Mediating connection at scale through space design: The University of Sydney Business School CONNECTspace

Peter Bryant
University of Sydney, Australia

This study explores the design of CONNECTspace, a novel teaching environment at the University of Sydney Business School, aimed at fostering and enabling connected learning at scale. Using participatory action research and cogenerative dialogue, the project addresses the challenge of creating spaces that build connections between students, staff, and disciplines. The design focuses on five key capacities: engaging with the crowd, the group, the individual and the knowledge, generating ideas, sharing work, building social connections, and creating safe spaces for success. The study highlights the importance of changing dynamics, functions, and relationships within teaching spaces to support connectivity, creativity, and effective learning. The findings offer insights for designers and educators seeking to transform traditional teaching spaces into collaborative, connected learning environments that transform both the structural and pedagogical experience of teaching at scale.

Keywords: Teaching spaces, connected learning, teaching at scale, business education, sociality

Introduction

Many academic studies of teaching space design anchor their analysis of the educational experience in the interrogation of the role space planning, interior and exterior design and engineering practices play in defining and demonstrating the value proposition for future students, through concepts such modernity, reputation or prestige (Boys, 2014; de Borba et al., 2020; Wilkins et al., 2022). In part this is due to the reinforcement of resistance to pedagogical change and the inertia in pedagogical innovation that is present in many teaching space designs and finished building projects (Børte et al., 2023). There has been a historical trend to design buildings and spaces with a rigid compliance to the traditional structural and technological archetypes and assumed standards for a teaching space (such as space allocations per student). These standards which are present in both new and established teachings spaces perpetuate didactic practices, encourage passive learning, and enable habitual communicative modes that provide comfort and security for both staff and students (Arvanitakis, 2014). There are tensions between the design of pedagogical practice and the design of teaching spaces, which are not easily resolved (Carvalho et al., 2020). The capacities of the users of the space to define their own forms of engagement and ownership is challenged by the expectations and assumptions that the design of teaching spaces can enstructure (Cardellino & Woolner, 2020). The physical shape, the architectural features and varying forms of technologies within teaching spaces are "capable of making the learning session an empowering, inspirational, collaborative event or, on the contrary, a stagnant, tedious endurance" (Power & Supple, 2021, p. 91).

Teaching space and sociality

Sociality is critical in teaching spaces to enable a sense of place-attachment, a modality that is fundamental to catalysing meaning making and a developing sense of ownership and resonance (Low & Altman, 1992; Mclane & Kozinets, 2019). Space is inhabited by and structures social relations, producing and reproducing sociality within its boundaries and constructions (Lefebvre, 1991). Soja (1998) architects the social realities of space as existing within the realities (real or imagined) of the user and the degree to which they are willing or able to create counterspaces that resist the dominant affordances of space. Both Lefebvre and Soja explore the notion of *thirdspace* to extend how space is conceptualised past the binary and into what Soja refers to as "a space of radical openness, a space of resistance and permanent struggle, a space of various representations, which can be analysed in binary terms but where there is always a third additional dimension, an other space" (Soja, 2008, p. 57). Space design is therefore in part understood by the representations that are enabled by its

architectural functions. Furniture enables comfort or discomfort, air-conditioning enables warmth, sightlines able connection and communications. Kreijins et al., (2003) describes these modalities of function and representation as social affordances, where spaces "act as social-contextual facilitators relevant for the learner's social interaction" (p.13).

Despite the emerging educational thinking around social affordances, thirdspaces and the empowering of teachers and students to break the functions of space as designed (Harkin et al., 2022; Nolan, 2022), the dominant paradigm of teaching space design remains the spatial privileging of didacticism, placing the teacher on, as Nielsen & Stovang (2015) describe it, the 'altar' of a church-like structure with rows of seats facing forward passively waiting for the 'sermon', creating an other space for the students that excludes the teacher and vice versa. Institutional teaching space specifications are based on the prioritisation of the action that is happening at the front of the room (for example, the location of projection screens, audio-visual controls, sight lines, seating pitch and speaker and microphone placements). The infrastructural foci of many teaching spaces signify the positioning and anticipated behaviours of the academic, as well as deprivileging the communicative, connective and interactive social affordances of the students (a concept deeply explored in this interesting study on lectures by Lacković & Popova, 2021). The user experience of the teaching space places ownership of how and when connections can be made as a formal learning process in the hands of the primary user (the transmitter), moving the students to the role of the passive audience (the receiver) and constraining interaction in mono or bi-directional ways (Hanratty & McNamara, 2020).

Designing teaching spaces *for* connection and connectedness? Defining the problem
The socio-materiality inherent in the design of teaching space creates privileges for users who enter and utilise the space with specific roles and power relationships already established. This can include the ways in which technology enables specific types of interactions and the organisation of the space and its internal structures such as furniture that divide function and critically, the work that happens within the space. Gourlay (2022) argues that ways in which we understand learning (and teaching spaces) within a physical campus is "…inadequate as a theorisation of the socio-material complexities of student engagement, and is reproductive of a very particular discourse of performative and observable interaction" (p. 67).

The enabling of connectedness is shaped by the invisible hand of the designer directing how teaching influences learning on order to conduct assessment or the architect integrating the mechanical, physical and infrastructure into the socio-materiality of how the space needs to be used. There is social significance and meaning that arises from how staff and students use (or misuse) a teaching space, how they feel ownership or engagement with the space and how they weave their work, their life, their play and learning into the resonance and a sense of emotional connection (McNaughton & Billot, 2016; Tse et al., 2018). For higher education, the social significance and meaning of teaching spaces emerge from how teaching spaces enable engagement with complex transdisciplinary practices and people, social connections within and between cohorts and a deeper sense of connectedness to epistemological framings, vocational outcomes, and future professional networks. If we are to assume that supporting social significance and meaning making through pedagogical design is in part a function of the space it occurs within, the objects of representational space in teaching spaces signify passive reception of knowledge and inherent authority and control located at the front of the room, creating a lived experience of mono-directional connection.

Connections are not made *for* students by the teacher or by the needs of the curriculum framework or assessment instruments. Connections are at their pedagogically most effective when the environment and the people allow for connections to evolve, to find their own value, equilibrium, and purpose and find rhizomatic roots and growth in and outside the space itself (Author, 2022a; Siemens, 2005). Connections are learning experiences, that as the connective tissue and sinew of adult education, weaving in-between gaps in knowledge and skills, integrating the problems, scenarios, applications, and schemas in the learner's brain through the thematic links within and between disciplines (Knowles, 1970).

Teaching space design and building is not an agile process, nor is it one that is cost neutral to the institution or the faculty undertaking the teaching (Author, 2018; Fisher, 2019). Existing teaching spaces, many built and furnished in ways that embed passive learning and didactic communications, will for the foreseeable future be the dominant architectural paradigm in which teaching happens. The pedagogical challenge for designers and academics is to break down the structural limitations of teaching spaces and the teaching and learning behaviours they rust on, to effectively design (break) spaces that enable connected learning and a more efficacious and sustained culture of engaged connectedness between staff, students, and the wider user community. What are the epistemological principles made manifest through pedagogical design that enable connected learning and the development of connectedness within 'traditional' higher education teaching spaces? How can the architectural design of future teaching spaces catalyse connection, creative significance and ontological settlement for students and staff?

Methodology and case context

This study used an adapted model of participatory action research (PAR) integrating cogenerative dialogue as a methodological framework for both the iterative design of the teaching spaces and for the reflexive interrogation of the research question that is in part parsed through the lens of an unknown future state (Elden & Levin, 1991). Cogenerative dialogue creates opportunities for participants in an educational design project (in this case, students and academic and professional staff) to "equitably participate in conversations about curriculum practice that they have enacted together" (El Kadri & Roth, 2015, p. 44). In this study, cogenerative dialogue was used to create an asynchronous forum for the lived and living experiences of staff and students prior to and then during the design, construction and launch of an ambitious teaching space, leading to the collective development of locally relevant theory and praxis development of how space can enable connected learning (Roth & Tobin, 2004) (see figure 1 for cogenerative/PAR methodology).

The subject of this study is the iterative design of teaching spaces at the University of Sydney Business School (Australia). This design project was a component of a much larger curricular transformation initiative called Connected Learning at Scale (CLaS) (see Bryant (2022b). CLaS was designed as an educational intervention in the field addressing a specific pedagogical problem (Kemmis, 2006). The problem being investigated here was the identification of design solutions to the challenges of building a curricular and space environment that enabled connections between students, staff, disciplines and their networks. Adapting the cogenerative dialoguing methodology posited by Elden and Levin, this study brought both insiders (staff and students) and outsiders (research leads, designers, architects, a project team comprised of key stakeholders and myself as chief investigator) together as part of a PAR cycle that was catalysed by synchronous and asynchronous cogenerative dialogue feeding into the iterative codesign and completion of the CONNECTspace, a new collaborative flat-floor teaching space with a capacity of between 160-200 students, which opened in 2024 (which is the single instance case study being shared in this article).
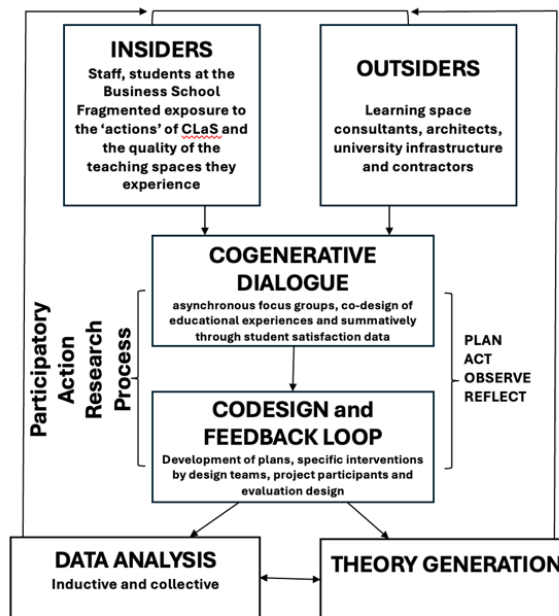
Figure 1: Cogenerative/PAR methodology

CONNECTspace – a single instance case study

CONNECTspace is a large flat-floor teaching space in the Peter Nicol Russell Building (PNR) of the University of Sydney that started its design journey in 2019 and was completed and opened for academic use in February 2024. It was designed to enable the pedagogical possibilities that arise from connection, adaptability, flexibility, and engagement through deployed architectural, pedagogical, aesthetic and technological interventions. It was also purposefully designed to enable the principles of the CLaS project which deploys pedagogical transformation through unit level redesigns that integrate changes to information engagement, active learning and connected participation and authentic assessment aligned together to address critical global, local and personal challenges.

CONNECTspace was a design collaboration between the University of Sydney Business School, our learning space design partners, Think Forward (UK), University of Sydney Infrastructure, the University of Sydney Audio-Visual team, and academic and faculty partners from across the University. Traditionally, most classrooms at the University of Sydney are either large-scale tiered rooms (100+) for lectures, or flat-floor square boxes for smaller seminar style delivery (less than 100). These spaces are didactic in nature, with a front of the room for the teacher broadcasting out to an audience of students. There is often a barrier between staff and students in the form of a large teaching desk which locates the control of the broadcast with the teacher. the technological architecture supports this didactic approach, amplifying the messages of the teacher, but not the students.

CONNECTspace was purposefully collaborative, enabling engagement between student-student and student-teacher and in-person and online participants in a natively hybrid model. The project started with five clear aims:

- To design and develop teaching and learning spaces appropriate for the delivery of world leading education.
- To provide an inspiring and creative atmosphere within our spaces.
- To renew and refresh our existing stock of classrooms to better support a variety of different teaching methods and styles.

- To provide our students with a professional and engaging space to study, interact and engage with each other, academics and their studies.
- To support the development of an aspirational approach for the university spaces.

Central to the premise of the room from the earliest design conversations was the capacity of space to enable social relations (in our case connections and connected learning) through socio-material interventions. Critical also was the ease with which this could enabled by the users of the space, both within the scheduled class time and between for the changes in class. There were five capacities of the space that formed the iterative design phases that progressed from conceptual drawings, extensive stakeholder consultations through to more detailed architectural representations and finally into a finished teaching space.
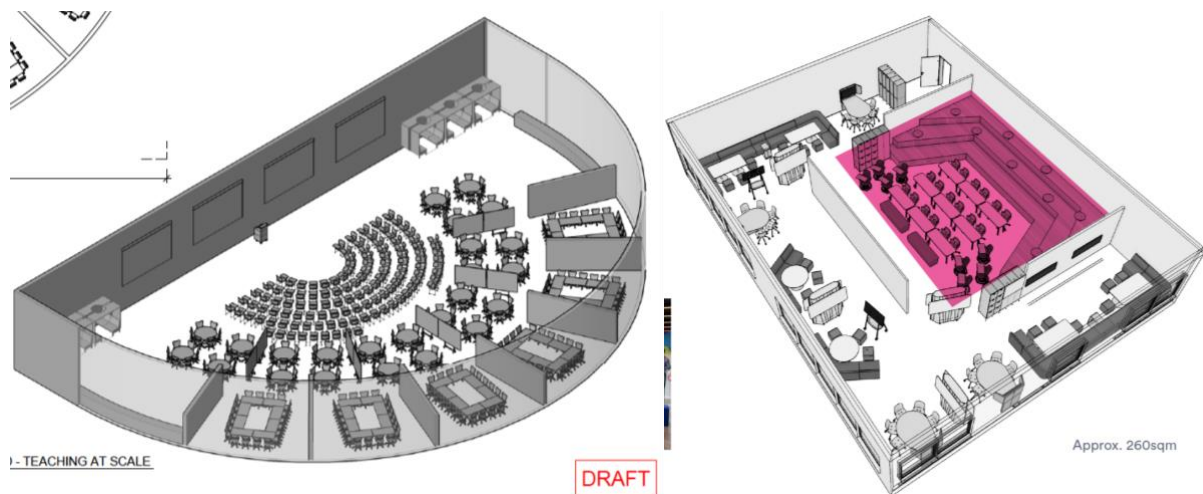

Figure 2: Early design drafts for a connected learning space (Think Forward)

1. *Capacity to engage with the crowd, the group, the individual and the knowledge*

CONNECTspace is room designed for connected learning at scale (200 people in the space at full capacity, plus an unlimited number online in hybrid mode). The space can be divided into four spaces of 50 students using acoustic curtaining which allows for up to eight different small classes to be run simultaneously in the space. The space can then return to a larger group size with a simple automated process triggered by pressing a button. Each zone has its own teaching point towards the rear of the space. There are eight acoustic booths that support online students to work collaboratively with those students in the room using Zoom. There are repeater screens and collaborative workstations accessible to every student. Using advanced audio-visual installations both the teacher and the students in the room can be amplified and share content with every zone in the space.

The functions able sociality in several ways. There is the capability for the teacher to deeply integrate large-group and smaller group activities in the same timeslot. For example, a connected learning class can deliver 15 minutes of large group lectures, 30 minutes of tutorial activity and then a 15-minute large group debrief all in the same space and a s ingle timetabled slot. It enables teachers and students to engage in large-group interactivity such as debates and panels or problem solving where ideation and group work can be visually and audibly shared to the entire cohort.
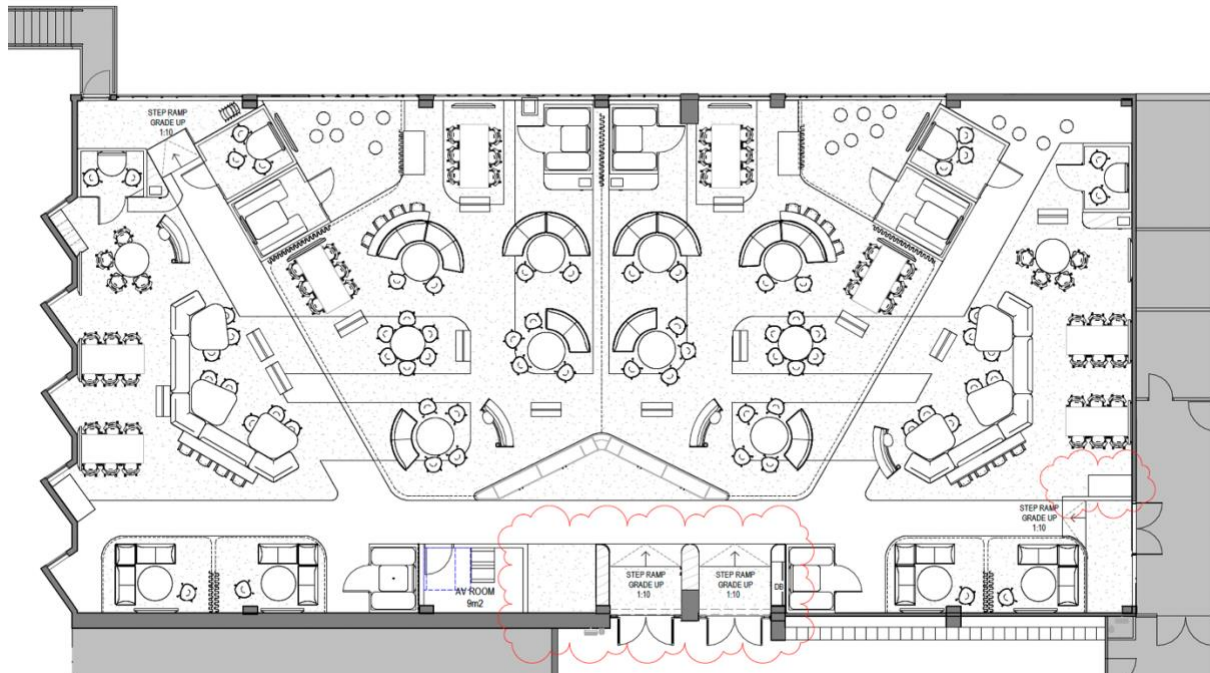
Figure 3: Final architectural drawings for CONNECTspace (Architectus)

2. *Capacity to generate new ideas and to solve problems*
3. *Capacity to share work*

As can be seen in *Figure 3,* CONNECTspace employs a range of collaborative furniture, all at different heights and different seating types from lounges to high chairs and stools to enable group work. All tables have power for students to charge devices and many tables have collaborative workstations with screens. Writable surfaces with pens are on every wall and mobile whiteboards are located throughout the space. Zoom powers the sharing of content to screens and enables online students to work in groups with in-person students. Student sight lines are mobile and not exclusively directed at the teachers but with other students. Students and teachers have agency over where they and stand within each zone, choosing furniture and groups that suit them, guided by clear wayfinding signalled in the colours of the carpet.

These functions enable several novel forms of sociality. Large-group interactivity and sharing from student to student and student to teachers, processes that are difficult in a traditional large teaching space. The support students to work on software based collaborative tools such a Miro which supports the keeping of formative work for further learning or for assessment. The use of amplification, lighting and the acoustic booths all enhance the accessibility of the teaching space (the booths can support neuro-diverse students in large crowds). The effects of agency on students in quite empowering and works towards the deep sense of place attachment and meaning making the space enables.

4. *Capacity to build social connections*

Connected learning is the singular design thread that weaves a complex ecosystem of functional interventions together. This was the most important output from the cogenerative dialogue and PAR. The engagement with academics, educational developers, students and industry around the importance of connection, what form and structure is it best applied to and evidenced by and what kinds of technology/function are needed to best support fed directly into the design of the CONNECTspace. Along with the collaborative engagement to build social relations discussed in capacities 3 and 4, the space was designed to create comfortable, friendly and inspiring small group spaces that can be acoustically isolated from the other spaces (but not visually). Break

out spaces were placed around the perimeter so that students could move their active learning to a different space and then return to their table to share. The wayfinding strategy labelled each zone after different native trees so that an identity and connection with that name was built up. The large-group cohort size that could easily divided and divided again into small groups of 5 or 6 was the most critical for connection as it builds a sense of community and belonging, supporting fleeting and lasting connections as students move around the room, have sightlines across the space and then crossover with other students coming as they are leaving, expanding their network from the tutorial of 25 to a group of up to 200.
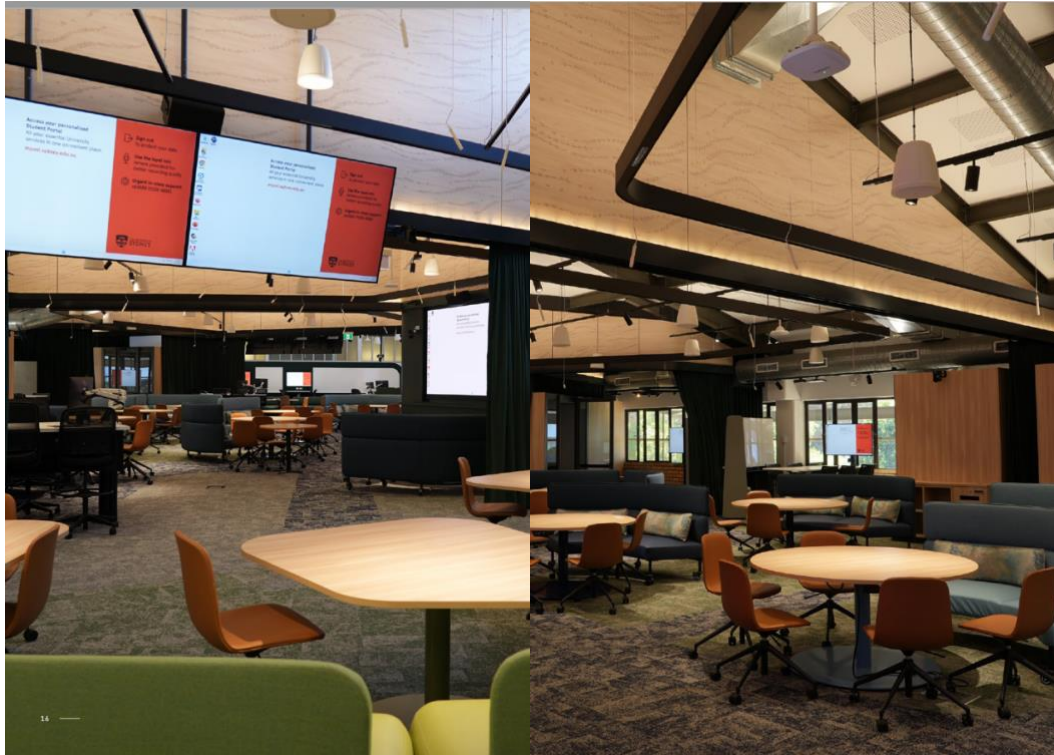

Figure 4: CONNECTspace aesthetics and furniture

5. *Capacity to create safe spaces to succeed*

The environment as it is experienced by the owners of a teaching space enables the conceptual immersion of sociality in a third or other space. CONNECTspace has employed purposeful use of colour to imbue the space with a deep sense of the organic and natural. The celling height is lowered with a large acoustic natural wood panel which also represents the traditions of Indigenous knowledge (the panel is a giant artwork by local artists). The room is filled with plants, other piece of art and natural light with large windows looking onto a courtyard. The acoustic curtaining is a lush green velvet which opens and closes automatically changing the feel of the space (along with the lighting grid) as it transforms into four smaller spaces. The deep sense of comfort, homeliness, settlement and warmth that comes from the aesthetics of the room reduce the sense of coldness, isolation and transaction that traditional spaces often create, especially lecture theatres.

Conclusion
CONNECTspace has been open for student use and pilot testing for six months. The pilot phase will run for the next two semesters (into 2025) where 60 hours a week of teaching will be evaluated through further cogenerative dialogues with academics and students. The space will also be used for co-curricular events such as orientation week, student clubs and societies, events and meetings to generate evidence to evaluate the effectiveness of the space to enable the capacities discussed above and to test the pedagogical and architectural design principles underpinning the space.

ASCILITE 2024
Navigating the Terrain:
Emerging Frontiers in Learning Spaces, Pedagogies, and Technologies

The biggest challenge for the designer of teaching spaces is turning the idea of connected learning spaces into a practical, implementable, affordable but effective room. There are three modalities that designers of teaching spaces should interrogate in the process of design (dynamics, functions, and relationships). These modalities consider how the space creates embodied experiences of settlement, belonging and sociality and what need to be adapted and redesigned to support connectivity, creativity, and more effective learning. The design process of the CONNECTspace exposed three significant changes that were necessary to enable the capacities of the space to create social significance, seed and nurture social relations and deliver a connected learning pedagogy effectively.

1. Change the dynamics

The dynamics of a connected learning space are critical to supporting engagement, collaboration, and ideation. The dynamics of are the directions of interactivity and engagement that occur within the space. Traditional teaching spaces are mono-directional. The space does not enable connection outside of the walls, forcing to students to use their own technology to make those through social media. Connected learning spaces are multi-directional. An effective connected learning space support movement and navigation within and outside the room. This movement is not exclusively physical, it can be based on attention, sightlines, on activity, on communication or associative, enabling a feeling of comfort in the space, even if the behaviours are disconcerting and unfamiliar. This enables connections to be made within the space, without privileging status. Dynamics are also a function of scale. A connected learning space supports how scale can be leveraged for crowd knowledge and collective problem-solving activities. It enables a flexibility to move from large scale to smaller groups without changing rooms or creating artificial delays in timetabling to allow for transition. Transitions happen in the space, physically and virtually, in real time.

2. Change the functions

Changing the function in connected learning spaces means rethinking what activities, relationships, challenges and communications can happen in a space. It takes different perspectives into the design that reimagine how activity leads to learning. A room with rows of tables and chairs facing a giant teaching podium locks in function. The deployment of technology and furniture, spatial design (such as rethinking where the centre of the room should be), what does it mean to sit or stand in the space and where does the sound, light, smell, and vision come from and go to (environment) are critical to shaping how the dynamics will be created.

3. Change the relationships

University teaching and learning spaces are functionally determined by the designer. Students are not encouraged to leave their mark on the space, resetting it for the next group as if they had never been there. Connected spaces change the relationship students have their rooms.

Staff and students using connected spaces need to be develop and foster heterogeneous relationships with the space, where they can feel comfortable to act, behave and learn in ways and states they feel safe and that are different to the ways other build those relationships. Traditional teaching puts the teacher behind the fourth wall and ask the 'audience' to act in the ways an audience should react;
reception, *contemplation*, *appreciation*. To act in other ways in those structures might be seen as disruptive. A connected space embraces disruption as a positive and shifts the student from audience to being multi-behavioural participants, changing the expectations of behaviour to *engagement*, *learning*, *mutual benefit*.

Designing physical and virtual spaces for connected learning is a complex challenge. The spaces must avoid the pedagogical directiveness of traditional teaching rooms. The momentum and motion *within* the space must be reimagined as an ecosystem, with ebbs and flows of communication, activity and individuality of varying intensities, patterns and behaviours flowing in from outside, through the curricular and educational frameworks enabled by the space and back out into the wider campus and the interstitial spaces between the students work, life, play and learning. The ecosystem of a connected teaching space brings together the disparate natures of the community of learning to act as a crowd, finding something fleeting (or lasting), communion (or oneness), learning (or unlearning), certainty (or uncertainty). The design of these spaces must

use the controllable aspects of the architectural design (from colour to light, from furnishing to infrastructure, from sound to texture and from space to atmosphere and the deployment of technology) to allow for connections to be made and leveraged for resonant learning. This kind of design aesthetic challenges the inculcation of teaching forms and pedagogies that are defined and formalised through the creation of institutional teaching space design standards. They require new ways of thinking about teaching spaces, drawing on the behavioural and associative interactivity more commonly seen in social media spaces than a university classroom.

References

Arvanitakis, J. (2014). Massification and the large lecture theatre: from panic to excitement. *Higher Education*, *67*, 735-745. https://doi.org/https://doi.org/10.1007/s10734-013-9676-y

Bryant, P. (2018). Making education better: implementing pedagogical change through technology in a modern institution. In A. Zorn, J. Haywood, & J.-M. Glachant (Eds.), *Higher Education in the Digital Age* (pp. 35-54). Edward Elgar Publishing. https://doi.org/https://doi.org/10.4337/9781788970167.00009

Bryant, P. (2022a, 5th June). Transforming business education through connected learning. *Disruptive Innovations In Business Education Research Group*. https://diberg.blog/2022/03/03/transforming-business-education-through-connected-learning-part-3/

Bryant, P. (2022b, 14th November 2022). Transforming Business Education Through Connected Learning - Part 3. *Transforming Education and the Student Experience in Business*. https://cdrg.blog/2022/03/03/transforming-business-education-through-connected-learning-part-3/

Børte, K., Nesje, K., & Lillejord, S. (2023). Barriers to student active learning in higher education. *Teaching in Higher Education*, *28*(3), 597-615. https://doi.org/https://doi.org/10.1080/13562517.2020.1839746

Boys, J. (2014). *Building better universities: Strategies, spaces, technologies*. Routledge. https://doi.org/https://doi.org/10.4324/9780203798881

Cardellino, P., & Woolner, P. (2020). Designing for transformation – a case study of open learning spaces and educational change. *Pedagogy, Culture & Society*, *28*(3), 383-402. https://doi.org/https://10.1080/14681366.2019.1649297

Carvalho, L., Nicholson, T., Yeoman, P., & Thibaut, P. (2020). Space matters: framing the New Zealand learning landscape. *Learning Environments Research*, *23*(3), 307-329. https://doi.org/https://10.1007/s10984-020-09311-4

de Borba, G. S., Alves, I. M., & Campagnolo, P. D. B. (2020). How learning spaces can collaborate with student engagement and enhance student-faculty interaction in higher education. *Innovative Higher Education*, *45*(1), 51-63. https://doi.org/https://doi.org/10.1007/s10755-019-09483-9

El Kadri, M. S., & Roth, W.-M. (2015). Co-teaching/co-generative dialogues in a teaching education program as room for agency and new forms of participation:'I found Jesus in [writing] the paper'. *Teacher Development*, *19*(1), 40-58. https://doi.org/https://doi.org/10.1080/13664530.2014.976715

Elden, M., & Levin, M. (1991). Cogenerative learning: Bringing participation into action research. In W. F. Whyte (Ed.), *Participatory action research* (pp. 127-142). Sage. https://doi.org/https://doi.org/10.4135/9781412985383

Fisher, K. (2019). Scoping the Future of the Higher Education Campus. In K. Fisher (Ed.), *The Translational Design of Universities: An evidence based approach* (pp. 23-50). Brill. https://doi.org/https://doi.org/10.1163/9789004391598_002

Gourlay, L. (2022). Presence, Absence, and Alterity: Fire Space and Goffman's Selves in Postdigital Education. *Postdigital Science and Education*, *4*(1), 57-69. https://doi.org/https://10.1007/s42438-021-00265-1

ASCILITE 2024

Navigating the Terrain:

Emerging Frontiers in Learning Spaces, Pedagogies, and Technologies

Hanratty, S., & McNamara, A. (2020). Student experience: Perspectives on learning in the university and the conservatoire. In K. Gravett, N. Yakovchuk, & I. Kinchin (Eds.), *Enhancing student-centred teaching in higher education: The landscape of student-staff research partnerships* (pp. 31-44). Palgrave Macmillan. https://doi.org/https://doi.org/10.1007/978-3-030-35396-4_3

Harkin, B., Yates, A., Wright, L., & Nerantzi, C. (2022). The impact of physical, mental, social and emotional dimensions of digital learning spaces on student's depth of learning: The quantification of an extended Lefebvrian model. *International Journal of Management and Applied Research*, *9*(1), 50-73. https://doi.org/https://doi.org/10.18646/2056.91.22-003

Kemmis, S. (2006). Participatory action research and the public sphere. *Educational action research*, *14*(4), 459-476. https://doi.org/https://doi.org/10.1080/09650790600975593

Knowles, M. S. (1970). *The modern practice of adult education*. Association Press New York.

Kreijns, K., Kirschner, P. A., & Jochems, W. (2003). Identifying the pitfalls for social interaction in computer-supported collaborative learning environments: a review of the research. *Computers in human behavior*, *19*(3), 335-353. https://doi.org/https://doi.org/10.1016/S0747-5632(02)00057-2

Lacković, N., & Popova, B. (2021). Multimodality and socio-materiality of lectures in global universities' media: accounting for bodies and things. *Learning, Media and Technology*, *46*(4), 531-549. https://doi.org/https://doi.org/10.1080/17439884.2021.1928694

Lefebvre, H. (1991). *The Production of Space* (Vol.). Oxford Blackwell.

Low, S. M., & Altman, I. (1992). Place attachment - A conceptual inquiry. In I. Altman & S. M. Low (Eds.), *Place attachment* (pp. 1-12). Plenum Press. https://doi.org/https://doi.org/10.1007/978-1-4684-8753-4_1

Mclane, Y., & Kozinets, N. (2019). Spatiality, experiences, and the formation of place attachment at campus student life centers. *College student journal*, *53*(1), 78-98. https://doi.org/https://doi.org/10.1007/978-1-4684-8753-4_1

McNaughton, S. M., & Billot, J. (2016). Negotiating academic teacher identity shifts during higher education contextual change. *Teaching in Higher Education*, *21*(6), 644-658. https://doi.org/https://doi.org/10.1080/13562517.2016.1163669

Nielsen, S. L., & Stovang, P. (2015). DesUni: university entrepreneurship education through design thinking. *Education + Training*, *57*(8/9), 977-991. https://doi.org/https://10.1108/ET-09-2014-0121

Nolan, C. (2022). What the Yurt? Round Teaching and Architecture as Pedagogy. *International Journal of Teaching and Learning in Higher Education*, *34*(1), 195-200. https://www.isetl.org/ijtlhe/pdf/IJTLHE3887.pdf

Power, C. K., & Supple, B. (2021). Teaching spaces: The fourth corner of university learning. *Transformative Dialogues: Teaching and Learning Journal*, *14*(3), 90-106. https://doi.org/https://hdl.handle.net/10468/12897

Roth, W.-M., & Tobin, K. (2004). Co-generative dialoguing and metaloguing: Reflexivity of processes and genres. Forum Qualitative Sozialforschung/Forum: Qualitative Social Research, *5* (3). https://doi.org/10.17169/fqs-5.3.560

Siemens, G. (2005). Connectivism: A learning theory for the digital age. *International Journal of Instructional Technology and Distance Learning*, *2*(1), 3-10. https://www.itdl.org/Journal/Jan_05/article01.htm

Soja, E. W. (1998). Thirdspace: Journeys to Los Angeles and other real-and-imagined places. *Capital & Class*, *22*(1), 137-139. https://doi.org/https://doi.org/10.1177/0309816898064001

Soja, E. W. (2008). Thirdspace: Toward a new consciousness of space and spatiality. In K. Ikas & G. Wagner (Eds.), *Communicating in the third space* (pp. 63-75). Routledge. https://doi.org/https://doi.org/10.4324/9780203891162

Tse, H. M., Daniels, H., Stables, A., & Cox, S. (2018). Introduction. In H. M. Tse, H. Daniels, A. Stables, & S. Cox (Eds.), *Designing buildings for the future of schooling: Contemporary visions for education* (pp. 1-10). Routledge. https://doi.org/https://doi.org/10.4324/9781315148366-1

Wilkins, S., Hazzam, J., & Ireland, J. J. (2022). Servicescape in transnational higher education: the effects of campus design, physical environment and facilities on student experience and satisfaction. *Journal of Marketing for Higher Education*, 1-20. https://doi.org/https://doi.org/10.1080/08841241.2022.2139792

ASCILITE 2024

Navigating the Terrain:

Emerging Frontiers in Learning Spaces, Pedagogies, and Technologies