



Psychological safety in innovative learning environments: planning for inclusive spaces

Jennifer Charteris, Joanna Anderson & Angela Page

To cite this article: Jennifer Charteris, Joanna Anderson & Angela Page (2024) Psychological safety in innovative learning environments: planning for inclusive spaces, International Journal of Inclusive Education, 28:5, 688-704, DOI: [10.1080/13603116.2021.1974108](https://doi.org/10.1080/13603116.2021.1974108)

To link to this article: <https://doi.org/10.1080/13603116.2021.1974108>



© 2021 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group



Published online: 02 Sep 2021.



Submit your article to this journal [↗](#)



Article views: 3148



View related articles [↗](#)



View Crossmark data [↗](#)



Citing articles: 5 View citing articles [↗](#)

Psychological safety in innovative learning environments: planning for inclusive spaces

Jennifer Charteris ^a, Joanna Anderson ^a and Angela Page ^b

^aSchool of Education, University of New England, Armidale, Australia; ^bSchool of Education, University of Newcastle, Newcastle, Australia

ABSTRACT

Innovative Learning Environments (ILEs) are characterised by features that can create hypervisibility, and hyperstimulation, that raise psychological safety issues. However, there is a lack of research in the field of ILEs that addresses these complexities especially for students with additional learning needs. This case study draws on interview data with staff and students in a special education setting within an Australian ILE. Results map three aspects of design that have implications for the psychological safety. Findings are presented as a set of indicators that educators and designers can use to assist in their planning for inclusive spaces in ILE.

ARTICLE HISTORY

Received 16 February 2021

Accepted 25 August 2021

KEYWORDS

Innovative learning environments; inclusion; psychological safety; school buildings; school spaces

Introduction

Across Organisation for Economic Co-operation Development (OECD) countries, there have been billions of dollars spent on building schools for the future that encapsulate a projected vision for twenty-first century learning (OECD 2013, 2017). These new buildings and school refurbishments are characterised by polycentric room designs, infused information and communication technologies, the flexibility of both open and intimate spaces, fewer often movable walls, and glass (Imms, Cleveland, and Fisher 2016). The strategic redevelopment of school learning spaces to encapsulate a projected vision for twenty-first century learning focus has been a product of demographic, economic and technological changes. For instance, there are new schools are built in areas where there is rapid population growth. Schools service new housing subdivisions that are established in areas where there is economic growth. It has been argued that this impetus has reframed how we perceive effective teaching and learning (Byers et al. 2018).

To date, significant consideration has been given to optimising the design of innovative learning environment (ILE) spaces with the judicious provision of mobile furniture that is designed to facilitate flexible learning (Woolner et al. 2012). While there is much interest in the effects of these learning environments on student learning outcomes (Byers et al. 2018), at present, there is no literature that ‘satisfactorily theorise[s] how the designed environment can be said to influence learning activity or how these

CONTACT Jennifer Charteris  jcharte5@une.edu.au  School of Education, University of New England, Armidale, Australia

© 2021 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group

This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivatives License (<http://creativecommons.org/licenses/by-nc-nd/4.0/>), which permits non-commercial re-use, distribution, and reproduction in any medium, provided the original work is properly cited, and is not altered, transformed, or built upon in any way.

effects play out across a range of educational settings' (Yeoman and Ashmore 2018, 1). However, there are some foundational elements for designers and educators to consider when creating ILE spaces that are both inclusive and conducive to learning.

In this article, we address the importance of the psychological safety of students with high and very high needs in flexible learning spaces. Drawing on definitions from the Aotearoa New Zealand Ministry of Education (2021) we define high needs students as those who require:

- significant adaptation of almost all curriculum content in order to learn because they have a severe delay in cognitive development
- high levels of specialist teaching because they have a severe hearing or vision impairment
- high levels of specialist support because they have a severe physical disability; and
- high levels of specialist support for needs arising from a severe disorder of both language use and social communication.

Very high needs students require:

- total adaptation of all curriculum content because they have extremely delayed cognitive development;
- significant specialist assistance to engage in all face-to-face communications because they have a severe sensory (hearing and vision) impairment;
- very high levels of specialist support because they have an extremely severe physical disability; and
- very high levels of specialist support because they have an extremely severe disorder of both language use and social communication.

With these cohorts of students in mind, we map aspects of design that have implications for the inclusion of students with disabilities in ILEs. An emphasis on future-proofing school design, as preparation for an unpredictable future, has resulted in an emphasis on flexibility. Flexibility is a feature of the range of spaces and environments, the capacity to cater for various sized groupings, approaches to learning, and moment by moment change to cater for pedagogical needs (Sigurdardottir and Hjartarson 2011).

There is a paucity of literature in the area of inclusive education in ILEs and, in particular, how student engagement and learning can be maximised in these spaces (Anderson and Boyle 2019). We provide an argument that the focus on flexibility and design principles of visibility can impact on the psychological safety of students. Moreover, if school buildings are designed without the specific needs of the students in mind, nor in consultation with teachers and students who are intimate users of the space, fundamental aspects of the learning environment may be overlooked (Newman and Thomas 2008). It is established that inclusive building designs need to address the pedagogical, physical and social (Mahat 2008) to be considered inclusive. In addition to these factors, we also contend that there is a need to address the fundamental psychological safety needs of all students.

In the following sections, we discuss the complexities of education provision to students with high and very high educational needs and the importance of considering the diversity of this cohort when designing spaces for optimal engagement and learning

in ILEs. A cartography of images and comments from students, teachers, leaders was curated during the process of data analysis and used to generate our findings to illuminate some of the complexities of inclusion in ILEs, with a specific focus on psychological safety. We commence by outlining the literature on inclusivity, functionality and safety in ILE, and discussing the notion of psychological safety.

Designing for inclusivity, functionality and safety in ILE

There is a complex nexus of enactment between what designers, in consultation with educators and departments of education, envisage for learning spaces and what is actually enacted in them when leaders, teachers and learners take occupancy. Cardellino and Woolner (2020) argue that the alignment between the future-focused design of learning environments and the educational agenda can make school spaces an influential driver of educational change, yet there are issues with attempts to use the physical alterations to buildings and educational spaces to drive policy-led transformation. To date, little has been written on how ILE spaces can be designed with inclusive education in mind or on the influence of these spaces on the success, or not, of inclusive practice (Anderson and Boyle 2019). Research in the field of disability and ILE has exposed arguably unforeseen barriers to learning for some students in this learning context, as Benade (2019, 60) observes that 'learning can be more challenging in flexible learning environments' for students with 'a range of auditory, sensory and socio-cognitive issues'. As such, we are interested in the design considerations that policy-makers, architects, leaders and teachers need to consider when conceptualising school buildings as inclusive spaces.

An evolving construct, inclusive education has morphed in recent years from a construct with an emphasis on students with disabilities, to embracing the provision of education to all (Anderson and Boyle 2019). This means all students should have access to learning opportunities (individual and collaborative) within the same educational environment, irrespective of their educational needs. Furthermore, there have been calls for educators to challenge existing educational exclusion and adopt pedagogies and practices that align with the principles of inclusive education (Slee 2018; Wrigley, Thomson, and Lingard 2012). According to UNESCO (2005, 13) 'inclusive education is a process of addressing and responding to the diversity of needs of all learners through increasing participation in learning, cultures and communities, and reducing exclusion within and from education'. The Convention on the Rights of Persons with Disabilities (United Nations 2016) acknowledges that to achieve this, changes are needed to schooling environments. When considering how buildings can be designed for inclusion, we 'recognise that all students must be able to participate, have opportunities to achieve and be valued' (Anderson, Boyle, and Deppeler 2014, 24). Charteris, Smardon, and Page (2018) have identified a number of structural and social aspects that can support inclusion in ILEs. These include:

- rich technological resources;
- co-teaching practices involving multiple teachers who collaborate in responsive practice;
- the flexible use of support staff; and

- a physical layout that can support easy movement for students with physical disabilities.

Many new buildings today are developed in keeping with the concept of Universal Design, an approach to designing environments, products and communications so they are accessible for all people to the greatest extent possible, without the need for subsequent adaption or specialised design (Millet 2009; Persson et al. 2015). The key premise of Universal Design is that planning to accommodate persons with disability will benefit everyone. Yet it is not evident that new schools are being designed with the same considered approach (Millet 2009; Persson et al. 2015). The key premise of Universal Design is that planning to accommodate persons with disability will benefit everyone.

The flexibility and aspiration for inclusivity associated with ILEs implies that students with high and very high needs have access to spaces that facilitate successful and inclusive schooling. Yet ILE spaces can exclude students with more complex educational needs, often as a result of their hyper-stimulative designs (Page and Davis 2016). Bright colours, lots of light (both natural and artificial), and large open spaces with a small entrance and exit doors and walkways, features of most ILE designs, create noisy and visually stimulating environments. These learning spaces may not support the individual needs of students with high and very high needs, particularly those who are hyper-sensitive to sensory stimulation.

In our school-based fieldwork to date, we have observed that vibrant colours are often incorporated into the interior design, glass walls, whiteboards and television screens reflect light and images, and sound bounces around the large, busy spaces. Looking through a glass wall into another glass-walled space creates multiple reflections and can be very distracting for students. Access into and out of these spaces is often chaotic, as large numbers of people are funnelled into and out of these spaces through small doors and walkways. This implies that consideration should be given to acoustics, use of colour, light, and the movement of people, in the planning stages of ILE schools.

Psychological safety

In their review of school climate research, Thapa et al. (2013) describe how feeling socially, emotionally, intellectually, and physically safe is a primal human need. The term 'psychological safety' has been used in organisational sciences for over five decades, however, a proliferation of writing in the area has only emerged over the last 15 years (Frazier et al. 2017). Linked with the functioning of teams, 'psychological safety' has been seen as necessary in workplaces if people are to 'grow, learn, contribute, and perform effectively in a rapidly changing world' (Edmondson and Lei 2014, 23). It plays a key role in enabling individuals to transcend the obstructions to learning in interpersonally challenging environments (Edmondson et al. 2016). Psychological safety has been seen as an important element underpinning learning behaviours (Carmeli, Brueller, and Dutton 2009; Edmondson 1999). As an agile concept, it has been used in relation to workplace learning and in particular how individuals 'feel able to show and employ one's self without fear of negative consequences to self-image, status or career' (Kahn 1990, 708).

The term ‘psychological safety’ has been used to explore the relationality of teams and how there can be a shared belief amongst members that the team is a safe context for interpersonal risk-taking (Edmondson 1999). Safety is an important element in learning environments where students are expected to take risks. It assumes an ethics of care, and an awareness of belonging and psychological safety so that students can achieve their potential (Baker et al. 1997). According to Lateef (2020, 2):

Psychological safety affects our sense of comfort and ease of mind in our educational journey ... [It can] create and nurture an environment where all can flourish, grow, and maximize their potential, improve self-esteem, as well as continue to develop their confidence and knowledge. It serves as a kind of safety net for people to act, think, and behave.

Psychological safety has been predominantly associated with the social, where individuals believe that they can act without fear of negative consequences (Edmondson 1999) and take interpersonal risks. These may include ‘raising concerns, asking questions, requesting help, proposing ideas’ (Appelbaum et al. 2020, 21). We differentiate psychological safety from emotional safety, as the latter speaks primarily to the role of supportive relationships, being respected and the support required for students to achieve their potential academically, socially and personally. Considering the influence of the materiality of learning environments on individuals and groups of students (Charteris, Sardon, and Nelson 2017), we conceptualise psychological safety here to denote the experience of security and wellbeing of individuals and groups within the social, cultural and physical school environment.

To date, the concept of ‘psychological safety’ has not been used in relation to students with high or very high needs in ILEs. However, few studies have interrogated disability and ILEs. Among these include the finding that students with conditions such as Autism Spectrum Disorder, one of the fastest-growing disability diagnoses in Australian children (May, Brignell, and Williams 2020), may find it difficult to learn in collaboration with others, particularly in hyper-stimulating environments. These difficulties sit in contrast to the social, pedagogical and physical aspects of many ILEs, and as such may result in heightened levels of anxiety, often expressed as challenging and unsafe behaviours (Benade 2019; Charteris, Sardon, and Page 2018).

Method

The data we report in this article is comprised of a qualitative case study, as described by Yin (2017), which investigated how inclusion was promoted, or not, in ILEs. We visited Greenacres High School (pseudonym), a newly built Australian secondary school, which had a suite of rooms designated for students with high and very high needs. These facilities were adjacent to the main building and were designed as a *learning neighbourhood*, in keeping with the ILE principles that were apparent in the rest of the school where each learning neighbourhood was a large open space with adjacent specialist and breakout rooms. The special education learning neighbourhood is comprised of a large open space that incorporated a kitchen area, and smaller rooms along two sides of this open space. A short corridor off the main space led to small office and resources areas. Almost all of the walls within each of the spaces were constructed entirely of glass of various colours, including the large wall that fronted the outdoor space used by all of

Greenacres High School students during break times. The furniture that filled each of the spaces was brightly coloured, of various shapes and sizes, and movable.

The evidence accessed for this study included field notes, transcripts of interviews and walk-through commentary, and the images taken by students. We conducted four one-on-one interviews with special educators (three teachers and one teacher aide), and held a focus group interview with three students, each who was over 16 years. Each of the students had an Autism Spectrum Disorder diagnosis (Level 1 or Level 2), and was provided specialist resourcing through the education system to support their access to school. There was a headteacher, Jane, who was very experienced and she had travelled to other schools before the new school was built to investigate the building design of schools in other contexts. She told us that she felt many of her recommendations had not been taken into consideration. The second teacher Tracey was working on a contract to the end of the year. The third teacher, Helaine, was a very experienced teacher who had worked with students with very high needs in schools before commencing at Greenacres High School.

The one-on-one interviews with teachers utilised a semi-structured approach and occurred within a place selected by the special educator. Once completed, the researchers walked through the special education learning neighbourhood with the special educators, who discussed the affordances of the spatial design and challenges they experienced. Affordances in this context are the properties of the design that can assist to achieve instructional goals (Nagashima et al. 2020). The students were asked by their teacher if they would like to participate in the research. Consent was also sought from their parents. We also asked for verbal consent when we came to the school and wanted to interview the students. For the student focus group interview, we used broad prompts as seed questions and followed the conversation in the direction the students took it. Two simple questions were asked: (1) 'How does learning happen in your classroom?'; and (2) 'Tell us about something you like about learning in this school'. These questions enabled us to gather initial data on the affordances of the learning spaces. Students were then invited to take photographs and to talk to the images, describing the important aspects in their pictures. Our analysis of the student's explanation of their generated images surfaced the theme of psychological safety. Nelson and Christensen (2009, 36) describe the value of photovoice as a research approach. Such research methods shift power in the research process from the researcher to the researched and in this way researchers gain access to the world of the participants through their eyes, with minimal interference in how this view is generated. The participants who created the images lead the interviews and talked researchers through the meaning and significance of their images as well as their thinking and perspectives.

In addition, students took the researchers for a walk through their learning neighbourhood and spoke about places within the school they liked and disliked (places where they felt safe and unsafe), and described how well or poorly these served their needs. During the walk-through the students described their experiences of moving about and learning in the spaces, making references to objects, aspects of the building design and technologies. All conversations, including those had during the walk-throughs and about student photographs, were audio recorded. All audio recordings were transcribed, and data were inductively coded using the qualitative data analysis software Nvivo. A decision was made not to provide copies of the transcripts to the participants for member

checking. There is a growing body of research that indicates, in research where anonymity is assured, that member checking does not enhance the experience or validity of the research for participants or researchers (Thomas 2017). However, participants were reminded that at any time they could withdraw their consent for all, or specific parts of, their interview data.

The pages of coded NVivo data were inductively analysed by two of the researchers separately and emerging categories were then discussed as a group. During the initial coding of the data, we identified and grouped comments about the use of the spaces. We then collaboratively refined these coded data into further categories to generate themes that indicated the participants' experiences around inclusivity, functionality and safety in the ILE spaces. From these data we identified three aspects of design that have implications for the wellbeing of students with high and very high needs in ILEs: (i) hypervisibility distractibility and an overload of sensory stimulation in ILE design (ii) the use of breakout and reset rooms; and (iii) ease of access to and movement within spaces. The following comments (pseudonyms used throughout) are drawn from interviews with the four special education staff, and two of the students from the focus group interview. These students' data were selected for this article as it was the most coherent account of the issues that the group of students identified. Moreover, these data were selected on the basis that they highlight relevant features for educators and designers to consider ensuring psychological safety for those occupying ILE buildings.

Results

Hypervisibility, distractibility and an overload of sensory stimulation in ILE design

The term hypervisibility describes the constant visibility (Alterator and Deed 2013) which is a key design principle of ILE learning spaces. The extensive use of glass provides a means to 'open up and deprivatise educational spaces, creating visibility and breaking down the close association between a particular learning space and a single teacher' (Istance and Kools 2013, 53). The hypervisibility of glass walls provides a means to collapse the territories that define the boundaries between practitioners' teaching spaces, so there can be collaboration, co-teaching and ongoing peer feedback (Charteris and Smardon 2018). Teaching practice becomes 'visible', 'exposed to the witness and critique of others' (Campbell et al. 2013, 212). Students are also visible to their peers.

The visibility of glass walls that provide a view out onto a playground or into a big shared space means student are on continual display to their peers. In the large open spaces of ILEs, walls of glass allow students to see across classes and learning spaces, so all behaviour is on show. It can be difficult for students to escape the constant gaze of others, and as a consequence, extensive use of glass can be problematic for some students. Students who experience anxiety and/or have hypersensitivity, as well as students on the autism spectrum, can be particularly impacted. For these students, anxieties can be heightened during adolescence, as they face a complex social milieu and become increasingly aware of their differences and interpersonal challenges (White et al. 2009). In ILEs these differences and interpersonal challenges are on display.

Helaine is a teacher in the special education learning neighbourhood and specifically works with students who are hyper-sensitive to sensory stimulation. As a result of an extended construction time for the new school, teachers did not have a chance to engage with the spaces before moving in and commencing their teaching; there was no time to get used to the affordances of the new environment. This missed opportunity had a significant impact on the special education staff. Helaine reported that she cried when she saw the space for the first time, as she could not visualise how it would support the complex educational needs of her students.

When I first walked in here I cried ... I could not believe that they expected my students to be in this environment ... I knew that they would struggle with their sensory overload. It was the glass. (Helaine)

Helaine went on to describe how the hypervisibility adversely effected one of her students who is hyper-sensitive to sensory stimulation. She noted that objects in the environment promoted distractibility and an overload of sensory stimulation. She pointed out issues around acoustics, colour choice, overly bright lighting, reflective surfaces on walls and flooring. Helaine told us that her student's anxiety was associated with the environment and it resulted in self-harm and withdrawal from school.

I knew it would be a lot for some of them. I was right and it proved to be. One boy left in two to three days of being in here. Left school, hasn't been back yet. He has come back twice to see me. Yeah, he could not handle the space at all and he went home and completely cut himself up. He hadn't done it for a long time. I thought that a few would – that that would have that effect and it has taken them a lot to – and there is still the sensory overload. It is so hard. (Helaine)

The classroom in which we conducted the focus group interview had three walls made entirely from glass; one was adjacent to the playground, one to a corridor, and the other to the classroom next door. The hypervisibility afforded by so much glass was described by students as challenging. Three of the older students we spoke with at Greenacres High School, Chas, Pete and Aaron, felt that they are being 'surveilled' by peers, and Aaron felt it needed to change:

I think we should get some blinds because a lot of people in here have social anxiety and it's just, you don't need as much glass. We got way too much. (Aaron)

A number of students in the special education learning neighbourhood relied on sensory tools to self-regulate anxiety. However, this solution did not address the initial problem of hypervisibility, nor prevent the associated anxiety it caused some of the students. Chas, Pete and Aaron expressed an intense awareness of their peers' scrutiny when using sensory tools during lessons. For example, Chas and Pete, who both experienced social anxiety, used a 'body sock', a cocoon of stretchy fabrics they could wrap around themselves, as a calming sensory tool. When asked how he felt in the classroom spaces, Chas commented that the visibility exacerbated his anxiety. He noted that even sitting in the glass breakout spaces, smaller rooms behind the larger classrooms, was anxiety-provoking for him.

It's like very demeaning and teachers just don't get that ... If you're in one of the ones [breakout spaces] behind the classrooms, not many people will pass. There'll be the odd occasional student and teacher, but that's about it – and even then that still gives you

anxiety. But that's just me, I don't know if it would for anyone else. I just get anxiety real easy. (Chas)

Aaron described how he felt about being in a small glass office space:

I was up there for a whole day, a couple of terms ago and it was so bad. I didn't like it, so I emailed my brother, he went and called my parents and I went home early because I was too stressed rather and I don't like it when – basically I feel like a zoo animal. (Aaron)

At the beginning of the school year, students, including Chas, Pete and Aaron, tried to reduce the hypervisibility of some of the glass walls. Jane, the Head Teacher Special Education at Greenacres High, describes how the students tried to reshape the room to avoid being visible to students in the space next door. It must be noted that it was the senior leadership team that required Jane and her students to remove the barriers from the glass walls.

Yeah. It's been really hard. It was a really hard start to the year and we had a lot of meltdowns earlier in the year with kids ... Their initial response was, 'We hate this room' ... There are white boards for writing, and so the kids managed to get enough to put along there [the glass wall]. And so they pretty much blocked that wall out within the first three days and then we were asked to take it away. So, we did and we tried to just let the kids realize that it is what it is and that these people next door are not going to be looking at you but, unfortunately, that's not the case because they did and initially there was a little bit of face pulling and staring and glaring and that really bothered these kids because they got a lot of sensory issues, so they didn't like it at all. (Jane)

Jane talked further about the issue of 'meltdowns' in a glass filled ILE. 'Meltdown' is a colloquial term for the experience of feeling overwhelmed with frustration and anxiety (Page and Ferrett 2018) and they are an extreme and involuntary 'emotional or behavioural response to overwhelming stress or over stimulation' (Lipsky 2011, 112). It is common for students to feel extreme shame and/or confusion after a meltdown (Lipsky and Richards 2009), and they can be distressing for the student experiencing it, as well as for any witnesses (Lipsky and Richards 2009). Jane highlighted the shame and embarrassment expressed by her students, who were visible to their peers and other staff members during a meltdown: 'there is no way a kid wants to be seen when he is having a meltdown and part of the reason they go further [with the meltdown] is because of that'. Jane believed the hyper-visibility of the glass walls acted as not only a trigger for the meltdowns, but also intensified them.

The use of breakout and reset rooms

Breakout rooms are spaces that are separate to the main learning space. They are places where peer-to-peer learning takes place and students can work autonomously and take responsibility for their learning (Dovey and Fisher 2014). Reframing these spaces as 'reset rooms', they can provide a haven for students with high and very high needs as dedicated spaces that students can access when they are feeling anxious. These spaces are offered less visual and auditory distractions, with preferred sensory tools readily available. Both breakout and reset spaces afford students time away from the often over-stimulating, open plan environments of ILEs, to either work or reset. It should be noted that what is being described here is not the use of small spaces as a means to seclude or

exclude students, a practice that has been identified as a common strategy to manage the behaviour of students with disabilities (Connolly 2017). Rather, breakout and reset rooms provide students with some agency to manage their own educational needs.

At Greenacres High School, like the larger teaching spaces, the breakout rooms were walled floor to ceiling with glass. In the special education learning neighbourhood, the glass used in these spaces was tinted green, though this did not reduce the visibility. The impact of this visibility was noted when a student using the space retreated into a body sock, and while this enabled them to retreat from the visual stimulation, this behaviour was on view to peers and staff alike. There was no obvious distinction between spaces used as breakout rooms for schoolwork and reset rooms.

Within the school's main learning neighbourhood, we noted the high use of breakout rooms by students working independently or in small groups. While this was noted as a purposeful use of these spaces, it meant that students with high needs did not always get an opportunity to use these spaces to reset when the need arose. However, even when these spaces were available, it was noted by one student, Chas, that they were not suitable. Chas understood when he needed time away from the over-stimulation of the ILE learning environment but did not find the breakout rooms pleasant. His comment below reflects his perception of both the space and his own diagnosis.

I call them autistic rooms. That is basically, that's another word for calling them shit. Because there's no fans, no air conditioning and they're a small little room and because they're built next to another classroom the doors have to be shut. (Chas)

Restricted access to use a space to reset was not only due to students use of them as learning spaces. The breakout rooms within the special education learning neighbourhood had been repurposed by the school leadership team as meeting rooms and could be booked by any staff member within the school. As a result, when students with high needs required a space to reset, it was often the case that a room was not available. Jane, the Head Teacher Special Education, described how to reset spaces are appropriated by other staff, despite having spent time with the architects to design the small rooms specially as reset spaces.

We did need some small breakout rooms because when you have a student who has a meltdown they need a space to reset. They need somewhere to go ... This is what we have intended them to be, but you can see those are 'Meeting one' and 'Meeting two' [pointing to signs on the doors of the reset rooms], and because we've got a lack of meeting space in the school often people will book these rooms as meeting rooms ... We often have people turn up to want to have a meeting and I'll have a student lying on the floor and it's very difficult for that student for me to have to say, 'I'm really sorry, sweetie, but you're going to have to go somewhere else'. (Jane)

Ease of access to and movement within spaces

ILEs, by design, are spacious and open. Large numbers of students move into and out of these spaces at designated times each school day, and transition frequently between learning environments and to other facilities whilst within the buildings. While the open spaces can afford a fluidity of movement between learning activities and spaces for students with physical disabilities (Byers 2015), the visual and auditory stimulus of

movement in these open spaces can be challenging for students with sensory sensitivities, including those with Autism Spectrum Disorder (Benade 2019; Page and Davis 2016). In addition, students who have social anxiety can experience additional stress when exposed to larger groups of students and teachers.

At Greenacres High, entry into and exit from the main ILE building occurred through a small number of double doors, located on the ground and first floors. At certain times during the day, these points of entry and exit acted as a funnel for large numbers of students; thoroughfares could get very busy and crowded, and this presented a challenge for students sensory issues and/or social anxiety. The proximity to moving crowds provoked distress before students had even commenced their work in the main learning neighbourhood. Trish, a teacher's aide who works with students with disability in the main learning neighbourhood, described how she circumvented this problem.

A thing that I find really good with some of our kids, especially the ones that are a little anxious ... I will take them up the fire escape and get them through the backdoor, quicker to the classroom than going through the crowd and all of that, having them negotiate kids coming down the stairs and any roughhousing that might go on. By the time we get to class, we are calm. You know, if we go that way (through the main doors) we are unsettled, you know, anxious. Then I find that impedes their learning. (Trish)

Jane, the Head Teacher Special Education, recalled the description a student had given to her about the internal space of the main ILE learning neighbourhood; a large public space that was like a 'shopping mall', full of noise, movement, and crowds – a frightening prospect.

Tina, a teacher in the special education learning neighbourhood, noted many access issues with the design of their new space. Students needed to traverse through various learning spaces to get to things they needed, and access to technology and resources was impeded by poor design (for example, screens being secured on walls opposite large glassed walls, so reflected light was a significant problem for the students). As such, Tina signals the importance of architects working closely with teachers who understand the educational requirements of students with high and very high needs who will access the ILE school.

I think if you're going to design in your school, the most important thing is to speak to the teachers using the spaces, you know, not necessarily speaking to executives or designers, it's about who's using the space, what they need in that space to survive. If you design a space that makes your job harder, the kids suffer ultimately ... If you ask a teacher what they want, they're not going to be lavish, they just want practical. (Tina)

Discussion: the promotion of psychological safety in ILEs

This research highlights that the design of ILE spaces and how they are used may not support students' psychological safety. The hypervisibility in ILE design, the ease of access to and movement within spaces, and the use of breakout and reset rooms are all factors to consider when architects and educators plan to ensure that all students are psychologically safe in ILE. It is a limitation of this study that there is a focus on only one special education setting within an ILE. A broader study with more schools would have enabled some comparison across contexts. While the sample was small,

the students and teachers did point to keys issues around psychological safety that designers and educators could take into consideration when designing new or refurbished school buildings. Moreover, the inclusion of the voices of students themselves and the use of photovoice to explore their perceptions of their physical surroundings were a unique contribution in this study. Additionally, the success of photovoice as a method for exploring the perceptions of students with high needs leads to a recommendation of this approach for future research.

It has been provocatively noted that the architectural community may be ahead of the education community in envisaging twenty-first century learning spatial design (Wells 2015). Although there is the need for synergy between architects and educators, it can be problematic when those designing the environments do not fully understand the requirements of students with high and very high educational needs being schooled within them. The design decisions that are made can have a significant impact on not only the educational success of students, but also their psychological safety.

Jane, Head Teacher Special Education, was consulted in the design phase of Greenacres High. Yet upon occupancy, she found the design was very different to what she had reportedly requested and therefore envisaged. It appears there is conjecture between the aspirations for future-focused pedagogy that different stakeholders bring to the design process. Architects may not fully understand the educational community – the practices of teachers and the needs of the students for whom they are designing spaces, just as educators may not fully understand the work of architects. As a result, a synergy between architects and educators engendered through cross-disciplinary dialogue can be fraught.

Despite the notion of flexibility being a key design characteristic of ILEs, they can be inflexible when it comes to the addressing the needs of students with high and very high educational needs. There are aspects of design that have implications for the

Table 1. Questions to promote psychological safety for students with disabilities in ILEs.

Aspects of ILE design that have implications for the psychological safety of students.	Questions to consider
Hyper-visibility	Are there spaces for students to be educated where they are not visible to many other students? Are students able to safely engage in self-regulatory behaviours without being visible to many other students?
Breakout and reset rooms	Are there secluded 'reset' spaces that students can elect to go to when they need them? Is there provision for a range of quiet indoor space that serve different purposes? Are there areas that can be fitted with materials that support sensory requirements?
Access to and movement within the learning spaces	Is there a way to enter/exit each the learning spaces without having to walk through other classes or in front of groups of students? Is the accessible toilet private enough for students to have their needs met with a carer without being visible to all? Do leaders have an office/meeting space that is private for when they are addressing personal issues with students, teachers, and parents?
Distractibility and sensory stimulation	How are objects and materials used that minimise distraction, discomfort, and distress? How can consideration be given to acoustics, colour choice, lighting, reflective surfaces, wall surfaces, and flooring?

psychological safety for this group of students in ILE. [Table 1](#) provides a set of questions that educators and designers can use to assist in their planning for inclusive spaces in ILE.

On the basis of our research, we view that developing a shared understanding around aspirations for inclusion and how and students' needs can best be met in ILE, is an element that can be built into the design phase when stakeholders (representatives from Departments of Education, architects, leaders, and teachers) come together. The nexus between design and the end-user experience could be explored through a participatory research process, where teachers and students record their experiences and share them with other stakeholders. There could be a vertical collaboration with leaders, teachers, students, and external experts to enable a multi-tiered approach to providing support and engagement with problem-solving as issues arise. A shared understanding could be established around the degree of visibility of ILE spaces and the use of breakout rooms.

Slee (2010) makes the observation that practitioners will only interrupt the ubiquity of exclusion if they are acquainted with its characteristics and operation. In this respect, it is important that educators, architects, and school communities understand the design features in ILE that support inclusion and have knowledge of the psychological safety-related reasons for designing and using spaces in particular ways. This should not remain as compartmentalised knowledge discreetly held by inclusive educators. Students with diverse educational needs access every classroom, so although the emerging issues discussed here were generated through research undertaken in a special education learning neighbourhood, this research is relevant to all educators. This knowledge may go some way towards identifying 'the manifest and insidious ways in which exclusion is established through and in schooling' (Slee 2010, 199), and support the psychological safety of all students who are educated within the walls of an ILE.

Conclusion

Innovative Learning Environments are seen as 'elegant spatial resolutions to complex future-oriented pedagogical problems' (Yeoman and Ashmore 2018, 14). However, the nexus of these elegant solutions and how they impact students who have high or very high educational needs require ongoing scrutiny. We recommend further research into the design features in ILE that afford and constrain educational opportunities for students with high and very high needs. Specifically, this could involve research work with architects, schools leaders, teachers and students with a focus on how ideas around inclusive design in ILE are conceptualised in the first instance, and how they impact teachers' work and students' learning and sense of safety and wellbeing. There could be an exploration of these design ideas are worked with and even resisted by the teachers who work closely with students who have high and very high needs and by the students themselves.

In this article, we have signalled that hypervisibility, distractibility and an overload of sensory stimulation, the use of reset and breakout rooms, and the ease of access to and movement within spaces are important considerations for the design of inclusive ILEs. Design features and the way that the spaces are used by practitioners can impact the psychological safety of students with high and very high needs. Further research into this area could address the impasse where there is a disagreement between the

perspectives of school leaders and teachers on how the needs of these students can be best met in ILE. Innovative Learning Environments provide an opportunity to not only reconceptualise the physical space of schools, but to also consider how these spaces can ensure inclusivity and psychological safety for all students.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Notes on contributors

Associate Professor Jennifer Charteris is Head of Department, Learners, Learning and Teaching at the University of New England. She conducts research into how technology can assist teacher and student learning. As a teacher educator with teaching experience in Aotearoa/New Zealand, Australia and the UK, Jennifer has worked with students, teachers, principals, school communities and school in service advisors across the primary, secondary and tertiary sectors. She researches in collaboration with educational leaders, teachers and students.

Dr. Joanna Anderson is Lecturer in Learning, Teaching Inclusive Education at the University of New England, Armidale. She has more than 20 years' experience in schools, where she worked as both a classroom teacher and school leader across in the primary, secondary and special education sectors. Joanna has a growing body of work in the area of inclusive education, as a researcher, teacher and consultant.

Dr. Angela Page is a registered educational psychologist and works as a lecturer in Inclusive and Special Education at the University of Newcastle, Australia. She has worked as a secondary and specialist education teacher and advisor in New Zealand and the Pacific. Angela's research interests are in the areas of health and wellbeing for young people including mental health, and the development of positive relationships.

ORCID

Jennifer Charteris  <http://orcid.org/0000-0002-1554-6730>

Joanna Anderson  <http://orcid.org/0000-0002-6171-0909>

Angela Page  <http://orcid.org/0000-0001-9857-9054>

References

- Alterator, Scott, and Craig Deed. 2013. "Teacher Adaptation to Open Learning Spaces." *Issues in Educational Research* 23 (3): 315–330. Accessed December 13, 2020. <https://www.iier.org.au/iier23/alterator.html>.
- Anderson, Joanna, and Christopher Boyle. 2019. "Looking in the Mirror: Reflecting on 25 Years of Inclusive Education in Australia." *International Journal of Inclusive Education* 23 (7-8): 796–810. doi:10.1080/13603116.2019.1622802.
- Anderson, Joanna, Christopher Boyle, and Joanne Deppeler. 2014. "The Ecology of Inclusive Education: Reconceptualising Bronfenbrenner." In *Equality in Education: Fairness and Inclusion*, edited by Hongzhi Zhang, Philip Wing Keung Chan, and Christopher Boyle, 23–34. Rotterdam: Sense.
- Appelbaum, Nital P., Kelly S. Lockeman, Shelly Orr, Tanya A. Huff, Christopher J. Hogan, Brenda A. Queen, and Alan W. Dow. 2020. "Perceived Influence of Power Distance, Psychological Safety, and Team Cohesion on Team Effectiveness." *Journal of Interprofessional Care* 34 (1): 20–26. doi:10.1080/13561820.2019.1633290.

- Baker, Jean A., Robert Bridger, Tara Terry, and Anne Winsor. 1997. "Schools as Caring Communities: A Relational Approach to School Reform." *School Psychology Review* 26 (4): 586–602. doi:10.1080/02796015.1997.12085888.
- Benade, Leon. 2019. "Flexible Learning Spaces: Inclusive by Design?" *New Zealand Journal of Educational Studies* 54 (1): 53–68. doi:10.1007/s40841-019-00127-2.
- Byers, Terry. 2015. "The Empirical Evaluation of the Transition from Traditional to New Generation Learning Spaces on Teaching and Learning." Accessed November 26, 2020. <http://e211e.com/wpcontent/uploads/2015/11/Terrains2015WebSmall.pdf>.
- Byers, Terry, Marian Mahat, Kirra Liu, Anne Knock, and Wesley Imms. 2018. *Systematic Review of the Effects of Learning Environments on Student Learning Outcomes*. Melbourne: University of Melbourne.
- Campbell, Matthew, Sue Saltmarsh, Amy Chapman, and Christopher Drew. 2013. "Issues of Teacher Professional Learning Within 'Nontraditional' Classroom Environments." *Improving Schools* 16 (3): 209–222. doi:10.1177/1365480213501057.
- Cardellino, Paula, and Pamela Woolner. 2020. "Designing for Transformation – A Case Study of Open Learning Spaces and Educational Change." *Pedagogy, Culture & Society* 28 (3): 383–402. doi:10.1080/14681366.2019.1649297.
- Carmeli, Abraham, Daphna Brueller, and Jane E. Dutton. 2009. "Learning Behaviours in the Workplace: The Role of High-Quality Interpersonal Relationships and Psychological Safety." *Systems Research and Behavioral Science: The Official Journal of the International Federation for Systems Research* 26 (1): 81–98. doi:10.1002/sres.932.
- Charteris, Jennifer, and Dianne Smardon. 2018. "Professional Learning on Steroids': Implications for Teacher Learning Through Spatialised Practice in New Generation Learning Environments." *Australian Journal of Teacher Education* 43 (12): 1–22. Accessed November 16, 2020. <https://ro.ecu.edu.au/ajte/vol43/iss12/2>.
- Charteris, Jennifer, Dianne Smardon, and Emily Nelson. 2017. "Innovative Learning Environments and New Materialism: A Conjunctural Analysis of Pedagogic Spaces." *Educational Philosophy and Theory* 49 (8): 808–821. doi:10.1080/00131857.2017.1298035.
- Charteris, Jennifer, Dianne Smardon, and Angela Page. 2018. "Spatialised Practices in ILEs: Pedagogical Transformations and Learner Agency." In *Transforming Education: Design, Technology, Governance in Global Contexts*, edited by Leon Benade, and Mark Jackson, 19–34. Singapore: Springer.
- Connolly, Jennifer. 2017. "Seclusion of Students with Disabilities: An Analysis of Due Process Hearings." *Research and Practice for Persons with Severe Disabilities* 42 (4): 243–258. doi:10.1177/1540796917725710.
- Dovey, Kim, and Kenn Fisher. 2014. "Designing for Adaptation: The School as Socio-Spatial Assemblage." *The Journal of Architecture* 19 (1): 43–63. doi:10.1080/13602365.2014.882376.
- Edmondson, Amy. 1999. "Psychological Safety and Learning Behavior in Work Teams." *Administrative Science Quarterly* 44: 350–383. doi:10.2307/2666999.
- Edmondson, Amy, Monica Higgins, Sara Singer, and Jennie Weiner. 2016. "Understanding Psychological Safety in Health Care and Education Organizations: A Comparative Perspective." *Research in Human Development* 13 (1): 65–83. doi:10.1080/15427609.2016.1141280.
- Edmondson, Amy, and Zhike Lei. 2014. "Psychological Safety: The History, Renaissance, and Future of an Interpersonal Construct." *Annual Review of Organizational Psychology and Organizational Behavior* 1: 23–43. doi:10.1146/annurev-orgpsych-031413-091305.
- Frazier, M. Lance, Stav Fainshmidt, Ryan L. Klinger, Amir Pezeshkan, and Veselina Vracheva. 2017. "Psychological Safety: A Meta-Analytic Review and Extension." *Personnel Psychology* 70 (1): 113–165. doi:1111/peps.12183.
- Imms, Wesley, Benjamin Cleveland, and Kenn Fisher. 2016. "Pursuing That Elusive Evidence About What Works in Learning Environment Design." In *Evaluating Learning Environments*, edited by Wesley Imms, Ben Cleveland, and Kenn Fisher, 3–17. Rotterdam: Sense Publishers. doi:10.1007/978-94-6300-537-1

- Istance, David, and Marco Kools. 2013. "OECD Work on Technology and Education: Innovative Learning Environments as an Integrating Framework." *European Journal of Education* 48 (1): 43–57. doi:10.1111/ejed.12017.
- Kahn, William. 1990. "Psychological Conditions of Personal Engagement and Disengagement at Work." *Academy of Management Journal* 33 (4): 692–724. doi:10.5465/256287.
- Lateef, Fatimah. 2020. "Maximizing Learning and Creativity: Understanding Psychological Safety in Simulation-Based Learning." *Journal of Emergencies, Trauma, and Shock* 13 (1): 5. doi:10.4103/JETS.JETS_96_19.
- Lipsky, Deborah. 2011. *From Anxiety to Meltdown: How Individuals on the Autism Spectrum Deal with Anxiety, Experience Meltdowns, Manifest Tantrums, and How You Can Intervene Effectively*. London: Jessica Kingsley Publishers.
- Lipsky, Deborah, and Will Richards. 2009. *Managing Meltdowns – Using the S.C.A.R.E.D. Calming Technique with Children and Adults with Autism*. London: Jessica Kingsley Publishers.
- Mahat, Marian. 2008. "The Development of a Psychometrically-Sound Instrument to Measure Teachers' Multidimensional Attitudes Toward Inclusive Education." *International Journal of Special Education* 23 (1): 82–92. Accessed June 21, 2021. <https://minerva-access.unimelb.edu.au/bitstream/handle/11343/240394/Mahat%202008.pdf>.
- May, Tamara, Amanda Brignell, and Katrina Williams. 2020. "Autism Spectrum Disorder Prevalence in Children Aged 12–13 Years from the Longitudinal Study of Australian Children." *Autism Research* 13 (5): 821–827. doi:10.1002/aur.2286.
- Millet, Pamela. 2009. "Using Classroom Amplification in a Universal Design Model to Enhance Hearing and Listening [Monograph], (23). What Works?" *Research into Practice*. Accessed November 26, 2020. http://www.edu.gov.on.ca/eng/literacynumeracy/inspire/research/ww_classroom_amplification.pdf.
- Ministry of Education, New Zealand. 2021. *Criteria and definitions for Ongoing Resourcing Scheme*. Accessed June 21, 2021. <https://www.education.govt.nz/school/student-support/special-education/ors/criteria-for-ors/>.
- Nagashima, Tomohiro, Kexin Yang, Anna Bartel, Elena Silla, Nicholas Vest, Martha Alibali, and Vincent Alevan. 2020. "Pedagogical Affordance Analysis: Leveraging Teachers' Pedagogical Knowledge to Elicit Pedagogical Affordances and Constraints of Instructional Tools." Accessed July 21, 2021. <https://repository.isls.org/bitstream/1/6366/1/1561-1564.pdf>.
- Nelson, Emily, and Kate Christensen. 2009. "Photovoice in the Middle: How our Students Experience Learning at School and Beyond." *New Zealand Journal of Teachers' Work* 6 (1): 35–46. Accessed November 20, 2020. <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.542.2164&rep=rep1&type=pdf>.
- Newman, Michelle, and Peter Thomas. 2008. "Student Participation in School Design: One School's Approach to Student Engagement in the BSF Process." *Co-Design International Journal of CoCreation in Design and the Arts* 4 (4): 237–251. doi:10.1080/15710880802524938.
- Organisation for Economic Co-operation Development (OECD). 2013. *Innovative Learning Environments, Educational Research and Innovation*, OECD Publishing. Accessed October 15, 2020. <http://www.oecd.org/education/ceri/innovativelearningenvironmentspublication.htm>.
- Organisation for Economic Co-operation Development (OECD). 2017. *The OECD Handbook for Innovative Learning Environments*. Paris: OECD Publishing. Accessed October 23, 2020. <https://www.oecd.org/education/the-oecd-handbook-for-innovative-learning-environments-9789264277274-en.htm>.
- Page, Angela, and Alex Davis. 2016. "The Alignment of Innovative Learning Environments and Inclusive Education: How Effective is the New Learning Environment in Meeting the Needs of Special Education Learners?" *New Zealand Journal of Teachers' Work* 13 (2): 81–98. doi:10.24135/teacherswork.v13i2.79.
- Page, Angela, and Renee Ferrett. 2018. "Teacher Aides' Views and Experiences on the Inclusion of Students with Autism: A Cross-Cultural Perspective." *International Education Journal: Comparative Perspectives* 17 (2): 60–76. <https://openjournals.library.sydney.edu.au/index.php/IEJ>.

- Persson, Hans, Henrik Åhman, Alexander Arvei Yngling, and Jan Gulliksen. 2015. "Universal Design, Inclusive Design, Accessible Design, Design for All: Different Concepts – One Goal? On the Concept of Accessibility – Historical, Methodological and Philosophical Aspects." *Universal Access in the Information Society* 14 (4): 505–526. doi:10.1007/s10209-014-0358-z.
- Sigurdardottir, Anna Kristín, and Torfi Hjartarson. 2011. "School Buildings for the 21st Century. Some Features of New School Buildings in Iceland." *CEPS Journal* 1 (2): 25–43. Accessed November 26, 2020. https://www.pedocs.de/volltexte/2012/6090/pdf/CEPSJ_2011_2_Sigurdardottir_School_buildings_D_A.pdf.
- Slee, Roger. 2010. "Political Economy, Inclusive Education and Teacher Education." In *Teacher Education for Inclusion Changing Paradigms and Innovative Approaches*, edited by Chris Forlin, 13–22. Abingdon: Routledge.
- Slee, Roger. 2018. *Inclusion and Education: Defining the Scope of Inclusive Education*. Paper Commissioned for the 2020 Global Education Monitoring Report, Inclusion and education. UNESCO. Accessed October 21, 2020. <https://unesdoc.unesco.org/ark:/48223/pf0000265773>.
- Thapa, Amrit, Jonathan Cohen, Shawn Guffey, and Ann Higgins D'Alessandro. 2013. "A Review of School Climate Research." *Review of Educational Research* 83 (3): 357–385. doi:10.3102/0034654313483907.
- Thomas, D. 2017. "Feedback from Research Participants: Are Member Checks Useful in Qualitative Research?" *Qualitative Research in Psychology* 14 (1): 23–41. doi:10.1080/14780887.2016.1219435.
- UNESCO. 2005. *Guidelines for Inclusion: Ensuring Access to Education for All*. Paris: United Nations Educational, Scientific and Cultural Organization.
- United Nations. 2016. *Convention on the Rights of Persons with Disabilities, General Comment No. 4*. United Nations. Accessed November 26, 2020. https://tbinternet.ohchr.org/_layouts/15/treatybodyexternal/Download.aspx?symbolno=CRPD/C/GC/4&Lang=en.
- Wells, Alastair. 2015. "Confusing Messages: Is the Modern Learning Environment an Example of Idealised Curricula or Disruptive Innovation?" Accessed November 12, 2020. <http://e21le.com/wp-content/uploads/2015/11/Terrains2015WebSmall.pdf>.
- White, Susan W., Donald Oswald, Thomas Ollendick, and Lawrence Scahill. 2009. "Anxiety in Children and Adolescents with Autism Spectrum Disorders." *Clinical Psychology Review* 29 (3): 216–229. doi:10.1016/j.cpr.2009.01.003.
- Woolner, Pamela, Sheila McCarter, Kate Wall, and Steve Higgins. 2012. "Changed Learning Through Changed Space: When Can a Participatory Approach to the Learning Environment Challenge Preconceptions and Alter Practice?" *Improving Schools* 15: 45–60. doi:10.1177/1365480211434796.
- Wrigley, Terry, Pat Thomson, and Robert Lingard. 2012. "Resources for Changing Schools: Ideas in and for Practice." In *Changing Schools: Alternative Ways to Make a World of Difference*, edited by Terry Wrigley, Pat Thomson, and Robert Lingard, 194–213. Oxon, NY: Routledge.
- Yeoman, Pippa, and Nathan Ashmore. 2018. "Moving from Pedagogical Challenge to Ergonomic Challenge: Translating Epistemology into the Built Environment for Learning." *Australasian Journal of Educational Technology* 34 (6): 1–16. doi:10.14742/ajet.4502.
- Yin, Robert. 2017. *Case Study Research and Applications: Design and Methods*. Singapore: Sage.