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New Technologies and New Spaces: Opportunities for Innovative Educational Environments

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Abstract

Both the *National Strategy for Higher Education to 2030* and the EU Commission's Report on the *Modernisation of Higher Education* emphasized the need for high-quality learning environments that are driven by state-of-the-art physical spaces and e-learning platforms. TU Dublin's impending move to a new consciously designed campus at Grangegorman, and its adoption of the new virtual learning environment, Brightspace, are reflective of these trends.

In anticipation of these developments, this paper explores how Brightspace might be integrated into the novel learning spaces created by TU Dublin's migration to the Grangegorman Campus. The migration presents an excellent opportunity for students and staff to further engage with a new virtual learning environment (VLE), and to bridge the divide between the traditional learning environment and interstitial learning spaces. This paper duly examines the nexus between TU Dublin's new campus, its state-of-the-art classrooms, and its new VLE. In doing so, it provides a snapshot of Ireland's first Technological University at present and initiates a discussion about how to sustain collaborative learning experiences at TU Dublin going forward.

Keywords: learning; spaces; technology; classroom; design; collaborative learning

Introduction

Both the *National Strategy for Higher Education to 2030* (DES, 2011) and the *Report on the Modernisation of Higher Education* (EU Commission, 2013) emphasize the need for high-quality learning environments that are driven by state-of-the-art physical spaces and e-learning platforms. TU Dublin's impending move to a consciously designed campus at Grangegorman, and its adoption of a new virtual learning environment, Brightspace, are reflective of these trends. The TU Dublin Grangegorman 'Migration Programme' states that the move to a new campus will: (1) enable pedagogical opportunities within new spaces, and (2) support staff in their development towards an enhanced learning experience (Technological University Dublin, n.d.). The prospect of working in an entirely new physical space and a new virtual learning environment (VLE) provides both opportunities and challenges for current and future staff at TU Dublin. This period of transition presents a unique opportunity to explore the innovation potential afforded by a purposefully designed campus and a new VLE.

Accordingly, this paper explores the pedagogical opportunities afforded by TU Dublin's migration to the Grangegorman Campus and the fundamental changes that students and staff will encounter as a result. The connection between physical spaces, learning technologies, and a new VLE will be a dominant theme in the transition to the Grangegorman campus (Raftery & Risquez, 2018). TU Dublin City Campus's new dedicated VLE, Brightspace, will thus be at the forefront of fundamental change into 2020 and beyond. This paper examines the nexus between the new TU Dublin City Campus, its state of the art classrooms, and its new VLE. In doing so, it provides a starting point for integrating Brightspace into a collaborative learning experience for students and staff at TU Dublin.

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Theories of Learning and Spatial Design

Over the past 50 years, the extent to which theories of space and spatial design influence teaching practices employed by higher-level institutions has come under increasing scrutiny (McClintock & McClintock, 1968). Educational spaces convey a sense of an institution's teaching and learning philosophy to students (Park & Choi, 2014; Thomas, Pavlechko, & Cassady, 2018), and drive the pedagogical commitment of staff (Finkelstein, Ferris, Weston & Winer, 2016). While institutions often lay claim to student-centred pedagogy, teaching often takes place spaces oriented around the instructor (Chism & Bickford, 2002). This tension between education and environment is reflective of a discord between pedagogy and practice. Institutions that design their campuses with students in mind, however, are communicating a very clear message that "the University cares about quality teaching and will make substantial efforts to provide the facilities that can improve both teaching and learning" (Fenton, 1991, p. 247).

Traditionally, teaching and learning environments were designed so as to make the lecturer the focal point of the room. Up until the early 1950s, behaviourist theorists conceptualised learning "as a simple process of forming connections between stimuli and responses" (Park & Choi, 2014, p. 751). As a result, classroom design was focused on achieving minimum levels of comfort, visibility, accessibility, etc. Such design reflected the behaviourist "stand and deliver, sit and listen" means of instruction (Steelcase, 2015, p. 2), or the teacher-centred approach, in which the focus was on the transmission of knowledge from the expert to the novice (O'Neill & McMahon, 2005, p.31). With the contemporary massification of higher education, many modern classrooms have retained these designs as a basic template: students

often sit at desks stacked in tiered rows, oriented towards a podium or projector screen (Halvorson, 2016; Kent, 2006).

However, the shortcomings of teacher-driven approaches to learning have been a dominant theme in contemporary scholarship on higher-level education (Chang & Smith, 2008; Jensen, 2006; Salinas & Garr, 2009). A 2014 study found that employing lecturing as the sole teaching method in the STEM disciplines increased failure rates by 55%, raising concerns "about the continued use of traditional lecturing as a control in future experiments" (Freeman et al., 2014, p. 8412–8413). As a result, many higher-level institutions are replacing teacher-focused, 'sage on the stage', practices "with those that emphasise the active construction of knowledge through collaborative—or active—learning events" (Thomas et al., 2018, p. 118).

Active learning has its roots in constructivism, which theorises that students must "'construct' their own meaning by building on their previous knowledge and experience" (Carlile & Jordan, 2005, p. 19). Cognition takes place when the student processes knowledge and makes it relevant to their own cultural context (Smith, 2004). As a result, constructivist teaching is often accompanied by a decrease in traditional lecturing, and an increase in student-centred activities that involve students "in doing things and thinking about the things they are doing" (Bonwell & Eison, 1991, p. 2). Such activities may include reading/discussion groups; problem and case-based learning; group and peer-to-peer assessment; and collaborative work. Because of these repeated student—student interactions, active learning has often been linked to cooperative or collaborative learning (Stoltzfus & Libarkin, 2016), and has been described as "social, active, contextual, engaging, and student-centred" (Johnson, Johnson, & Smith, 1998; Park & Choi, 2014, p. 752).

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Social constructivism has been increasingly influential in framing e-learning scholarship (Laurillard, 2002). The positive effects of well-designed active-learning activities have been so well-documented that a recent meta-analysis discouraged further comparison of active/passive learning (Freeman et al., 2014). Instead, the authors advocated further research into the efficacy of the range of different active-learning approaches. Recent scholarship has focused on how educational spaces can be adapted to augment active learning pedagogies (Fortier, 2014; McAvinia, 2016). Alternative classroom designs have been conceptualised, such as the Student-Centred Active Learning Environment for Undergraduate Programs (SCALE-UP), Technology Enabled Active Learning (TEAL), and Spaces to Transform, Interact Learning, Engage (TILE) (Baepler, Walker, & Driessen, 2014). At the heart of each of these models is the conscious design of the learning space to facilitate information sharing, social and collaborative interaction, and individual knowledge creation (Thomas et al., 2018, p. 119).

Typically, these active learning classrooms (ALCs) are characterised by circular conferencing tables; moveable seating; and additional learning technologies such as smartboards, tablets, and/or student computer-projection capabilities. ALCs are consciously designed to encourage ad hoc group formation, "interaction within and among groups, and between teachers and groups" (Smith, 2004, p. 68). Indeed, in one study examining student perceptions of higher education classrooms, students ranked the room layout for interaction and collaboration with others as having the most influence on their perception of the room (Yang, Becerik-Gerber, & Mino, 2013, p. 178; Asino & Pulay, 2019). The perceived importance and the inspirational value of good learning spaces should not be underestimated. As Vaughan (1991) argues, "Good rooms enable good teaching... Curricula can inspire good architecture, but good architecture can also inspire a new understanding of teaching and learning" (p. 12).

For some higher education institutions, entire campuses have been conceptualised as an extension of the traditional classroom: student cafés have been fitted with moveable whiteboards; lounges with informal seating offer power outlets; classrooms may feature moveable walls that can divide and redistribute space (Steelcase, 2015). Creating these 'interstitial spaces' is central to linking traditional classroom environments to the informal contexts in which contemporary learning takes place (Chism & Bickford, 2002, p. 92). The continued growth of mobile learning technologies, in particular, has made spaces outside of the classroom "an integral part of the learning experience, whether students are working alone, with peers or with instructors" (Steelcase, 2015). Reshaping educational spaces has duly been identified as "a pivotal factor for future success [sic] of integrating technology into the classroom" (Asino & Pulay, 2019, p.180). Emerging principles for (re)designing Technology Enhanced Learning (TEL) include a diverse range (both physical and virtual) of high quality and flexible (individual and collaborative) design principles that span spatial layout, furniture, technologies, acoustics and lighting/colour (Finkelstein et al, 2016; Weston, Finkelstein, Ferris & Abrami, 2010). This paper will now move to examine how TU Dublin's move to Grangegorman takes account of these dominant trends in contemporary education.

The Policy Context: EU and National Levels

TU Dublin's approach to learning environments is rooted in the *National Strategy for Higher Education to 2030* (DES, 2011) and the *Report on the Modernisation of Higher Education* (EU Commission, 2013). Both emphasize the increasing emphasis on high-quality learning environments that are driven by state-of-the-art physical spaces and e-learning platforms. The Grangegorman Development Agency (GGDA)—established under the Grangegorman Development Agency Act 2005—has been mandated by stakeholders at the community (Grangegorman Development Act 2005), government (HSE 'A Vision for Change' Provision

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Policy) and institutional (TU Dublin) levels to adopt design principles that will underpin all future development on the new site.

The *2015 Technology Outlook for Higher Education in Ireland* (Johnson, Adams Becker, Cummins, Estrada & Freeman, 2015) ranked 'collaborative environments' and 'adaptive learning technologies' as major long-term priorities to be harnessed (time-to-adoption horizon: 4-5 years). Key trends accelerating these developments include redesigning learning spaces, advancing cultures of innovation, an increasing preference for personal technology, and the rise of digital (including VLE) delivery. The National Forum (2015) champions 'embedding technology in pedagogy at the earliest stages and throughout students' careers' (p.3). In this context, Brightspace can potentially provide a rich environment that cultivates dynamic and authentic learning activities (Grabinger & Dunlap, 1995). This is consistent with approaches to deep learning in the digital age (Weigel, 2002). Strong evidence suggests that students process at higher intellectual levels when collaborating rather than when working individually (Entwistle & Peterson, 2004; Steelcase, 2015).

However, Johnson's et al.'s (2015) expert report did note "wicked challenges" posed by embedding technology in pedagogy, including "scaling teaching innovations" and "integrating technology in teacher education" (p.8). While learning technologies can free up in-class time for more rewarding learning experiences, ensuring that all the technical aspects of a course are running smoothly can be an additional source of stress (Taylor & Francis White Paper, 2019). Mastery of the variety of digital tools available to educators can seem like a job in and of itself (Taylor & Francis White Paper, 2019). As noted by the National

Forum report *Building Digital Capacity in Higher Education* (2018; in Raftery & Risquez, 2018. p.31):

> The constant emergence of newer and better tools has often resulted in confusion among staff regarding the best tools to recommend and use, and to develop and learn about in their teaching and practices. This may go some way towards explaining the emerging evidence suggesting that key digital resources (for example, virtual learning environments) are not being used to their full pedagogical capacity.

While there is evidence of the increased usage of VLEs throughout the third level landscape, there is little evidence to suggest "change in pedagogic practice" (Rienties, Giesbers, Lygo-Baker, Ma & Rees, 2016, p.539). Existing research suggests a failure to integrate the VLE as a teaching aid (Logan-Phelan, 2018). However, if used correctly, VLEs can foster group collaboration through problem-based learning (Logan-Phelan, 2018).

The recent #VLEIreland Student Survey offers valuable insights on utilising the VLE to promote greater student and teacher engagement (Ryan & Risquez, 2018). Significant numbers of students and teachers have identified the VLE as a convenient tool for study and communication; and as a materials repository (Ryan & Risquez, 2018; Farrelly, Raftery, Harding, 2018). The vast majority of students—94% and 83% of student responses in 2013 and 2011 respectively—recognise the value and potential of VLEs (Raftery & Risquez, 2018). Student engagement with VLE platforms is standard practice; the onus is duly on teachers to integrate the VLE into the physical learning environment. Anecdotally, one of the challenges posed by learning technologies is the siloing effect that apps such as Socrative and TurningPoint can have on students (Rafferty & Risquez, 2018). Given the individuated aspect of many learning technologies, students interface with their screen and not their peers. While

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the VLE can "remove the obstacle of physical distance" between those in class, the lack of personal interaction through the VLE itself has been noted as a challenge (Guo, Gong, Shi, & Luan, 2018, p.1). Over-reliance on the VLE can lead to App fatigue; a dearth in 'face-to-face communication,' a disengagement from learning technologies over time, and ultimately, disengagement from class. Having a VLE which promotes collaboration and socially-engaged learning (Figure One) might be an excellent way of utilising novel class environments such as those in Grangegorman (O'Rourke, Rooney, & Boylan, 2015).

Figure 1: Brightspace Pulse Mobile App (Source: Desire2Learn Instructional Video)

Active Collaborative Learning in Grangegorman and Brightspace

To enact this vision for 2020, the GGDA/TU Dublin Masterplan has articulated innovative design principles that reflect digitally-enabled and co-creative spaces (Figure 2). TU Dublin's faculties are arranged in a "continuous array" around the campus' 'Academic Heart' and 'Social Hub' (GGDA Masterplan, p. A3). The architectural design of the buildings grants them to "a modular flexibility of uses," while the spatial design of the campus promotes and encourages interaction amongst staff and students (GGDA Masterplan, p. A3). Communal spaces within each of the faculty districts encourage "collective interaction among users" (GGDA Masterplan, p. A31). Each of these spaces are duly connected to larger spaces that

reflect a positive image of academic and "research-oriented life to the surrounding area and community" (GGDA Masterplan, p. A31). As per the GGDA Masterplan:

> The relocation of all Institute activity to a single campus affords the opportunity to create a central bank of quality learning space in the form of lecture rooms, break-out rooms, seminar rooms and study spaces that would be accessed by all faculties and facilitate the growth or contraction of faculty demands for space over time (p. A93).

Figure 2: TU Dublin Academic Hub & Library, Grangegorman (Source: Moore Ruble Yudell Architects | Conceptual Design)

The clear vision for the Grangegorman campus is thus open, collaborative and innovative learning spaces (academic and social hubs, circular seating and pod/cluster arrangements around educational technologies) achieved through connected 'spaces' (Figure 3). The newly appointed architects for the West Quad Business School, Henegan Peng, recently outlined their vision for collaborative learning spaces that seek to replicate the orientation in the workplace environment:

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> This Quad will feature a range of specialist and shared learning spaces which will cater to the needs of a changing third-level education environment for the College of Business. (GGDA Masterplan, p.A2).

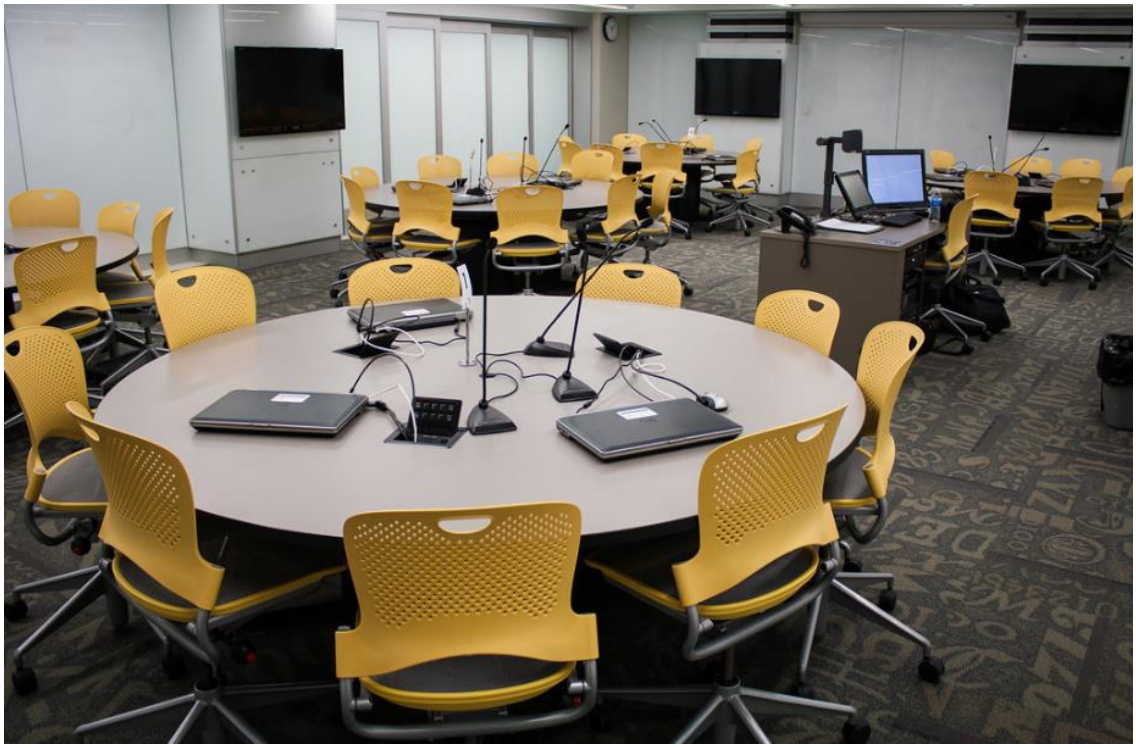

Figure Three: Active learning Classroom (ALC), University of Iowa (Bruff, 2018).

This represents a strategic shift away from the siloed, disconnected nature of conventional learning spaces and VLEs in the higher education environment (McAvinia, 2016).

Given that the design of the Grangegorman campus signals a shift away from the traditional, pulpit-oriented learning environment; teachers are presented with a chance to utilise the VLE as a student-centred activity and learning space in its own right. One feature which could be used to promote active learning in the classroom is Wiggio - a social-media-like platform provided by Brightspace which offers students the opportunity to exchange ideas, blog and post comments in group forums. While Wiggio is currently not part of the Brighspace suite

utilised in TU Dublin, the feature offers an in-class teaching aid to promote innovative social learning and collaboration. Groups working at clustered pods would be able to share their contributions with the classroom in real-time through the online VLE, or by projecting their contributions to the main screen. Wiggio also offers features that link the classroom, the campus, and the home as connected learning spaces. Given the ubiquity of mobile technology, VLEs have been shown to enhance "student communication and flexibility" (Raftery & Risquez, 2018, p.30). A modern and user-friendly platform like Brightspace can augment communication across flexible and movable learning spaces. The Brightspace "Pulse" App offers immediate access to programme/module materials, as well as discussion and brainstorming forums, in the classroom, on-campus, and beyond. As a result, students are empowered to turn any common space into a learning environment.

Results from the #VLEIreland Student Survey have shown that over 90% of students surveyed in the years 2011 and 2013 used the VLE from home (Raftery & Risquez, 2018). This trend can be seized upon by teachers: students can be encouraged to use Wiggio as a brainstorming tool at home; to exchange ideas online with peers; and to expand on these ideas in group discussion during class. Thus, the VLE can be used to foment collaboration, social learning and peer idea-exchange, with the added benefit that learning moves beyond traditional knowledge transmission models in the classroom to active learning in connected spaces.

Large numbers of teachers canvassed during a multi-college staff survey noted routine applications/uses of the VLE, such as note dissemination, announcements, emails and assignment collection (Farrelly, Raftery & Harding, 2018). However, among those who

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recognise the usefulness of VLEs, it is acknowledged that there is significant scope for reconceptualising the VLE from a repository to an active, collaborative in-class tool in itself (Farrelly, Raftery & Harding, 2018). The integration of a new VLE in a novel learning environment should be recognised as a potential opportunity to move away from widely held opinions that the VLE is a poorly utilised technology.

Conclusion

With the migration to the new Grangegorman campus on the immediate horizon, now is a timely opportunity to reconsider the usefulness of VLEs as educational spaces. This is particularly so in light of widespread academic sentiment that VLE platforms are "highly successful in enabling the administration of learning but less so in enabling learning itself" (Educause, 2015, p.2; Farrelly, Raftery, Harding, 2018). TU Dublin's engagement with a new VLE in a consciously designed campus provides an opportunity for development and augmentation of teaching methods and tools in a consciously designed learning environment. A body of literature suggests that re-designing learning spaces in this manner promotes academic engagement and achievement (Beichner et al., 2007; Dori & Belcher, 2005; Hopson, Simms, & Knezek, 2001; Stoltzfus & Libarkin, 2016; Thomas, Pavlechko, & Cassady, 2018)

However, changing the room and furniture layout and adding technology cannot be considered "a panacea" that will sustain active learning processes (Stoltzfus & Libarkin, 2016, p. 9). Innovative pedagogy remains paramount. In order to truly transform teaching and learning practice, design modifications must be accompanied by pedagogical training and continued professional development programmes (Thomas et al, 2019). Mastering new

technologies and pedagogies may require increased support from on-campus learning centres, information technology departments, and/or senior decision-makers (Taylor & Francis White Paper, 2019). Continued professional development programmes and technical training are time-intensive processes, however.

As Ireland's first technological university, TU Dublin has a unique opportunity to determine the active and collaborative learning strategies that will be at the heart of such institutions. In order to ensure sustained innovation going forward, TU Dublin's migration to Grangegorman must continue to be negotiated by its major stakeholders:

> Legislators and donors, faculty, students, administrators, even architects and furniture makers need to be part of a dialogue aimed at gaining understanding and momentum around abandoning the old assumptions that guided decision making and supplanting them with a new understanding of how learning spaces shape learning (Chism & Bickford, 2002, p. 95).

The initial signs are encouraging. As the Grangegorman campus continues to take shape, the vision of collaborative learning outlined in the GGDA Masterplan begins to come into focus (GGDA Masterplan, p. A3). In the immediate term, TU Dublin should continue to dedicate resources to upskilling faculty in the fields of pedagogy and technology. Staff confronted with the forthcoming migration should be given the time, confidence and training to conceive the VLE as a pedagogical tool which stimulates debate and extracts the best value from TU Dublin's promising new spaces (McAvinia, Ryan & Moloney, 2018; Thomas et al., 2019; Stoltzfus & Libarkin, 2016).

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