CAR PARKS OR CROSSROADS?

FINDING NEW SPACES AND PLACES FOR LEARNING IN LARGE-CLASS ENVIRONMENTS

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INTRODUCTION

The combination of the words ‘campus’ and ‘lectures’ evokes an image of a geographical location, a place set aside from town, where “skill and intimate familiarity with people and things have provided the most promising route to success” (as cited in Cornfield 2002:par47). This place, or what we call a university, comprises teaching spaces, administrative areas, and social and leisure settings. Although the physical environment is integral to the educational process, its layout and design has largely been taken as given (Jamieson, Fisher, Gilding, Taylor & Trevitt 2000). Traditionally, responsibility for the built environment lay with support staff, while teaching and learning transactions were the responsibility of academics. Within the places managed by administrators, a lecturer carved out a space where she/he was able to systematically organise and communicate the information and content that had to be taught to students (Siemens 2008).

Worldwide, this 20th-century conception of a university is changing in tandem with the diversification of education models (distance, virtual, open and distributed education), new technologies, new programme demands, new audiences, and new commercially competitive vendors and services (Garrison 2000). The emergence of the virtual university – a space where “wholly mediated relationships are tied together by information and communications technology” (Cornford 2002:np) and students never meet lecturers face-to-face in a class room – is altering our current assumptions about the layout and scheduling arrangements of a typical higher education institution. Two recent and notable examples of this conceptual change is the course in Artificial Intelligence presented in 2012 by Sebastian Thrun and Peter Norvig at the Stanford University School of Engineering, and the rapid growth in Massive Open Online Courses (MOOCs). Thrun and Norvig’s course attracted a 160,000 students from more than a 190 countries (from India and South Korea to New Zealand and the Republic of Azerbaijan), and more than a hundred volunteers signing up to translate the lectures into forty-four languages (described in Leckart 2012). Despite the large

PART THREE • SUPPORTING LARGE-CLASS TEACHING

numbers, Thrun and Norvig avoided conventional 'lecturing' and set out to create a tutor-like experience with personal dialogue. They consciously moved beyond the current system of information delivery, with a professor as a 'sage on the stage', and filmed short amateur quality videos in their basement instead. The course was not arranged around the amount of time spent on learning (although they did use deadlines to keep the course going forward), but focused on what had actually been learned. The second example of a challenge to typical 20th-century higher education notions is the introduction in 2013 of the first MOOCs-for-credit and the companies associated with them (Coursera, Udacity, Udemy, etc). If these freely available and free of charge courses prove sustainable, this alternative model will allow a new level of access to higher education. While the student numbers involved in both these open and virtual courses are higher than for any other university course, their use of educational technology (recording lectures and laboratory work, sequencing and posting these audio or videos files online with a range of other learning resources, and making the course freely available to anyone) is not unique. The Open University has been doing it for over forty years, while the Massachusetts Institute of Technology's OpenCourseWare (MIT OCW) recently celebrated a decade's worth of open courses that have reached an estimated 100 million individuals worldwide.

Here in South Africa, low Internet penetration rates, limited educational technology expertise and capacity, financial constraints, few commercial service providers, and a range of digital divides have slowed the impact of the Internet on higher education providers. However, the combination of a rapid acceleration in enrolment numbers, increasingly better and cheaper Internet connectivity with an international SEACOM/WACS and national SANREN/TENET network, and an explosion in the number of mobile computing devices available may serve as a catalyst for change in technology-assisted education in South Africa.

The pressure to enlarge, alter or refurbish lecture theatres, classrooms, laboratories, tutorial rooms, etc, cannot simply be attributed to increasing class sizes. The impulse to reconfigure campus and its facilities comes from a range of internal and external drivers for change. These change drivers occur at a micro and macro level. Within the ivory tower, ongoing requests from lecturers for data projectors, networked podiums, and interactive white boards highlight the need for well-equipped and up-to-date teaching facilities. Lecturers, no longer satisfied with only lecturing with chalk and talk, want to use new instructional forms with their students. These alternate forms do not always fit neatly into existing time tables. Active learning requires greater blocks of time. Another change driver is the student. Many newly enrolled first-year students have smartphones, tablets or laptops. As able users of digital resources, their technological expectations are constantly shifting. Many have moved beyond computer labs and use portable and wireless devices to access content. They expect the university to have a wireless network that supports their mobile and personal device(s). Facility upgrades is another change driver. Outdated, organisationally and physically compartmentalised teaching structures need more than a lick of paint if they are going to be suitable 'next

CHAPTER 11 • CAR PARKS OR CROSSROADS? FINDING NEW SPACES AND PLACES FOR LEARNING ...

generation learning spaces'. The traditional 'egg box' suite of lecture halls may have suited an industrial model for education, where the design of structures focused on efficiency and the ability to promote student concentration, not on creating an inspiring environment that promotes agility, creativity and collaboration.

Drivers for change are not only internal. Externally, the state, industry, and ambitious parents and students have expressed and published their expectations for higher education quite clearly. The *Green Paper on Post-School Education and Training* (RSA DHET 2012), released by Higher Education and Training Minister Dr Blade Nzimande in January 2012, addresses some key challenges facing South African higher education. One of the recommendations contained in this document is that universities have to almost double their enrolment numbers – from the current 900,000 to more than 1.5 million – over the next twenty years.

Another driver is an industry-wide concern about the dearth of science and technology graduates. And then there are parents and the expectations they have of universities to remedy the inadequacies of the school system and produce academically and technologically competent graduates who are prepared for an unknown future. Student applications for entry to post-school education are growing. In 2013, *Business Day* reported that the University of Johannesburg (UJ) had received 89,000 applications in 2012, but only has space for 10,500, which means that nearly 80,000 hopefuls were disappointed (Magubane & Goko 2013). During the same period, the University of the Witwatersrand (Wits) had 34,000 prospective students applying for only 5,500 places. This rapid growth in enrolment requests and the associated graduation rates, combined with greater, cheaper and faster web access, could act as a catalyst and challenge the prevailing spatial, pedagogical and administrative assumptions in South Africa, and may even alter our current conceptions of the place we call a university.

The most common South African response to the above-mentioned internal and external pressures for larger teaching facilities has been for university administrators to instruct their infrastructure committees to commission building projects across campus. Many of these facilities are standard 'manufactured' facilities, built in the most economic and efficient manner in the shortest possible time.

If universities want to ensure that they are able to carry a greater number of students and keep graduation and dropout rates constant, then university management will also need to consider how additional spaces, to accompany the teaching facilities (lecture halls, classrooms, laboratories, etc) can be developed – places where students can take ownership of their own learning; where flexible, informal space can be used to promote face-to-face contact; where received information is unpacked, discussed and understood. This chapter will argue that, by itself, the renovation and/or construction of learning facilities and the deployment of Information and Communication Technologies (ICTs) in these structures is not the solution for a changing campus. Scaling up the infrastructure will not, by itself, automatically accommodate the learning needs of students. Unless administrators and academics can (i) appreciate how place and space

PART THREE • SUPPORTING LARGE-CLASS TEACHING

affect what is learned; (ii) recognise that pedagogic practices are changing; (iii) ensure that academics are able to complement taught content with alternative learning opportunities; and (iv) enter the lifeworld of the student, it is likely that universities will only create large 'car parks' that can house more students, and not the necessary nexus or 'crossroads' that characterise a higher education environment. An appreciation of the four factors mentioned above should lead to greater consultation across the academy when new teaching facilities are commissioned. If not, then it is likely that teaching and learning in these new spaces will be limited by previous experiences of knowing and learning. But if learning spaces can become physical representations of an institution's vision and strategy for learning, and those responsible for implementing that vision are willing to analyse the teaching and learning needs of those using the learning spaces and the mediating effects of technology, then administrators, academics and students can generate a new and shared understanding of learning in these new spaces.

PLACE AND SPACE AFFECT LEARNING

Space – whether physical or virtual – can have an impact on learning. It can bring people together, it can encourage exploration, collaboration and discussion. Or space can carry an unspoken message of silence and disconnectedness. More and more we see the power of built pedagogy (the ability of space to define how one teaches) in universities and colleges.

(Oblinger 2005:1)

Physical space has an impact on behaviour. It can bring people together with reverence or raucousness. As sacred spaces, cathedrals use architectural elements to evoke awe and veneration; stadiums, as entertainment spaces, are built to amplify excitement. Most places for teaching on a university campus are designed to efficiently deliver content at specific locations and times. Office designers have realised that design elements can be used to foster actions and emotions, and intentionally design modern workspaces to encourage exploration, collaboration, and discussion. Yet, campus infrastructure committees have largely kept to the traditional architectural model for their content delivery spaces.

Existing spaces can also hamper change, especially first-generation technological change: "Only after a period of exploration, do we understand how new tools require a re-shaping of existing physical structures" (Siemens 2008:np). Paul A David (in Siemens 2008) looked at how the adoption of the electrical generator in factories was delayed because of the way factories were built. Steam-powered factories had a central power source and the entire factory was powered by belts running from this central shaft. As the electrical engine replaced the steam engine, it took up to forty years for factories to reconfigure their physical arrangement in order to take advantage of the affordances of the new technology.

Architectural structures can limit the range of lecturers' available teaching options. A tiered amphitheatre with fixed seats lends itself to a lecture, but not collaborative group

CHAPTER 11 • CAR PARKS OR CROSSROADS? FINDING NEW SPACES AND PLACES FOR LEARNING ...

work. This link between place and teaching behaviours is known as ‘built pedagogy’ – the ability of space to define how one teaches (Monahan 2002). If we are to ensure that future learning environments can house bigger classes and still foster a range of learning practices, then these new spaces must be designed for flexibility and built in a manner that allows for the adjustability of a space to the practices of individuals. In order to achieve such flexibility, aesthetically aware architects, future-focused IT specialists, time-strapped academics, and budget-constrained administrators (and other role players in the institution) will have to combine their expertise to enquire how the ‘learnspace’ (the context where learning occurs) (Goodyear 2008) will support communication and community, knowledge building, and engagement *before* a building is erected. If the physical infrastructure primarily supports ‘lecturer-centric’ learning practices, then the university will find that their new large classrooms are ‘car parks’: places that promote a passive learning experience, as there are limited opportunities for engagement, inquiry and feedback. If, however, we are able to use these spaces as environments that allow for unlimited agency to build and experiment with things within those boundaries (Thomas & Seely Brown 2011), then a university can develop learnspheres where lecturers and students at scale can engage in learning activities that are suited to the 21st century.

PEDAGOGIC PRACTICES ARE CHANGING

Our understanding of learning has expanded at a much faster rate than our conceptions of teaching (Bass 2012). As we understand more about the working of the brain, explore incorporating alternative learning practices (seminars, learning communities, collaborative assignments, service learning, internships, etc) into traditional course structures, promote informal learning and networks, and read about alternative theories of learning, such as constructivism, social constructivism and connectivism (Siemens 2008), it is apparent that pedagogic practices have changed significantly over the last twenty years. It is also apparent that both new and refurbished buildings, and the teaching and learning facilities within them, have not always kept pace with these changes.

From an architectural perspective, this is unsurprising, as a building is designed to last fifty to a hundred years. Yet, the curriculum in these spaces may change every ten years (Oblinger 2005). One may therefore expect that, from a pedagogic point of view, our growing understanding of how people learn should have some effect on the configuration of learning spaces and the technologies supporting them.

There are some exceptions to the above. There are some spaces that have been specifically designed to support students’ learning practices, such as libraries and knowledge commons. Goodyear (2008) calls these newly emerging learning environments ‘learnspheres’ (much like the term workplace) – specific contexts where learning can occur. With updated and appropriately placed facilities, a learnsphere offers students and lecturers more than a container for teaching and learning. The

PART THREE • SUPPORTING LARGE-CLASS TEACHING

room may be structured in such a way that the lecturer goes beyond information transfer and uses the space as a junction or nexus; in other words, a place for connecting person to person. Portable networked devices, such as smartphones and tablets, combined with growing digital network infrastructure, have the potential to reconfigure the imagined learning geography of the classroom and facilitate new learnspaces. But typical room designs (how furniture is arranged and power and access points are provided) in newly constructed venues do not really hint at the possibilities of such a change. If we are to prepare places and spaces that cater for today's (let alone tomorrow's) learning, then we will have to move beyond consulting with academics and educational technologists *after* structures have been built and bolting new technologies onto traditional physical structures (Heppell, Chapman, Millwood, Constable & Furness 2004). Such learnspaces should be planned in advance, so that restructured, ergonomically appropriate, networked, scalable, sustainable, student-centred and flexible environments may be created.

LECTURES AND CONTENT DELIVERY SYSTEMS NEED TO BE COMPLEMENTARY

Historically, the lecture and lecturer have a central place in the delivery of content; and many teaching spaces on campus reflect this. This information dissemination model of course delivery is deeply entrenched and ubiquitous: it goes back to mediaeval times, spans all disciplines and is found across all faculties. With the integration of ICT into courses, some lecturers have found an alternative space for information dissemination. Students can use ICTs to access information and services at any time and any place. Courses can be delivered in a variety of ways and to an increasing variety of students by means of face-to-face, blended, or fully online learning (Bates 2010). These new distribution options, according to critics of the lecture, constitute a threat to the continued existence of this age-old delivery mechanism.

Supporters of the lecture counter this view with the weight of tradition. Despite restructuring, expansion, and the introduction of new areas of scholarship, universities have remained largely unchanged for the past 800 years (Bates 2010), and proponents of the lecture claim that lectures will not necessarily be discarded now, because a particular generation is looking for engagement and interactivity. Built pedagogy, as alluded to in previous sections, also makes it difficult to abandon this teaching mode – ironically, critics of the lecture often use it themselves to critique the lecture form. Nor has there been much success at reforming academic teaching (Mårtensson, Roxå & Olsson 2011).

As the future of the lecture is debated, it may be helpful to look at the history of this form. There have been modifications to the lecture form in its 800-year history. Long before Gutenberg, the lecture played an indispensable role in communicating information and content. In its mediaeval incarnation, the purpose of the lecture was not to transmit or disseminate learning, but rather to save a written cultural heritage from irretrievable loss and decay. The word 'lecture' comes from the medieval Latin

CHAPTER 11 • CAR PARKS OR CROSSROADS? FINDING NEW SPACES AND PLACES FOR LEARNING ...

lectura (a reading), which in turn comes from the Latin *lectus*, the past participle of *legere*, originally 'to gather, collect, pick out, choose' and later 'to read'. Hence, in the Middle Ages, the lecture was a reading of an authoritative text (usually the Bible), and this reading was the conduit for scarce knowledge from the past to be preserved and passed on from one generation to the next. In order to achieve this aim, the 'reading' or lecture took the form of slow oral dictation so that those attending could carefully memorise and painstakingly reproduce what was read (Friesen 2011).

Gutenberg's introduction of the printing press in the 15th century offered a much better and efficient way of recording and preserving information, and eventually made printed information plentiful. Yet, although the plenitude of printed information obviated the need for the lecture to be a site of dictation and verbal note taking, it continued to keep to its mediaeval form long into the Renaissance, and not until the 18th century did the dictated mediaeval lecture or sermon fall into decline (Friesen 2011).

During the Renaissance, the podium became a locus where someone created knowledge. It became a site of the 'new', with the emphasis on spontaneity, creativity and originality. In short, the lecture was no longer about the authority of the text, but the authority of the lecturer. The lecture was no longer the conduit for tradition received from the past, but a place and occasion where people could speak their mind, and in doing so act as the author of spoken thoughts and words. Texts, both those used by the speaker and produced by the note taker, became important inasmuch as they enabled and captured the creativity of the speaker (Friesen 2011).

In the late 20th century, multiple technologies have turned public speaking into a 'fresh talk' – a supposedly spontaneous conversation that is rehearsed and augmented with a range of media. Yet again, on campus, the lecture form has taken a while to catch up and generally still retains its Renaissance attributes (Friesen 2011). Even if lecturers recognise that the purpose and form of the lecture have changed, and that new mediation layers are allowing their students alternative spaces to connect with content, each other, and expertise, they still find that the places and structures on campus intended for teaching confine them to the Renaissance model and have to struggle to connect their students with current forms of content engagement.

Newly emerging ways to augment or engage with course content have led many to question why lectures should not be scrapped altogether as a teaching method (Laurillard 2002). Certainly, the bounded, self-contained course, which is primarily accessed in the lecture theatre, library and tutorial room, is being transformed by access to information via new technologies. This access has 'thinned' classroom walls and is constantly altering the way that information is brought into and communicated out of the classroom. The appreciation of the porous boundaries between the classroom and life experience has created tensions between the expansion of learning and the limitations of our structures. Not many lecturers get away these days with reading out a prepared text to an audience of tentative students jotting down reams of handwritten notes without at least one request for an electronic copy of the lecture.

PART THREE • SUPPORTING LARGE-CLASS TEACHING

A common mistake among critics of the lecture is to assume that, as there are other more efficient information transformation mechanisms, the lecture as a form will fade away regardless of whether its form changes or stays the same. But instead of focusing on changing the lecture itself, we need to acknowledge that a lecture is not about transmission of content. It is about developing a personal, emotional connection between the lecturer and his students that brings the subject alive. The closer the connection between lecturer and student, the more likely it is that the student will 'learn'; or, conversely, the larger the class and the less opportunity for personal engagement, the less likely it is that a student will engage with the matter being taught. Moore (in Birochi & Pozzebon 2011) calls this 'transactional distance'. At one time, when classes were small, the lecturer could use the lecture theatre to engage students in discussion or dialogue. These days, as class sizes continue to grow, lecturers faced with teaching increasingly large classes, and administrators wanting to provide larger facilities that will attract yet more students, have turned to technology as a quick fix for the congestion they see in front of them. Indeed, the Internet (Web 2.0 and social media) and personal (and often disruptive) devices such as laptops, mobile phones and tablets offer new ways of increasing interaction between students and between students and lecturers, thereby diminishing transactional distance. Moreover, students born into a digital world are assumed to be ready to make use of these electronic and virtual possibilities. But many lecturers and the venues they teach in cannot take advantage of such technologies.

ENTERING THE LEFELFORLD OF THE STUDENT

If universities are to offer quality education without abandoning the lecture and really take advantage of scalable technologies (broadcast media, computers and networks), they will have to go beyond providing academics and students with the hardware, software and competencies they need to access a fast, university-wide, digital infrastructure. Attention will also need to be paid to the use of space (physical and virtual) to promote student learning.

Much has been written about how ICT will change the educational process. Yet, the impact of ICT has not been as great as we might have hoped or expected (World Bank 2008). Ongoing research about the impact of technology on teaching and learning paints a chequered picture. It might be relatively easy to add a layer of technology to disseminate, amplify or broadcast course content to large classes, but if we take Moore's theory of transactional distance seriously, it may first be necessary for academics and administrators to consider how they may understand and appropriate spaces that will allow them to understand the lifeworld (or 'habitus') of the ordinary undergraduate student at university.

This lifeworld – somewhere between the first space, the formal classroom where lecturers teach and the second space, a library or at home where informal learning takes is the student's mental world of beliefs – is a liminal, hybrid, or diaspora space

CHAPTER 11 • CAR PARKS OR CROSSROADS? FINDING NEW SPACES AND PLACES FOR LEARNING ...

commonly referred to as ‘third space’ (Prinsloo, Slade & Galpin 2012). It is neither a lecture hall nor a learnspace, but a space where these worlds can merge as “individuals negotiate [and] renegotiate their assumptions, beliefs and identities in a constant space of becoming” (*ibid*:131). Kearney, Schuck and Burden (2010) argue that third space is the social context for learning that exists at the nexus between the formal and informal. Here, in the third space, the formalised and normative elements (including campus culture, subject culture and assessment structures) collide with the informal, bottom-up influences, such as students outside school culture and personal histories of learning (Sutherland, Armstrong, Barnes, Brawn, Breeze, Gall, Matthewman, Olivero, Taylor, Triggs, Wishart & John 2004). With ICT, access to and participation in this ‘third space’ becomes possible. First-hand digital artefacts from outside the classroom can be brought into the formal lesson and used to support further learning (‘bringing the outside in’). Academics and students can also use ICT to externalise thoughts and processes that are normally internal and therefore not accessible to others (‘bringing the inside out’). Third space requires equal ownership between lecturer and students and equality of participation, so that students’ personal histories of learning and the teacher’s own history of learning may overlap. Such a space allows for the building of a bridge between ‘individual and idiosyncratic’ and ‘institutional’ knowledge, as well as a shift in focus from the teacher as the font of all knowledge to a focus on the learning intention.

A CASE STUDY OF WITS UNIVERSITY

As Wits University celebrated its ninetieth anniversary in 2012, its attention was focused on the approximately 120,000 graduates produced since it was founded in 1922. If the current four per cent growth in enrolments remains constant over the next decade and the percentage of students graduating does not drop, then it is possible that the university will have produced an additional 80,000 graduates by the time it celebrates its centenary. This rapid acceleration in enrolment numbers and the associated graduation rates will highlight spatial, pedagogical, and administrative issues that may alter our current conceptions of the place we call Wits.

Wits’ response to increasing student numbers has been to instruct its infrastructure committees to commission 1.5 billion rand worth of building projects across campus. The science stadium, for example, has three laboratories with 1,100 bench spaces, five auditoriums with a total of 1,500 seats, and tutorial rooms for a total of 800 students. On the technical front, the university is investing in a 10GBps-backbone that will allow it to create a high-capacity network covering the whole campus. In addition, wireless network coverage is increasing across campus, a student laptop ownership programme called SCAN is in the pilot phase, and an open-source electronic learning environment called Wits-e has been launched.

In newly built lecture venues, educational technologies, such as data projectors and PowerPoint, are still viewed as extras or ‘add-ons’ to the lecture theatres. This add-on

PART THREE • SUPPORTING LARGE-CLASS TEACHING

approach is at odds with the architectural incorporation of other building elements, such as lighting or air-conditioning. Despite the rapid growth of e-learning over the past decade, ICT infrastructure integration remains at the periphery of classroom planning, and is typically treated like curtains, carpets or coffee machines – something that is added by contractors at a later stage.

If Wits is going to be able to cope with larger student numbers and successfully incorporate ICT into its teaching and learning infrastructure, it may be necessary for the university to take a broader look at its campus and teaching and learning facilities and identify how these facilities do in fact aid the institution in accomplishing its broader vision. The Place of Learning Spectrum (Figure 11.1, developed by the Australian Teaching and Learning Council, in Radcliffe 2008), illustrates the argument presented in this chapter that there are different spaces and places for learning. The model places space on a continuum and identifies how various spaces and places are typically used for formal and informal teaching and learning, thereby allowing architects and administrators to identify learning modes in teaching and learning facilities and other third spaces in order to provide appropriate ICT infrastructures to support these modes.

FIGURE 11.1 The Place of Learning Spectrum (Radcliffe 2008)

The add-on approach to ICT provision leads to a built pedagogy (the ability of space to define how one teaches) and effectively means that the physical structures

CHAPTER 11 • CAR PARKS OR CROSSROADS? FINDING NEW SPACES AND PLACES FOR LEARNING ...

are unable to fully accommodate the wave of social, economic, generational and cognitive change that is transforming much of the connected world. If Wits continues to take this approach to the provision of ICT, e-learning will remain at the margins of the institution. If ICT is to be used effectively to benefit teaching and learning, then it must be integrated into the infrastructure of Wits itself. If space is to become a physical representation of Wits' overall vision and strategy, then those responsible for implementing this vision should be able to appreciate different learning and teaching modes and incorporate appropriate technology networks across the various spaces and places on campus. Then, to paraphrase Winston Churchill, we can shape our buildings before they shape us.

CONCLUSION

Successfully accommodating students' and academics' spatial and educational needs on campus is already a challenge, or to quote Gower (2009:np): "It's relatively easy to massify the higher education system, but access must be coupled with success." As South African universities continue to experience an annual increase in student enrolments, they will have to quickly work out how to deal with the converging pressures of pedagogy and space. The easiest response to macro spatial drivers is to "fit as many individuals as possible into a cost-effective space designed for the delivery of information" (Radcliffe 2008:10). Scaled teaching infrastructures should mean that newly built venues will be able to accommodate greater numbers of students. However, if architecture and economics remain the primary considerations with regard to new infrastructure, then it is likely that the cost per square metre mentality will lead to venues that support only one teaching style. Paradoxically, scaling up the teaching infrastructure is also likely to highlight the inherent contradiction of expanding access to education by increasing class sizes. Learning in large classes is intimidating for students, and the amount of engagement, inquiry and feedback available to students is obviously constrained by the class size. While broadening access to education may result in increased numbers of students, the expansion may result in the deterioration of quality teaching and learning.

Audio-visual experts will suggest that an appropriate ICT infrastructure, including a range of print, audio, video, networked and other channels, will make it possible to disseminate, amplify or broadcast what is being taught to a far larger audience. This massification may meet external stakeholders' demands, but merely bolting new technologies onto walls and increasing class sizes will not create greater opportunities for learning (Heppell *et al* 2004). Jamieson *et al* (2000) suggest that scaling up infrastructure will introduce new questions about the pedagogical process, architectural assumptions, and the role of ICTs. If universities wish to continue with their current face-to-face approach to educating students, now at scale, then it may be necessary for them to look beyond their spatial development strategy of aesthetically pleasing structures and enlarged floor plans, and work out how physical and virtual structures may be used to foster the rich interactions that characterise face-to-face teaching in smaller groups.

PART THREE • SUPPORTING LARGE-CLASS TEACHING

Many academics have started incorporating ICTs into their courses to address growing class sizes. However, it would be a mistake to assume that these online models for programme delivery are automatically innovative. Instead, they may simply be online copies of current forms of teaching. If ICTs are to be used for alternate pedagogical forms (for example, collaborative work, projects, problem solving and creative thinking), then educational technologists will have to go beyond bolting technologies onto buildings. This will require a major redesign of how courses are delivered. Equally, administrators cannot only look to technology to help them cope with spatial challenges. While new or enlarged lecture halls equipped with technology-mediated facilities may immediately address growing class sizes, extra seats and enlarged screens do not automatically result in engaged learners. A learning space, be it physical or virtual, should be designed with particular pedagogical intent. There is no hierarchy here. Pedagogy should not be valued more than space; and technology should not supersede pedagogy. The three elements must form part of an integrated framework that guides the growth and development of facilities on campus.

If South African universities are to deal successfully with macro and micro internal and external drivers for change, they will have to design places and spaces that can support appropriate and changing pedagogical practices. Building designers will have to go beyond standard designs that deal with lighting, heating, networks and power points. At the same time, architects, administrators, learning designers and academics will need to participate in effective dialogue in order to establish the effect that a place will have on practice and the different environments required in order to form learnspaces. Efficiency in content delivery and speed of class movements must be balanced with the need to create spaces that allow students to connect with each other and their lecturer, especially in large classes. Bridges will have to be built between the learnspace, the venues where teaching happens, and the students who are coming to a place of understanding. Researchers will have to investigate and promote new modalities that enable connections, and identify the factors that are likely to promote or inhibit learning in the physical and virtual places where knowledge is mediated. A renewed emphasis on learning means that when infrastructure committees are thinking about building new learnspaces or renovating old ones, they must consider the learner and the teacher in the planning phases. If teaching and learning at higher education level is going to successfully shift its attention from communicating content in classrooms to connecting minds in learnspaces and third space, then infrastructure committees will have to make a conceptual shift that involves a commitment to valuing pedagogy, space and technology equally.