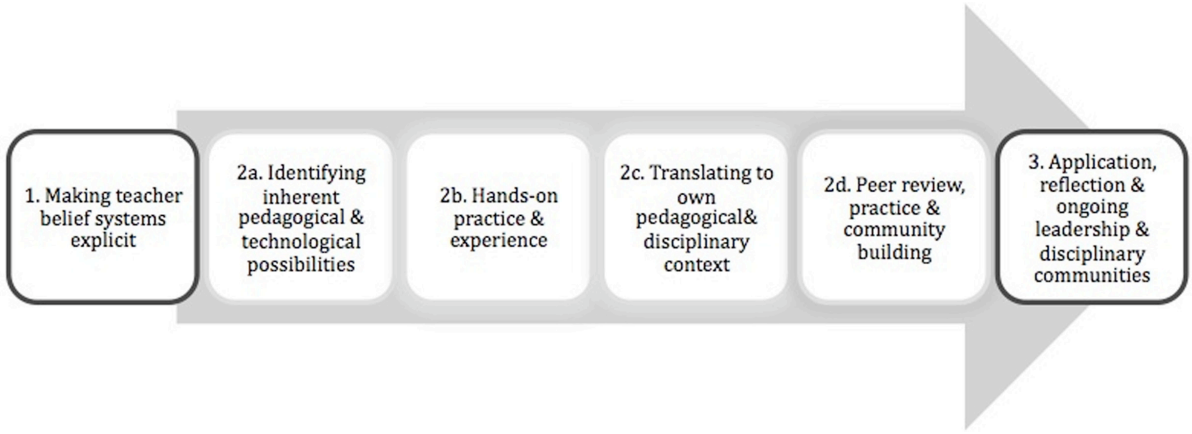
While some learning designs are highly effective they may not be very efficient or vice-versa (Hornby, 2003). Moreover some learning designs may be suitable for one teacher's pedagogical context but not for another. The pedagogical context includes variables such as teacher and student characteristics and preferences, the pedagogical approach employed by specific disciplines, the organisation of the learning environment as well as disciplinary and institutional culture and norms. It encompasses the variables 'woven together in the act of learning, rather than around it, as conveyed by the word 'environment'' (de Figueiredo & Afonso, 2006) and can be understood as 'the relationship between a setting and how participants interpret that setting, including the meaning of practices' (Moschkovich & Brenner, 2000).

When re-imagining teaching for technology-enriched learning spaces teachers can benefit from testing the pedagogical effectiveness of a learning design in a peer-supported environment that is conducive to safe constructive feedback and reflection. For example, an excellent learning design may be conceptualised that is actually an add-on to the curriculum rather than integral to it. Or due to students being located in different international time zones some features of the design may not be feasible. Workload is of course a crucial issue. Many teachers have implemented highly effective teaching and learning strategies only to find that their own workload has been highly exacerbated. There is high value in trying to troubleshoot these kinds of issues ahead of time as teachers quickly loose enthusiasm for innovation when troublesome issues arise.

Affordances and Constraints of Technologies and Space

If teachers have not used or experienced available technologies and spaces, it is very difficult to be able to identify the affordances and constraints of the technologies and spaces. The terms 'affordances' and 'constraints' suffer a lack of clarity in contemporary literature particularly as applied to the use of technologies in teaching and learning (Conole & Dyke, 2004; McGrenere & Ho, 2000).

Figure 2. A model of academic development for technology-enriched learning spaces



A more interrelational view of the concept was offered by Kennewell (2001). He pursued the idea of exploring affordances and constraints not only in relation to the inherent properties of the object and the perceptions of the actor, but also in relation to the whole pedagogical context. Kennewell (2001) defines affordances as "the attributes of the setting which provide potential for action" and constraints as "the conditions and relationships amongst attributes which provide structure and guidance for the course of actions" (p. 106). As with pedagogical effectiveness, teachers need opportunities to consider the affordances and constraints of technology-enriched spaces in relation to their pedagogical context and educational aims.

Considering the issues and challenges for teachers who are confronted with the need to re-imagine their teaching for technology-enriched environments, it is surprising that so little attention has been given to supporting teachers to enact quality teaching practices in these environments. The next section offers a model of academic development for technology-enriched learning spaces that draws on and builds capacity toward distributive leadership while being inclusive of different disciplinary perspectives and TLRs.

DEVELOPING A MODEL OF ACADEMIC DEVELOPMENT FOR TECHNOLOGY-ENRICHED LEARNING SPACES

With a clear knowledge of the considerable challenges that teachers are confronted with when trying to re-imagine their teaching for innovative technology-enriched learning spaces, a model for academic development was developed to help individuals and disciplinary communities move forward (Figure 2). The model itself is also aimed at developing capacity for leadership and building communities so that progress and growth are championed, sustained and encompassing. As noted by Lefoe (2010), there is an urgent need in Australian universities to build leadership capacity that will enable distributive leadership in all aspects of teaching and learning. She also quotes Fullan, Hill and Crévola (2006) as proposing that "capacity building involves the use of strategies that increase the collective effectiveness of all levels of the system in developing and mobilizing knowledge, resources and motivation, all of which are needed to raise the bar and close the gap of student learning across the system" (p.88). It is with these aims in mind that the model was created. As a model of academic development for technology-enriched learning spaces it aims to:

- facilitate a process whereby academics can translate their practices in ways that harness the potential of these spaces and technologies for their own pedagogical context
- build leadership capacity that can influence
- build collegial peer-based disciplinary communities

Further, congruent with the notion of academic development as 'elastic practice' (Carew, et al., 2008), the model is designed to be applicable in different modes, disciplinary contexts and with different teacher cohorts (higher education and K12). It is also flexible in terms of the kinds of activities that can achieve the different components of the model. This kind of inherent flexibility is meant to accommodate different academic developers'/ facilitators' styles and preferences. Two applications of the model are detailed later in this section.

The model, as visually displayed in Figure 2, depicts a staged process that addresses the challenges previously outlined in Figure 1 with a particular focus on teachers' learning designs for use in technology-enriched spaces.

Stage 1: Teachers' Pedagogical Beliefs and Beliefs About Technologies and Spaces

The initial stage of the model begins with the provision of opportunities for teachers to make their pedagogical beliefs and beliefs about technologies and spaces explicit. Many academics have not necessarily had the opportunity to articulate these beliefs and as such this can be a reflective and revealing process. This step is also an opportunity for some teachers to start to conceptualise their pedagogical vision for the use of the space and the technologies on offer.

Stages 2a-2d: Orienting to the Possibilities and Re-Imagining Practice in a Peer-Supported Environment

These next four components of the model are integrated rather than a linear staged process. They may occur together at different times and serve to further surface teachers' belief systems and assist in conceptualising their pedagogical vision for the use of the technology-enriched spaces. These four elements are designed to help teachers envisage learning designs that are appropriate to the spaces and to their own pedagogical and disciplinary context. In 2a, teachers engage with discipline relevant models that exemplify some of the pedagogical and technological affordances of the spaces. During their engagement they are encouraged to identify and discuss both affordances and constraints for their own pedagogical context, discipline, curriculum and assessment agendas. Teachers are also encouraged to consider their student profiles, needs and challenges. In 2b, opportunities are made available for hands-on training and practice in the spaces using various technologies. Teachers also experience a student perspective of the use of the spaces and technologies during their participation in exemplar teaching models. Most academics have not learnt with technologies or in technology-enriched spaces, so providing them with opportunities to participate as both student and teacher are important. As teachers have competing priorities for their time, it is also essential to ensure that there is time (preferably both during and outside of academic development) to translate a part of their curriculum into learning designs that harness the potential they have identified for the space. Therefore 2c is integral to enabling teachers to re-imagine their teaching practices for technology-enriched learning spaces. As learning designs emerge and mature, peer review and sharing can be used to catalyse disciplinary communities (2d). Such peer-supported communities can be encouraged

Table 1. Teacher challenges mapped to model

Teacher challenges (Figure 1)	Mapped to Model (Figure 2)
a. Pedagogical beliefs and beliefs about technologies	1, 2c, 2d
b. Pedagogical vision for use of space	1, 2a, 2b, 2c, 2d
c. Discipline, curriculum and assessment agendas	2a, 2c, 2d
d. Student profiles, needs and challenges	2c, 2d
e. Pedagogical effectiveness vs. real constraints of pedagogical context	2a, 2b, 2c, 2d, 3
f. Affordances and constraints of technologies and space	2a, 2b, 2c, 2d

to provide a safe, non-competitive space for discussing possibilities, pedagogical effectiveness, affordances and constraints.

Stage 3: Consolidating Designs, Enacting Leadership and Sustaining Community Learning

Finally in stage 3, teachers apply their designs to their own pedagogical context, supported by their disciplinary communities and leadership both within that community and institutionally. Reflection has been interwoven throughout the model, however teachers are strongly encouraged to reflect on the application of their designs and evaluate their pedagogical effectiveness. Having completed the academic development model that underpins the process with a network of peers, teachers are being positioned to lead further iterations of the model either in partnership with academic developers or with community members in their cohort. The model itself is made explicit, resources are made available and the expectation of leadership has been interlaced throughout the academic development process. Further to this, teachers have experienced the potential of socially-mediated community-based learning and are provided with a range of strategies to continue this practice both with established community members and with other teachers in their local cultural communities.

The teacher challenges outlined in Figure 1 are mapped to the model in Table 1.

APPLYING THE MODEL TO TWO CASE STUDIES

The following two teacher development programs were designed to help teachers address barriers to technology innovation while enabling them to identify and realise the affordances and constraints of new learning environments enriched with technologies. Each culminated in a portfolio of learning designs that were appropriate to their own pedagogical contexts.

Masters of Educational Studies Course

The development of a postgraduate course in a Masters of Educational Studies program provided an opportunity to test the model of academic development for technology-enriched spaces over two iterations. The course is aimed at helping teachers to integrate technologies into their teaching and become future leaders in their home school environment. As this was a predominantly online course, both virtual and physical learning spaces were explored. Enrolled teachers engaged in the course through a Learning Management System (LMS) and used a range of other technologies throughout the course. They attended campus-based workshops three times over the semester.

The course objectives were as follows:

1. Review and reflect on the common enablers and barriers to technology integration and the

use of different learning spaces in relation to your educational context
2. Express and evaluate your beliefs about technology, teaching and learning and their influence on your own use of technologies and different learning spaces
3. Compare and evaluate various pedagogical and learning theories in relation to the use of educational technologies and consequential pedagogical affordances and constraints for current and emerging technologies
4. Critically analyse and debate contested issues associated with existing and emergent technologies with reference to scholarly research and theories
5. Design and justify a range of your own learning designs for new technology-enriched spaces with reference to your beliefs, learning theories and pedagogies, attributes of effective technology practices and potential barriers to implementation.

The assessment items for the course were:

1. Concept map and reflective essay on teachers' beliefs about teaching and learning and technology use
2. An online discussion on a contested issue and submission of debate synthesis
3. Project: Portfolio of learning designs that included
    - A presentation of a design with peer review
    - A portfolio of learning designs for technology-enriched learning spaces

Teachers were initially required to introduce themselves online and complete an online icebreaker. The icebreaker was designed to 'hook' teachers in, place them in the course context and promote strong interaction in order to stimulate an initial sense of community. A short, provocative YouTube video was used and stimulus questions provided in a dedicated discussion forum in the LMS. Teachers were exposed to various models of technology and space use during the course, and the course itself was designed to model possibilities inherent in the technologies and spaces explored.

Their first assessment sought to help teachers make their beliefs explicit in order to challenge their ideas of what is possible in their own teaching context as well as expose them to the beliefs and practices of their fellow teachers. Throughout the course they were exposed to various technologies either through their own exploration or as part of the course (e.g. a virtual field trip into the virtual world of Second Life™). The course challenged teachers to think through the enablers and barriers of both technologies and different spaces from their own pedagogical context and belief systems and also in terms of their own hands-on experiences.

An online discussion, again on a provocative and contemporary issue, gave teachers the opportunities to expose and question some of their beliefs about the value and risks of using technologies in their teaching practices. Finally, each teacher created a portfolio of learning designs for technology-enriched learning spaces for their own teaching context. This was accompanied by a rationale for each activity that articulated their underlying beliefs and thinking for their designs. A template was provided for this activity to encourage them to relate their designs to their pedagogical context and affordances and constraints they identified. Peer review of designs promoted cross-fertilisation of ideas and access to other teachers' examples of practice. As a cohesive online community developed participants gave constructive feedback and supported each other.

Although class sizes were relatively small (5-12 teachers), participants were able to work on their own disciplinary areas, create peer networks and engage in authentic activities that were aimed at helping them re-imagine their teaching. Teachers responded well to both iterations of the course (offered so far) as indicated in email correspondence:

Iteration 1 (we had one extra assessment item which was a blog for reflections on course readings):

I have enjoyed the subject immensely and see immediate applications in my teaching and planning for next year.

I thought the course overall was excellent and I learned a lot of practical ways to implement new knowledge in my teaching. Also, the mode of the course was great with so much online and the assessment really worked to reinforce what we were learning. The only negative I would say is that it was quite time consuming, in that there seemed to be more assessment for this course than for other Masters courses I've done.

Iteration 2

I have found this course so interesting – its about what is happening now. There is so much talk about connecting study to the real world but very little of it actually happens. Most of the assignments I do are so dull and boring – it is worse than watching paint dry. I find this course not only challenging and exciting but providing me with new strategies, new challenges in teaching and learning strategies – for classrooms and in my own life.

Thank you so much for this course. I have learnt so much and it has made me think more about technology in the classroom.

Teacher Continuing Professional Development Program

In 2010 an urban private school was planning to open its new teaching and learning complex. The building consists of collaborative teaching and learning spaces (CTLCs) and advanced concept teaching spaces similar to those at The University of Queensland (UQ) (http://www.uq.edu.au/~webaf/index.html). These advanced, technology-enriched teaching and learning spaces are intended to support more collaborative, interactive and engaged approaches to teaching and learning at the school and will have a major impact on teaching and learning at the school. It is envisaged that the use of these spaces will improve students learning experiences and help support students' transition to university learning. This would occur through the familiarisation with technology-enriched learning spaces and approaches that are evolving at the university through the use of such spaces.

Recognising the need to prepare teachers to work in these new spaces and build their capacity for leadership within their disciplinary areas, senior levels of leadership within the school were proactive in addressing teacher development ahead of the completion of their new centre. This is consistent with Long's view (2009) that teacher development for new technology-enriched spaces should occur prior to the building completion. An initial group of eighteen teachers were selected to participate in a continuing professional development program to provide distributive leadership in the use and applications of these spaces across the rest of the school community.

The continuing professional development program was offered through a combination of whole day face-to-face workshops supported by online modules over a period of four months (see Table 2). It was aimed at helping teachers address the challenges outlined in Figure 1. Tasks and discussion were designed to help teachers reconcile their own pedagogical beliefs, and beliefs about technologies and spaces, with their own learning experiences in different physical spaces and online using a variety of pedagogical models. In this way teachers were encouraged to develop their own pedagogical vision for use of the space that was meaningful for their own discipline, curriculum and assessment agenda as well as mindful of their own student profiles, needs and challenges. The workshops in

Table 2. Summary of continuing professional development program for technology-enriched spaces

Modules and workshops	Activities
Online module 1: Pre-workshop online activities:	Participants were required to read some introductory material and complete the following tasks: • Post a personal bio photo, experience with technologies, teaching profile/experience, discipline, aspirations for this CPD) to the LMS – maximum 250 words • Create and submit a concept map on their pedagogical beliefs and a short reflect piece on how these beliefs might be expressed in a technology-enriched learning space – the challenges, enablers and barriers.
Face-to-face workshop 1	• Overview of two different learning spaces • Discussion and evaluation of teaching and learning models derived from innovative teacher practices in different discipline contexts and spaces (virtual and physical) • Discussion of teacher beliefs, enablers and barriers
Online module 2	• Identification and rationale for unit of work to be translated into a learning design for technology-enriched spaces • Reflection on anticipated changes to teacher and student roles
Face-to face workshop 2	• Hands on training and practice in UQ learning spaces • Activity stations set up with explicit pedagogical approaches that used the spaces and a variety of technologies in different ways • Time allocated to work on learning designs (template provided for optional use)
Online module 3	• Preparation for developing learning designs for peer review and for peer review process
Face-to-face workshop 3	• Further hands on training and practice in UQ learning spaces • Presentation of learning design concept for peer feedback and discussion • Time allocated for further developing learning designs incorporating feedback
Face-to-face workshop 4	• Participants conducted mini-teaching sessions for selected spaces • Time was allocated for peer questioning/comments and all teachers received written peer feedback • Discussion around leadership and strategies for sustaining peer knowledge sharing via disciplinary and cross disciplinary communities • Wrap up and presentation of certificates

particular, provided an array of opportunities to compare the pedagogical effectiveness of various pedagogical models with the affordances and constraints of the spaces, technologies and their own pedagogical context.

The workshop facilitators utilised both the technological and spatial features of the learning spaces, so that teachers could explore different theoretical approaches to teaching and learning such as inquiry learning, independent learning and discovery-based learning. They were provided with many reflective opportunities to examine their own belief systems and how they might be translated into learning designs for technology-enriched learning environments, including the challenges and enablers. The teachers all participated in hands-on training in both physical spaces and a familiarization with the classroom management software that will be used in their own spaces, LMS technologies, virtual worlds, mobile technologies and Web 2.0 technologies. This enabled teachers to develop an understanding of the affordances and constraints of the space and the technologies and develop a coherent vision for how they might utilise the space for their own teaching and learning activities.

The final workshops enabled teachers to test their learning designs in their selected space with feedback from peers. The peer reviews were conducted with an emphasis on providing with a safe and respectful space to practice the implementation of their designs with constructive and supportive peer feedback (Eisen, 2001; Pedder, et al., 2008). This concluding component was also designed to enable teachers to re-visit their beliefs and to promote leadership, strong communities of practice and mentoring strategies. The mini-teaching sessions were highly successful with teachers demonstrating a wide variety of approaches to

utilising the spaces. There was a strong emphasis on active and collaborative learning in the presentations, signalling a shift for many in their teaching and learning approaches. Many teachers were also keen to explore opportunities for team teaching offered by the new centre.

The combination of online modules and face-to-face workshops were derived from the model of academic development for technology-enriched learning spaces (Figure 2). Throughout the program teachers became increasingly supportive of one another and prepared to share their ideas, knowledge and expertise. The course was fully evaluated throughout and that data is currently being analysed. Additionally, a follow-up evaluation will take place in mid 2010 once teachers have experienced teaching in their own spaces. Each workshop was rated individually and qualitative data was gathered to monitor learning and identify learning gaps. Facilitators were then able to respond to evaluations at subsequent workshops. Feedback from teachers generally indicated that participants were happy with the quality and content of the workshops. In particular, they indicated that the opportunities the program provided for practice and peer-learning were highly valued. The online modules, though integrated with the workshops, were not received as well. Teachers found that allocating time outside of the face-to-face sessions was difficult.

Leadership was also a critical factor. Initially a distributive leadership model was established between the academic developers and the school with a strong sense of partnership and commitment on both sides. With changes in leadership in the school, this partnership was not sustained at the same level and this had a notable impact on the teachers' behaviours. Although the program was successful, the academic developers all believed that the outcomes would have been even more powerful if the distributive leadership approach had continued with equal commitment and momentum.

FUTURE RESEARCH DIRECTIONS AND RECOMMENDATIONS

Evaluation of the impact of academic development on teacher practices and student learning in technology-enriched learning spaces, and development and testing of models of academic development that support teachers to re-imagine their teaching for these spaces, are key areas for further research. The positive outcomes experienced by teachers who participated in the programs outlined here suggests that opportunities for practice in the new spaces accompanied by peer feedback, in particular 'active helping' (Topping, 2007), should be considered as critical elements. Programs designed to support teachers to develop the skills to successfully capitalise on the affordances of technology-enriched learning spaces are crucial to the success of these initiatives. Institutions need to consider how such programs can be integrated into their overall academic development programs in a timely manner (Long, 2009). Incorporation of models such as the one offered here should also be offered through formal post-graduate higher education programs to encourage teacher participation and address the challenges outlined in this chapter.

In conjunction with dedicated time for appropriate academic development and distributive leadership, reward structures, vision, and social-cultural factors are influential to the use of technology-enriched learning spaces. Enabling teachers to participate in change means using motivational strategies and addressing perceived barriers. For example, reward incentives can be as powerful an influence as lack of time for some faculty members (Newton, 2003; Zhou & Xu, 2007). With competing priorities it is important that both leaders and faculty are allocated sufficient time and recognised and valued for their efforts to transform their teaching (Pajo & Wallace, 2001). Some university teachers have felt that there is a 'lack of respect', institutionally, for the development of teaching materials because it

is not a research-related activity (Newton, 2003). These kinds of perceptions need to be constantly and specifically addressed through all levels of leadership in order for teaching cultures to buy into change. Implementing change strategies that are culturally aligned with institutional, disciplinary and pedagogical beliefs and priorities are more likely to be successful (Kezar & Eckel, 2002).

CONCLUSION

In order to see a strong cost-benefit return for the significant financial and capital investment these spaces command, a substantial investment in the academic development needs of university teachers needs to be made. Teachers require time and experience using technologies to translate their pedagogical beliefs and beliefs about technologies and re-imagine their teaching in these spaces (Hai, 2008). This chapter offers a model for academic development for technology-enriched spaces that has been well received in the contexts it has been applied thus far. As outlined here such academic development programs need to draw on the benefits of academic developers' 'elastic practice' (Carew, et al., 2008), in conjunction with a focus on distributive leadership. Such approaches have been seen to go some way towards addressing the range of challenges faced by teachers and disciplinary cultures in adapting to technology-enriched learning environments. Additionally, these approaches can be powerful in encouraging teachers to develop a strong pedagogical vision for their use of these technology-enriched spaces.

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KEY TERMS AND DEFINITIONS

Academic Developers: Scholarly professionals with expertise in the discipline of Higher Education who focus on providing a link between pedagogical practice, research and theory.

Academic Development: Opportunities to develop the link between pedagogical practice, research and theory.

Affordances: The action possibilities inherent in technologies and spaces that can be realised by a teacher in relation to their own pedagogical context.

Distributive Leadership: Leadership that is enacted through power sharing of knowledge and ideas by collegial groups.

Learning Designs: Curriculum-based framework that includes tasks and interactions that are designed to promote student learning.

Pedagogical Context: The variable that are interwoven into the act of learning and teachings such as teacher and student characteristics and preferences, the pedagogical approach employed by specific disciplines, the organisation of the learning environment as well as disciplinary and institutional culture and norms.

Teacher Beliefs: A complex and inter-related system of personal and professional beliefs that are often held implicitly and serve as cognitive maps that underlie teachers' practices.

Technology-Enriched Spaces: Innovative physical learning environments that are equipped with a range of technology tools and designed to support new ways of learning and teaching.

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looking at spaces to bring new and different understandings, like "smooth and striated" (Deleuze & Guattari, 1987) to what learning and teaching spaces might mean for dramatically changing global educational environments and practices. Rather than seeing a student's classroom, workroom, lecture hall, and lab as a singular person's situation or place, the authors of this chapter propose seeing and thinking conceptually about spatial-dimensional multiplicities for identities. That is seeing various coextensive situations and sites both out and indoors (where 'doors' may also be 'walls') as activities and areas not pre-bounded or specified for particular individual purposes, and thinking about these by bringing different mind-views to conceptualising collaborative activities in spaces as complex knowledge generating affects.

In this chapter, the authors argue that a disjuncture has emerged between the look of learning spaces within learning spaces discourse, definitions of learning spaces, and the aspirations of learning spaces as a design concept that transforms higher education. Using Visual Studies methodology and photographs, the chapter contrasts the hegemonic look of learning spaces with a viral learning space – learning that is not designed or controlled by the institution. The authors argue that the Learning Spaces agenda will fail to transform higher education in the twenty first century if its proponents do not adequately conceptualize lifelong and lifewide learning achieved by learners outside the institution.

This chapter explores the environmentally sensitive design characteristics of Charles Sturt University's Albury Wodonga campus and the outdoor learning spaces it provides. Attention will be given to exploring how the holistic and integrated nature of the campus and the environmental functionality of the site provide unique opportunities for learning within learning spaces. Examples are provided of how the natural and built environments of the campus are used as learning spaces to promote social interactions, conversations, and experiences that enhance student learning. The chapter highlights the value of outdoor environments as legitimate and critical spaces for learning within higher education. The chapter explores the benefits of designing teaching space based on strategies that are defined by personal pedagogic repertoires and practical wisdom. By enacting such strategies, it is argued that universities can develop diverse, locally appropriate, and inclusive pedagogies.

Section 2
Physical and Virtual Learning Spaces

eZine and iRadio represent knowledge creation metaphors for scaffolding learning in a blended learning environment. Through independent and collaborative work online participating students experience a simulated virtual publishing space in their classrooms. This chapter is presented as an auto-ethnographic account highlighting the voices of the learning designer and the teacher. Using an iterative research design, evidence is provided for three iterations of each course. A collaborative approach to the development, planning, implementation, and evaluation of two tertiary music elective courses between lecturers, tutors, learning and technological designers is narrated. The student voice is embedded in the methodology, which involved an innovative approach that blends software development and pedagogy in iterations of software and experience design. The chapter describes how the teachers and learning designers translate these data into action and design. A blended learning space was incorporated within each of these elective music courses and the movement between these learning spaces is described and problematized. The research suggests that learning design, which provides real world examples and resources integrating authentic task design, can provide meaningful and engaging experiences for students. The dialogue between learning designers and teachers and iterative review of the learning process and student outcomes has engaged students meaningfully to achieve transferable learning outcomes.

This chapter shows how virtual and physical learning spaces are shaped by pedagogy. It explores the shift in pedagogy from an orientation to teaching to an emphasis on student learning. In so doing, it touches on Net Generation literature indicating that this concept has a poor fit with the diverse nature of student populations engaged in lifelong learning. The argument is that the skill set required for lifelong learning is not age related. At the core of the chapter is a case study of the University of Southern Queensland (USQ) which describes a history of learning environments that have been variously shaped by pedagogy and the limits of technology. It refers to the concept of the 'edgeless university', which acknowledges that learning is no longer cloistered within campus walls, and it describes how USQ is engaging with this concept through the development of open source learning materials. An important point in the chapter is that the deliberate design of quality learning spaces requires whole-of-institution planning, including academic development for university teaching staff, themselves often ill-equipped to take advantage of the potential of new learning environments. The import of the discussion is that higher education learning spaces are shaped by deliberate design, and that student learning is optimised when that design is pedagogically informed and properly managed.

Section 4
Authentic Learning Spaces

The description of learning environments as physical or virtual spaces focuses on the tools and infrastructure that support learning as opposed to the learning interactions. The authors of this chapter advocate the view that to maximise the potential of any learning environment, educators need to understand how students learn in the first instance and then design the learning environment based on these insights. Throughout this chapter, formal learning is conceived as an individualised experience within an organised learning community, and as such, it is suggested that this learning environment is described as an experiential space. Within this chapter, an approach to designing an experiential space that uses problem based learning to engage students and facilitate their active construction of knowledge is described. The Holmesglen built environment degree program is used as a case study to illustrate a particular solution to designing an experiential learning space.

This chapter explores the human element in the learning space through the notion that once a learning space is inhabited, it becomes a learning place of agency, purpose and community involving both staff and students. The School of Languages and Learning at Victoria University in Melbourne has initiated a multifaceted peer learning support strategy, 'Students Supporting Student Learning' (SSSL), involving the deployment of student peer mentors into various physical and virtual learning spaces. The chapter discusses the dynamics of peer learning across these learning space settings and the challenges involved in instituting the shift from teacher- to learning-centred pedagogies within such spaces. Both physical and virtual dimensions are considered, with the SNAPVU Platform introduced as a strategy for facilitating virtual learning communities of practice in which staff, mentors, and students will be able to engage in mutual learning support. The chapter concludes with calls for the explicit inclusion of peer learning in the operational design of learning spaces.

Foreword

Howard Rheingold was asked to comment on a number of questions in relation to learning spaces. His insightful reflections serve as the foreword to the book and a recognition of the importance of spaces for learning and teaching in higher education.

What are some important features of learning spaces? Traditional learning spaces perpetuate the power hierarchy and the innate assumptions of pedagogy which are built into the architecture of the lecture hall. You have the authority standing at the front and everybody is focused toward them and if the student wants to hide out, you hide out in the back row. To me the most important part of the classroom is that you can fold up the tables and the chairs and move them out of the way... No matter what other fancy technology you've got in the classroom, if the chairs and tables are bolted down, you're in trouble. In other words, I like re-configurability, whether you're talking about the physical equipment or the online aspects of learning and teaching. For me, moving the students' chairs in a circle has an explosive effect as there is no back row and you are all seeing each other. It is important to move away from the movie theatre effect, where all of the screens are in the front and everyone has to face the same direction...

How have learning spaces changed? The change that overshadows all other changes is the availability of broadband wireless internet access. In addition, the increased diversity and range of devices allows student and teacher access, which was unanticipated. This ubiquity of wireless access and the range of devices create both a challenge and an opportunity because it wasn't planned from a pedagogical perspective. However, we can capitalize on this opportunity as the technology affords a much richer opportunity for peer-to-peer interaction, collaboration, and of course a connection with the world of other people and information that is available across the globe.

Do you think universities understand collective intelligence? Collective intelligence suggests that everybody finds a piece of the puzzle, and collaboratively, everyone pieces together the puzzle utilizing the contributions of the many. Collaborative inquiry is particularly called for in the 21st century as it optimizes collective intelligence to solve problems. However, because anyone can publish to the Web, the degree of authority, credibility, and accuracy that you can assign to a text needs to be determined individually as well as collaboratively and socially. Science, scholarship, business, and education are increasingly dependent on more collaborative work and less individually authored work. This is a trend that is a traumatic change for students who are used to being the sole author of a work and who perceive their role as performing for the instructor. For example, a Wiki collaboration is radically new in that you don't have an author so much as you have a revision history, and I use it in my own teaching as a collective action problem. I've got a different team every week who co-teach with me and who stimulate active discussion. In terms of education, there are tools yet to be invented that will make more visible how these collaborations happen and make it visible for the students so that they can see collaboration in action.

How do you think university learning environments might change in the future? I don't see learning institutions having an in-built incentive for changing anywhere near the pace at which technology is changing. When I first started teaching at Stanford I was surprised at how many students really didn't know how to blog or use a Wiki. I assumed that they were all like my daughter and her friends, that is, digital natives. However, as I found, you can't assume they know how to use a blog or wiki. From the teachers' perspective there is no incentive for innovating in pedagogy, and this is a major issue.

Do you have a metaphor to describe learning spaces in higher education? What comes to mind immediately is the learning community, which of course can be virtual and/or physical. The agora is the gathering place, a marketplace of ideas and a place of exchange. The agora is not the auditorium with the podium. It's not the passive audience and the active "sage on the stage." The locus of authority and the lines of communication in the agora are very different from the auditorium.

Howard Rheingold

Howard Rheingold *is a critic, writer, and teacher; who specialises in the cultural, social and political implications of modern communication media such as the Internet, mobile telephony and virtual communities (a term he is credited with inventing). Howard worked on and wrote about the earliest personal computers. In 1985 he published Tools for Thought and The Virtual Community and he co-authored Out of the Inner Circle: A Hacker's Guide to Computer Security. In 1991, he published Virtual Reality: Exploring the Brave New Technologies of Artificial Experience and Interactive Worlds from Cyberspace to Teledildonics. He was the editor of The Whole Earth Review; Editor in Chief of The Millennium Whole Earth Catalog; and founding Executive Editor of HotWired. In 1996 he founded Electric Minds which was named one of the ten best web sites of 1996 by Time magazine. In 1998, he created Brainstorms, a private successful webconferencing community. He published Smart Mobs in 2002, and in 2008, he became the first research fellow at the Institute for the Future. He is a visiting lecturer at Stanford University and a lecturer at U.C. Berkeley.*

Preface

INTRODUCTION

Higher education is facing a renaissance in terms of its approaches to teaching and learning and the use of physical and virtual spaces. This book will address the question of how higher education institutions and administrators need to re-conceptualize, re-design, and rethink the use of space for students entering university in the 21st Century. Higher education institutions are no longer defined by the physical boundaries of their traditional campus but the entire student experience, whether that be negotiating the physical corridors of the campus or connecting to virtual environments. The design of spaces to support the generation of knowledge by students themselves is an important and neglected field. With lectures and tutorials still predominant in higher education, the organization of space and time configures students as receivers of knowledge until the point of graduation, at which time they are expected to produce knowledge of their own. Rather than lecture halls with rowed seats being the predominant physical learning space for learning and teaching in higher education, learning spaces need to include: physical/virtual, formal/informal, blended, mobile, personal, and professional learning spaces that need to consider flexibility, adaptability, and time. They need to mirror contemporary learning and teaching strategies that emphasize independent and peer-based learning in both physical and virtual learning spaces, and need to account for how students perceive and utilize space in higher education settings. In meeting these priorities, it is essential for universities to support synchronous and asynchronous, multi-disciplinary, multi-campus, and inter-institutional collaboration amongst students, between students and teaching staff, and amongst teaching staff.

THE TARGET AUDIENCE

The target audience of this book will be composed of professionals and researchers working in the field of physical and virtual learning spaces in higher education (e.g. university academics teaching in higher education, librarians, educational designers, academic developers, learning and teaching centre staff, online professionals focused on the design and development of educational technology projects, architects who design buildings and spaces in university environments, and IT administrators). Moreover, the book will provide insights and support university senior management who make decisions about learning space and building projects, heads of departments, faculty deans, and facility managers at universities concerned with the management and design of physical and virtual learning spaces in higher education.

HOW THIS BOOK IS ORGANISED

This book is divided into four sections: Section I. Space Perspectives; Section II. Physical and Virtual Learning Spaces; Section III. Blended Learning Spaces; and Section IV. Authentic Learning Spaces.

Section 1: Space Perspectives

Section 1 examines theoretical and practical perspectives in relation to learning spaces. The first four chapters examine distributed learning spaces, the continual emphasis of 'place' in learning spaces, viral learning spaces, and outdoor learning spaces. The chapters attempt to push the boundaries of what we mean by learning spaces from both a theoretical and practical perspective.

In Chapter 1, Mike Keppell and Matthew Riddle examine distributed and personal learning spaces across the spectrum of physical, blended, and virtual learning spaces in the higher education context. They suggest that higher education is no longer defined by the physical boundaries of a 'physical campus,' but the entire student experience, whether that involves negotiating the physical corridors of the campus, attending face-to-face classes, participating in fully online courses, or a blend of both face-to-face and online courses. In addition the student experience may also involve connecting to virtual environments from home, a local café, on the train, or participating in professional practice hundreds of kilometers from the physical campus. This chapter attempts to account for the diverse range of spaces that are enriching the learning and teaching experience for both academics and students and suggests that we need to recognize the changing nature of learning space and broaden our mental models of learning spaces in higher education. In Chapter 2, Warren Sellers and Kay Souter focus on differences between educational places for learning and spaces for learning. They suggest that discussions about teaching and learning spaces continue to concern themselves with what happens at an educational "place." This chapter looks less at the physical place and more into potential spaces – the notional margins, interstices, and liminalities that are outside, between, and on the fringes of defined places. Rather than seeing a student's classroom, workroom, lecture hall, and lab as a singular person's situation or place, they propose seeing and thinking conceptually about spatial-dimensional multiplicities for identities. In Chapter 3, Merilyn Childs and Regine Wagner examine viral learning spaces which are spaces neither designed nor controlled by the institution. They suggest that a disjuncture has emerged between the look of learning spaces within learning spaces discourse, definitions of learning spaces, and the aspirations of 'learning spaces' as a design concept that transforms higher education. They argue that a current emphasis on designing learning spaces will fail to transform higher education in the twenty first century if its proponents do not adequately conceptualize the end of the institution and the rise of viral learning spaces. In Chapter 4, John Rafferty examines the design of outdoor and environmentally integrated learning spaces. He emphasizes the need to explore how the holistic and integrated nature of the campus and the environmental functionality of the site provide unique opportunities for learning within learning spaces. The chapter highlights the value of outdoor environments as legitimate and critical spaces for learning within higher education. Examples are provided of how the natural and built environments of the campus are used as learning spaces to promote social interactions, conversations, and experiences that enhance student learning.

Section 2: Physical and Virtual Learning Spaces

Section 2 examines the diversity of physical and virtual learning spaces. The five chapters examine institutional spaces for learning, using design-based research to evaluate spaces, networked learning environments, lifelong learning through e-portfolios, and learning community spaces.

In Chapter 5, Robert Fox and Paul Lam explore the changing needs for university learning spaces and the resultant designs to maximize opportunities for student learning, taking into account the special needs and learning culture of the local context and the changing curriculum needs of all higher education institutions in Hong Kong. The chapter outlines a study of these needs and an institution's plans to better use space to support both flexible and interactive learning environments to enhance active student learning. In Chapter 6, Shirley Reushle discusses the purposes, design, and implementation of a physical experimental learning and teaching space which forms part of the University of Southern Queensland's Australian Digital Futures Institute (ADFI). It identifies challenges associated with the initial design and offers some recommendations for addressing these challenges. The chapter examines the principles of the PaSsPorT design model which has been developed to guide the redesign of space. The chapter also introduces a process for evaluating the design and implementation of learning, teaching, and research spaces using design-based research to frame the model. In Chapter 7, Chris Jones introduces the idea of networked learning environments and argues that these environments provide the totality of surrounding conditions for learning in digital networks. He provides illustrative vignettes of the ways that students appropriate networked environments for learning. The chapter then examines the notion of networked learning environments in relation to the idea of infrastructure and infrastructures for learning and sets out some issues arising from this perspective. The chapter suggests that students and teachers selectively constitute their own contexts and that design can only have an indirect effect on learning. In Chapter 8, Eva Heinrich and Yuliya Bozhko explore the dominant virtual learning spaces employed in institutions of higher education and contrast them with the virtual social spaces provided by Web 2.0 tools. Guided by the increasing focus on lifelong learning skills in the world of work and in higher education, the authors identify the gap that exists between institutional and social virtual spaces. Heinrich and Bozhko argue for filling this gap by providing access to institutional e-Portfolio systems to students in higher education, and giving students an institutionally supported, student-focused virtual learning space. In Chapter 9, Nathan Wise and Belinda Tynan explore the conceptualisation and creation of an interactive, online, social network community of practice. The Distance Education Hub (DEHub) is both a virtual and physical community space. DEHub is in the simultaneous process of constructing and facilitating a virtual space to support and encourage both knowledge dissemination and knowledge creation. The DEHub space focuses on learning as a cooperative, constructive, and dynamic process involving engaged communities of scholars, learners, and practitioners.

Section 3: Blended Learning Spaces

Section 3 examines the concept of bridging the gap between physical and virtual learning spaces and the movement of the learner between the spaces. The three chapters examine blogs for traversing physical and virtual spaces, a simulated virtual publishing space and blending space with pedagogy.

In Chapter 10, Kerryn Newbegin and Leonard Webster use blogs to traverse physical and virtual spaces. The chapter proposes that new ways of thinking need to be adopted, and new strategies for collaborating need to be developed to enable students and teachers to traverse physical and virtual

environments. In traversing these spaces, learners must use them to best advantage, both within the higher education context, and then later in the professional arena in which they will be operating. Specifically, this chapter will examine the use of one collaboration tool—blogs—to bridge the gap between the physical and the virtual, the formal and the informal learning spaces. Strategies for using blogs will be presented as a tool for students and educators to enable and promote knowledge creation, and to develop a habit of reflective practice both during and after formal study. In Chapter 11, Steve Dillon, Deidre Seeto and Anne Berry describe knowledge creation metaphors for scaffolding learning in a blended learning environment. Through independent and collaborative work, online participating students experience a simulated virtual publishing space in their classrooms. This chapter is presented as an auto-ethnographic account highlighting the voices of the learning designer and the teacher. Using an iterative research design, evidence is provided for three iterations of each course. A collaborative approach to the development, planning, implementation, and evaluation of two tertiary music elective courses between lecturers, tutors, learning, and technological designers is narrated. A blended learning space was incorporated within each of these elective music courses, and the movement between these learning spaces is described and problematized. The research suggests that learning design, which provides real world examples and resources integrating authentic task design, can provide meaningful and engaging experiences for students. In Chapter 12, Lynne Hunt, Henk Huijser, and Michael Sankey examine blending space with pedagogy. This chapter shows how virtual and physical learning spaces are shaped by pedagogy. It explores the shift in pedagogy from an orientation to teaching to an emphasis on student learning. In so doing, it touches on Net Generation literature indicating that this concept has a poor fit with the diverse nature of student populations engaged in lifelong learning. The argument is that the skill set required for lifelong learning is not age related. The chapter refers to the concept of the "edgeless university," which acknowledges that learning is no longer cloistered within campus walls. An important point in the chapter is that the deliberate design of quality learning spaces requires whole-of-institution planning, including academic development for university teaching staff, themselves often ill-equipped to take advantage of the potential of new learning environments.

Section 4: Authentic Learning Spaces

Section 4 examines the concept of authentic learning spaces. The five chapters examine assessment in virtual learning spaces, creating an authentic learning environment for nurses, academic development for learning spaces, designing experiential learning spaces, and utilizing student mentors in learning spaces.

In Chapter 13, Geoffrey Crisp examines assessment in virtual learning spaces. The chapter examines how assessment spaces must change in response to the rapid development and uptake of new virtual learning spaces. Students are engaging in collaborative, cooperative learning activities in a spatially distributed environment, yet their assessment tasks are often delivered in traditional assessment spaces that bear little resemblance to their learning spaces. The assessment of students in virtual worlds, virtual laboratories, role-plays, and serious games is examined, and the case is presented for the wider use of evidence-centered assessment designs and stealth assessment techniques. In Chapter 14, Gylo (Julie) Hercelinskyj and Beryl McEwan present an overview of an innovative teaching approach in an undergraduate nursing degree at Charles Darwin University (CDU). The authors describe the development and initial integration of a virtual learning space into the first year clinical nursing subject using a case-based approach in order to address some of the issues associated with an externalised Bachelor of Nursing program. In addition, the use of the CDU vHospital® in supporting early role socialisation into nursing

and professional identity of first year nursing students will be explored. In Chapter 15, Caroline Steel and Trish Andrews suggest that academic development can be designed to provide strong opportunities for university teachers to re-imagine their teaching for these new spaces while also building their leadership capacity. This chapter discusses challenges that teachers face in transforming their teaching practices and proposes a model for academic development. Two case studies demonstrate the flexibility and efficacy of the model and provide pointers for further adoption in the higher education context. In Chapter 16, Chris Cheers, Chen Swee Eng, and Glen Postle advocate that to maximise the potential of any learning environment, educators need to understand how students learn in the first instance and then design the learning environment based on these insights. Formal learning is conceived as an individualised experience within an organised learning community, and it is suggested that this learning environment is described as an experiential space. Within this chapter, the authors describe an approach to designing experiential space that uses problem based learning to engage students and facilitate their active construction of knowledge. In Chapter 17, Keith Kirkwood, Gill Best, Robin McCormack, and Dan Tout explore the human element in the learning space through the notion that once a learning space is colonised, it becomes a learning place of agency, purpose, and community involving both staff and students. The chapter discusses the dynamics of peer learning across learning space settings and the challenges involved in instituting the shift from teacher- to learning-centred pedagogies within spaces. Both physical and virtual dimensions are considered, with the SNAP-VU Platform introduced as a strategy for facilitating virtual learning communities of practice in which staff, mentors, and students will be able to engage in mutual learning support. The chapter concludes with calls for the explicit inclusion of peer learning in the operational design of learning spaces.

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