Daring spaces

Creating multi-sensory learning environments

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Abstract

In this article, we argue that physical rooms cannot be replaced by virtual space without literally losing the student's body and that experimenting with rooms and active learning is imperative for improving and advancing students' learning. Our case study offers insight into a 'soft room experiment' without hard furniture or audio-visual equipment at one Australian university and makes recommendations that will be useful in many other educational environments. Our qualitative research project is based on feedback from students and staff as well as on class observation. Findings show that learning spaces need to be designed with appropriate pedagogies in mind, be multifunctional and ideally also multi-sensory.

Keywords

active learning space, barriers, communicative learning environment, education, learning spaces, multi-sensory learning, soft-room experiment

Education and higher education landscapes have changed in recent years because of globalisation and digitalisation, and most recently because of a need to adapt to new conditions during a pandemic. The virus has forced students and staff to dive into online learning, but it has also revealed many shortcomings because of the digital divide, unfulfilled expectations and obstacles impossible to prepare for. Dreaming of flexible physical learning spaces might be daring in times where virtual spaces and learning independent of time and place seems more progressive, achievable and necessary. While online spaces such as iLearn, Blackboard, Zoom, Microsoft Teams and the like work well for some, there also is a longing to return to physical environments to facilitate exchange and create human togetherness, to where groups can learn together and from each other.

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In their book chapter about students' physical and digital sites of study, Lesley Gourlay and Martin Oliver (2016) remind readers of early writing about online study that praised the independence of learning from time and place, thereby 'idealizing the virtuality of educational experiences' (2016: 73). They point out that this results in disembodied experiences where not only spaces and places disappear, but, along with them, also the bodies of learners. Technological developments do not negate and eliminate structures and strategies that worked for hundreds of years, but they enhance and change existing approaches. In line with recent research on active learning and spatial design at universities (Gourlay and Oliver 2016; Ravelli 2018; Todhunter 2015), this article argues for a multi-functional and ideally also multi-sensory approach to designing learning spaces. Our project contributes to a relatively under-researched and underrated aspect of learning environments, that is, physical space, flexibility for interaction and inter-connectedness.

We will examine the transformation of a regular classroom at Macquarie University into a soft space, and assess the impact it had on learning and teaching. This article will offer the results of a qualitative research project on how students and staff evaluated the soft room (2013–2014); look at continuous student comments on the room in unit evaluations (2011–2016); and provide reflections on the project and its shortcomings by Faculty Asset Manager, Craig Oliver. Even though, or maybe for the very reason that the room we are writing about failed and has been decommissioned, we encourage experimenting with room design and corresponding learning and teaching approaches to eventually arrive at attractive and functional learning environments that embrace and empower their users.

From classroom to learning space

The assumption that classroom layout reflects a teacher's educational philosophy and affects participation and engagement of students is forty years old. Robert Sommer established that 'there is no ideal classroom layout for all activities' (1977: 175). Student control over seating arrangements is important because it influences participation and engagement, which in turn affects student learning experiences (Earp 2017; Fernandes et al. 2011; Matthews et al. 2011). Research has shown that, for example, a horseshoe arrangement attracts more student involvement than rows facing the front of the room (Marx et al. 1999). Amanda Lattimore (2016) observed learner-centred usage in a classroom with mixed equipment: If a student wanted to work more

independently, they could grab a bean bag in the corner, but more often two of them would get together and work as a pair. Giving students more of a choice about how they learn helps make them more willing to learn, and a safe and comfortable environment helps foster creativity and innovation.

During the pandemic, there has been lots of praise for staff and students coordinating learning and teaching online. Institutions have had to act quickly, and online spaces have been found to 'empower[s] learners to participate in accordance with their own time and ability' (Ross 2020: 1126). Sir John Daniel assumes that 'institutions that normally teach face-to-face in classrooms or on campuses will likely return to that mode of instruction with some relief' (2020: 95), but he also predicts further acceleration of the expansion of online learning in tertiary education. Technology-based learning is here to stay, but it will not completely take over. It quickly became apparent that it is not enough to simply put the same activities online: there has to be a completely different approach. Ray Archee already pointed out years ago that the delivery of lectures in tertiary education has not adapted to a new environment: 'It does not matter if this information is delivered in a live lecture or provided on an online learning platform' (2012: 420). The approach, as he observes, is still teacher-centred. Learners construct knowledge through experience (Boyle 1994), and the process is as important as the product. When the teacher becomes a facilitator, learners can take responsibility for their own learning through interaction. David Kolb's (1984) experiential learning cycle recognises that effective learning activities need to engage the cognitive, the affective and the behavioural dimensions of the learning process: 'Learning is the process whereby knowledge is created through the transformation of experience' (1984: 38). Ideally, 'students go through a concrete, real-life experience, then critically reflect on the situation and their own behaviour and apply the new knowledge to the next real-life experience, which will develop it further' (Krajewski 2011: 143).

In this article, we treat learning spaces as multi-sensory. Jinsop Lee (2013) explains in his TED talk how multi-sensory experiences impact the way we perceive our environments and how products evolve and change when different sensory experiences are added to them. The effect of the physical environment on the learning experience has been studied in schools in particular, but with a focus on one of the senses rather than on a combination of them. Tim Davis (1984) focusses on touch; Michael Mott and colleagues (2012) and Nancy Kwallek and Carol Lewis (1990) explore visual elements; Julian Treasure (2012) points out the importance of acoustics in a room, and

Christelle Porcherot and colleagues (2010) alert us to the importance of smell. We argue that attention to each of these elements improves learning.

Individuals learn in different ways and react to different stimuli. Abraham Maslow and Norbett Mintz established as early as 1956 that an aesthetically pleasing room results in happier people. Andrew Oswald and colleagues (2009) showed how the level of happiness of workers correlates positively with their productivity. What constitutes an aesthetically pleasing room depends very much on personal preference and on learning modalities and teaching approaches, but some features seem to be universal and have a positive effect on the learning experience. People work and learn better in well-ventilated, uncluttered and bright rooms with pleasant or neutral odours (Al-Omari and Okasheh 2017; Bluyssen et al. 2018; Nag 2019).

Different learning approaches suit different physical and online spaces, but learning theories do not specifically describe these contexts. Those involved in creating physical learning environments, architects and facility planners, need to be aware that spatial requirements need to match educational specifications in ever-changing learning environments (see Akinsanmi 2008). Ideally, room planning occurs in cooperation with staff and students, at least when new spaces and places are designed. Research on the compatibility of learning theories and physical space should have an impact on learning environment design. This is, of course, easier said than done, but creating a public sphere for communicative action and using concrete examples (a subject, specific content) should be possible in a university environment.

Course scheduling is a complex issue, and classrooms at universities are allocated according to group size and available timeslots, which offers very little flexibility for those using them. There are, and always have been, rooms that have been designed for special use – for example, language labs, science labs and computer-equipped rooms. It is, however, difficult to transform a traditional classroom with rows of tables and chairs into an inspiring classroom that suits communication amongst individual students and student groups. Most existing settings have been designed for frontal teaching, and therefore instructivist approaches which have been used for decades and even centuries. As Liz Burke (2017) points out, traditional classrooms in older buildings are failing the test of time. Learning spaces need to inspire. Meanings of education have changed dramatically in the last few decades, away from knowledge transfer to knowledge construction, selection and re-framing, from memorisation to experiential learning and critical think-

ing, but learning spaces have not quite kept pace. Student groups will not be homogenous in terms of learning preferences. This makes it even more important to see learning spaces from a student's perspective. In light of our investigation, we argue that, in culturally and linguistically diverse groups in particular, a barrier-free, appealing environment can positively affect well-being, participation and learning outcomes. By 'barrier-free', we mean first of all without hard furniture, a physical space that can easily be transformed because there are no unwieldy tables and chairs but only soft furniture that can easily be re-arranged or removed. Visual aesthetics, sound and smell can be obstacles to successful learning – or they can support it.

The soft space

Prior to the availability of the soft room, the usage of 'space' was limited because the hard furniture barely allowed reorganisation of the room, and, no matter how tables were arranged, there was no room to walk around or easily connect to people from another table. Some groups built rather dangerous-looking towers of tables and chairs and used the carpeted floors to sit on, while others boldly removed some of the furniture to create more room, but this was the exception to the rule. In the soft room, groups were explicitly encouraged to be creative and use the physical environment to their advantage. This approach is clearly constructivist and learner-oriented. On student presentation days, the facilitator becomes a learner and follows the lead of the presenting team.

To an extent, this is also possible in a traditional classroom and may benefit from the use of audio-visual (AV) technology. To give an example, a group presenting on cultural transition in a regular classroom removed all furniture except for the chairs, which were placed in two double rows. Presenters were dressed like stewards and stewardesses, and the screen in front of the room showed advertisements for the destination the 'plane' was on its way to. The engines could be heard, and announcements were made (in the language of the target destination). 'Travellers' were issued with different 'passports'; one passenger, however, did not get an ID paper at all. This was a creative experiential set-up to explain theories of culture and language shock; exposure to different food, signs and symbols; and the importance of national identity in these scenarios. In the soft room, this would have looked different, and it would not have been possible to use the same sound and visual support. This shows that space can be used creatively and

become part of the presentation in any room, but fewer students will achieve this goal in a traditional classroom setting.

The creation of the soft room at Macquarie University turned out to be particularly suitable for a constructivist/experiential learning approach, but it was not conceptualised for a particular approach and learning style. As the Asset Manager, Learning and Teaching, said: 'The soft room never really connected to any organisation or learning approach. It was very much arranged on the "build it and they will come philosophy"' (Oliver 2018). The soft room was ready to use in Semester 1, 2011. It was the brainchild of the then Executive Dean of the Faculty of Arts, who sponsored the room, intending to re-create 'some positive opportunities that could come from a discussion type atmosphere that he had experienced elsewhere. One of the defining features of the room was that it would deliberately not have AV' (Oliver 2018).

A small group of staff (including the corresponding author) had brainstormed about what it should look like, and imagined it as an oasis away from PowerPoint, social media, hard furniture and teacher orientation (Figure 1). The rectangular room measured 61.8 square metres. After its transformation, the floor was covered with soft black rubber gym mats in the form of

Figure 1. The soft room with bean bags, cubes and balls

puzzle pieces. The room had twenty-four bean bags in primary colours (red, blue and black). The only hard furniture was a wooden shoe rack near the door because room users were required to remove their shoes to protect and keep the floor and bean bags clean. The walls were painted with a coating making them into whiteboards; later, additional porcelain whiteboards (six whiteboards measuring 120 x 240 cm each) were installed. The wall opposite the door had large windows opening up to the outside. The room had high ceilings with dimmable lights, in addition to the already existing fluorescent lighting and various fans used for ventilation. There was no AV equipment and no designated space for a lecturer (i.e. no front of the room).

A sign on the door of the room asked users to remove their shoes before entering. Later in the year, other messages were added, such as 'Please do not use permanent markers!' or 'Please do not use this room for sleep, or for having sex!' Over the years, the room was booked for Yoga classes, student association meetings and one-off casual meetings, but less and less for scheduled classes.

Oliver (2018) pointed out that the execution of the room as well as the lack of maintenance of the room limited its potential:

> The whiteboard paint walls quickly became sullied by usage and poor cleanability, and I replaced them with more standard porcelain whiteboards once the situation became clear. The idea of bean bags sounds good in theory, but if you buy cheap (and they looked cheap too), and then don't have a maintenance regime for keeping them appropriately filled, they become an impediment to their original intent.

It is correct that student enthusiasm became less over time as each group came to a slightly less comfortable room than the one before. There was no strategy to increase its usage or even advertise its existence; there was no long-term plan of possible usage. This could be avoided by including staff and students from across the university in planning and implementation, but this type of action and coordination takes time. However, Oliver said that it was simply assumed that the room would be 'discovered' by staff and students:

> Macquarie doesn't have a good connection between constructing space and advocating and advertising the space. Knowledge of the room was largely limited to the Faculty of Arts. This further reduced the full potential of the room organisationally. When you are relying on word of mouth, it doesn't give you much at this scale. (Oliver 2018)

Evaluation of the soft room

Method

Feedback on the soft room has been collected throughout the years it has been in use. In the following, some of the feedback from students and staff will be reflected and assessed in light of the declining usage of the room and its demise in 2018, using our own observations and comments from the Asset Manager Learning and Teaching, Craig Oliver.

In 2013–2014, we conducted qualitative research about the student experience in the soft room in the form of questionnaires, semi-structured interviews and classroom observation, to determine the opinions of students and staff at Macquarie University in terms of its aesthetics and to determine room for improvement. Our focus was on how touch, sight, sound, smell and taste may be configured to enhance the general feel and experience of a room with the intention of increasing understanding, creativity and student collaboration.

Eight staff members who were either currently using the room or had used it previously were contacted via email or phone. Students were approached via staff members who agreed to participate in the project. Both staff and students completed questionnaires regarding their experiences with the room (Appendix, Figure 2). The questionnaire was anonymous, and participation was voluntary. Consent forms allowed participants to withdraw from participation at any time. Forty students from across three classes, all within the

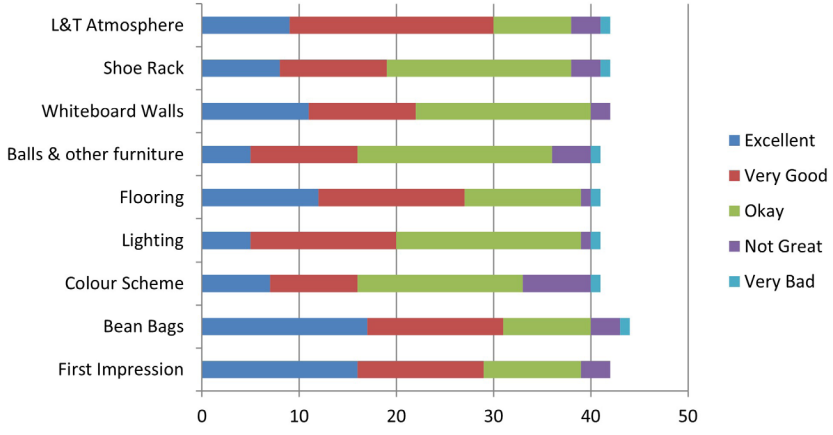

Figure 2. Staff and student evaluation of the soft room (2014)

Faculty of Arts, completed questionnaires and rated the room in Semester 2, 2013. We also interviewed five staff members and four students who used the room and included classroom observation in this study.

Sensory evaluation

The bean bags ranked highest on the scale, rated as 'excellent' or 'very good' by most students. Weaker components of the room included the colour scheme, the balls and other furniture as well as lighting. The suggestions for improvement in the room echoed the results: a more appealing colour scheme, cleaner bean bags and softer lighting. Oliver (2018) put this down to the room being 'created "on the cheap" in terms of furnishings and changes'. He described the implementation of a potentially good idea as a 'depressing environment': quite claustrophobic, poor lighting, poor acoustics and poor air conditioning.

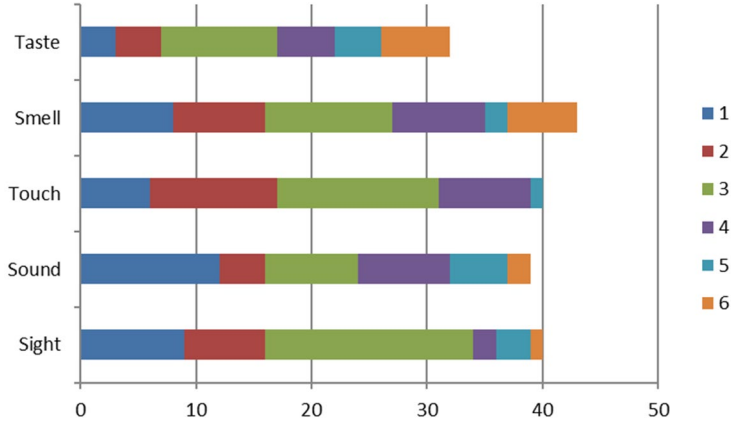

Figure 3. Staff and student evaluation of the soft room's appeal to the senses

Vision

Figure 3 reflects how the participants feel about the room regarding its appeal to the senses, with '1' being on the positive end of the spectrum and '6' on the negative end. Asking participants to rate a space in this way can only give an initial impression, and only relates to positive vs. negative, so we

need to look at each category to make sense of the answers. Sight was given a relatively unimpressive ranking, in line with the rating of the physical features seen in Figure 2. Eighteen participants rated the visual impression of the room '3', which during the interviews was revealed to mean 'uninspired and dull'.

The colour scheme proved key in determining the room's aesthetic appeal and was one of the features rated lowest. The original idea was to keep it simple, the flooring black and the walls white, with whiteboards all around. The only colourful elements in the room would be the bean bags. Kwallek and Lewis (1990) tested the academic performance of participants in three rooms, one coloured primarily white, the other green and the last bright red. Participants in the bright red room scored higher results on all tests. The study only showed short-term effects of the colour red as a main colour scheme; it did not explore the long-term effects. Once users of the room become accustomed to the colour, the effects may diminish.

However, Elizabeth Duffy (1957) confirms the advantage of a red colour scheme by pointing out the psychological effect of the colour red as a more arousing and exciting colour relative to white. Participants in the soft room study commented in the questionnaire that the white-walled room looked sterile. It would have been useful to look into colour schemes and to include student opinion before making decisions. Red walls with whiteboards would have been 'low risk' because the red would not have been overpowering given the size of the whiteboards. The black flooring also proved to be an issue because it very quickly looked unclean. Both staff and students said in the follow-up interviews that the colour scheme was uninspiring and had a somewhat demoralising effect. In the interview, students were asked how they would design their own room. One student answered: 'My room wouldn't be white because I think it's boring; it wouldn't inspire me', and a staff member said: 'I would probably have different colours; I wouldn't stick to the black and white'. There were also suggestions to use pictures and other decorations, which translates to positive physical stimuli and symbolic artefacts (Davis 1984).

Students and staff indicated that the fluorescent lighting contributed to the poor colour scheme and aesthetic appeal. It has been established that different types of lighting have different effects on well-being and learning outcomes. While earlier research suggested that full-spectrum fluorescent lighting improves children's behaviour in classrooms (Ott 1976), later research proved that it yielded only marginal behavioural improvement

(McColl and Veitch 2001). Lisa Heschong and colleagues (2002) showed that natural lighting was in fact the better choice for raising student performance. Participants in our study were in favour of softer, better-quality lighting which would add to the appeal of the soft room. The main problem was that the soft room used to be a regular classroom, and it was randomly picked without looking into suitability. Natural light was limited, and with high ceilings attempts to introduce dimmable, soft lighting were futile.

The lighting of the room influences the happiness of its users, according to Maslow and Mintz (1956), due to the manner in which shadows can alter the physical appeal of a room. The poor lighting and white walls in the soft room created shadows, which further impacted the space negatively. This was particularly noticeable during certain times of the day and during periods of cloudy weather.

Sound

The soft room received an average ranking. The observation and interviews resulted in a more negative outcome. As the room has a high ceiling and solid cement walls, reverberation was an issue. The negative impacts of reverberation include heart stress, decreased class discussion and a lower quality of learning (Nelson et al. 2002). Decreased class discussion is typically a by-product of reverberation due to the difficulty in determining sounds from the multiple other sounds created through the echoing. A lack of design for sound is an important issue because it diminishes the improved interactivity effects of a relaxing, informal and close proximity environment. Students may miss 50 per cent of what is said in class (Treasure 2012). Again, our room was not checked for acoustic suitability, so there was no design for sound.

Touch

Bean bags and gym balls, which scored highly, replaced conventional seating (see Figure 1). The purpose of these soft and easy-to-move seats was to allow for a more informal and relaxed classroom setting, but also for changing seating arrangements in a matter of seconds. The relaxed setting led to students sharing the bean bags and sitting close to each other. The typical single desk to a single chair does not allow this proximity: hard furniture creates obstacles and separates students from each other.

Students noted that the soft room provided a more relaxing and comfortable environment which reduced tension. This resulted in higher classroom participation and a more comfortable setting for speeches and presentations by students. The 'tactile aspect' of the bean bags received positive comments. This was complemented by the gym mats as flooring, which also rated well. However, a tutor who regularly used the room remarked that 'the bean bags could be fluffed up a bit; I don't think they've been cleaned'. Participants taking the questionnaire also noted the lack of volume and the smell of the bean bags. This is a simple maintenance issue that needs to be addressed at implementation.

Smell and taste

Although smell appears to have a fairly regular distribution of ratings, the item received the highest amount of the lowest rating of '6', tied with taste. The questionnaires showed that students were uncomfortable with the smell of the room, mainly due to air flow issues and the cleanliness of the furniture.

Some participants may have found it difficult to rank the room in terms of taste, but most of them were aware that the senses of smell and taste are inseparable. Robert Frank and Jennifer Byram (1988) conducted experiments in which participants ate food with modified odour; the same foods with sweeter odours were rated as having sweeter tastes. Their study concluded that smell and taste were linked and that in a teaching environment smell was a palpable impression of the environment. Moreover, the smell and cleanliness of a room can contribute towards the atmosphere of enjoyment because it is a physical stimulus (Davis 1984). Figure 2 shows that smell was amongst the least favoured impressions in the room. The material of the equipment, in particular the rubber flooring, created a 'gym smell'. To protect the gym mat floor and bean bags, students were required to take off their shoes, which resulted in an additional smell in the room. Interviews with both students and staff concluded that odours created by feet and bean bags were an issue. The smell of a room can be associated with the tidiness of the room, which can influence the perception of the room for both users and visitors (McElroy and Morrow 1981). It has to be said that the soft room rarely looked tidy; its state deteriorated during semester. Regular cleaning would have made a big difference, and room users needed, in general, to take some responsibility for keeping the room in order.

However, rubber flooring and poor air flow did not help. During an interview, a staff member explained that the room physically felt, smelled and appeared to be 'a bit like a gym'. Long-term solutions suggested included increased air flow and scents. At present, there are fans on the ceiling that improve air flow, but only some of the windows can be opened to let in fresh air. The use of scents in various situations was examined by Porcherot and colleagues (2010): vanilla and strawberry scents had calming effect on participants. Alternating scents could be regarded as positive stimuli (Davis 1984). Different cultures rate scents differently, but some, such as vanilla, have been rated positively across cultures (Fox 2009), so vanilla scent would have been a good start.

Observation

Observation took place close to the mid-semester break in Intercultural Communication, a unit towards the Master's in International Communication. The observer was a student of law at the time (not a participant of any class that took place in the soft room and not known to the student group) and is the co-author of this study. Students consented to being observed, and the observation lasted for twenty minutes. The intention of this observation was to gain an insight into how students used the room during discussion, with a focus on student-to-student interaction, student-to-teacher interaction and the use of the soft furniture. Observations included the following statements:

1. Students were seated on the bean bags close together, even if they were not familiar with each other. Friends did sit closer to each other, but only marginally closer unless a bean bag was shared.
2. There was comfort with peers throughout the class discussion.
3. There was an informal atmosphere with an engaging class.
4. There was an overall feeling of community in the room.

The bean bags and gym balls allowed for mobility, as students could easily turn to face the person speaking. The proximity encouraged conversation, as students could easily shift their bodies to reply to the person speaking. This is consistent with both the interviews and questionnaires, as students noted this sense of comfort, which reduced the tension of speaking in front of others. It is this 'mobility' in particular that creates a constructivist learning

environment. The room was not very large (61.8 square metres), so not too many configurations were possible, but students certainly used the versatile setting to their advantage. They were able to simply pick up their bean bag and join another group, or sit on a ball, slightly higher than those on bean bags, to summarise the results of a discussion. The informal atmosphere also resulted in some students lying across bean bags or moving closer to different people in turn. It invited students to use their bodies and integrate activities where the bean bags were just pushed out of the way or stacked on top of each other.

Figure 4. Students' intercultural game (2014)

These results are also reflected in students' comments in their unit evaluations of Intercultural Communication across several years. Table 1 shows that the room has been commented on each semester *though there is no specific question* in the evaluation surveys about the classroom at all. Most of these comments were placed under the question: 'What are the most positive aspects of this unit?' The table reflects only comments explicitly mentioning the room.

Table 1. Students commenting on the soft room in unit evaluations

Description	**S1 2011**	**S1 2012**	**S1 2013**	**S1 2015**	**S1 2016**
Number and percentage of students who gave written feedback	N = 29/37 72%	N = 15 60%	N = 41 97.6%	N = 31 70.5%	N = 24 44%
Comfortable, informal, relaxed	4	2	2	4	–
Fantastic, great, special, inspiring, creative, amazing	5	1	4	2	1
Love/like/enjoy the space	1	4	1	4	2
Free to ask q's, more suitable for learning	1	–	2	2	1
Comfortable/great atmosphere	–	–	3	2	–
Interactive	5	2	3	1	–
Fun	3	–	–	1	–
Focus on communication, more involved in discussion, share ideas, engaging	4	2	4	1	2
Enhance presentation skills	–	1	2	–	–
Novelty	1	1	–	–	–
Good for peer feedback, learn from each other	1	–	1	–	1
Productive	–	–	1	–	1

The relation between the number of students taking each survey and the number of times the soft room was mentioned reveals that the enthusiasm for the room gradually subsided. Even in the early years, there were comments about poor maintenance attached to a general appreciation of the room: 'The room needs to be taken care of, sometimes not clean, both the whiteboard and floor'. However, the same student noted that 'the fact that one was not allowed to use PowerPoint etc. led to more creative ways of presenting and involving the class'. We found that a highly international group like the one taking Intercultural Communication benefitted from the barrier-free, communicative environment. One international student commented:

> The soft room is very special classroom, make each other more close. It's good for communicate with each other. I think the soft room was a good idea for tutorial, so that we can have relaxed learning experience, making learning with fun [sic]. (Unit evaluation S1, 2011)

Numerous students said that the room facilitated discussion and made them 'think out of the box'. The lack of AV technology was seen as positive because presentation groups had full attention, but also negative because some students would have liked to show YouTube clips or play music.

What worked well and what did not

Lack of AV technology in the room had been a major drawback for staff to book the soft room for their classes. Oliver commented:

> I don't see that a desire for soft furnishings, flexible space, less rigid conventional furniture necessarily has any bearing on whether there is AV in the room for example. Why shut down that possibility with a black or white delineation – 'You can have this, but you can't have that'?

Our findings support this argument; learning spaces consist of multiple modalities and need to be flexible to accommodate different learning styles and teaching approaches.

When students first realised the lack of AV technology in the room, they reacted with disbelief. These are student generations who communicate through social media; each student has at least one electronic device on them when coming to class. They are used to PowerPoint presentations and being able to show YouTube clips as part of their presentations. In the years 2011 to 2016, postgraduate students in intercultural communication were asked not to use any electronic devices for their presentations. Instead, they were encouraged to role play or find other creative ways to include AV information in their presentation. As a result, the physical use of the room changed. In the traditional classroom with AV technology in the front, it was a common pattern to see a group walk up to use their PowerPoint and present one after the other. Presentations were rather static, and even the change of memory sticks for the next student's presentation interrupted the flow of the group presentation. Activities such as a game would be attached to the end of the presentation. In contrast to that, the soft room invited students to use all of the space and to use their bodies. Very few presentations had students

standing in the perceived front of the room (the longer wall between door and window) and presenting one after the other. Now, most presentations included a variety of activities; the most interesting ones had students use all surfaces and make people change direction and shift on their bean bags, get up and look at elements temporarily attached to a wall, or add opinion stickers to the wall, re-group by bean bag colour or use a gym ball or other props to determine who should take the lead in an activity. Props were created, and often a group would ask students to wait outside so that they could set up. Each presentation created scenarios for participants to live through and react to; each presentation contained an element of experiential learning. In the critical commentary session following a group's presentation, the participants made comments and suggestions about the experience and assessed how it added to their knowledge or how it was a practical application of theoretical elements. Presenters took notes and answered questions, discussed various issues with one another, and expanded on their presentation. Subsequently each presenter uploaded a summary of their part of the presentation to iLearn, followed by an evaluation of whether they achieved their goal and what they would do differently if they were to present again. Throughout the years, this subject took place in the soft room, and the presentation task featured prominently in positive student feedback. The reasons given were:

- working with people from diverse backgrounds;
- having attention from the rest of the group and no distraction (e.g. people looking at slides);
- immediate feedback from all in the room; and
- space to create.

We also note that international students mixed more readily in the bean bag environment than they would in a regular classroom. In a regular classroom with table clusters, students seemed more likely to be seated with students from similar cultural and linguistic backgrounds. The same happened initially in the bean bag room, but this seating arrangement was soon broken up and re-arranged. According to Oliver (2018), the Asset Manager, 'the problem is that a lot of our "conventional" rooms are over-full of furniture, and of course desks and chairs are harder to move than a ball. We are deploying some furniture with castor wheels as a result but not universally'.

There are limitations regarding practicality and physical adjustments. During an interview, a student noted that he preferred to sit on a slightly

Figure 5. Students using mobile devices in the soft room (2016)

higher and firmer cube. Although the bean bags provided seating comfort, there may be an issue with the way students were positioned while using them. One student commented that not sitting close to the level of the white-board resulted in neck pain. A study into the effects of such neck pain by Pierre Côté and colleagues (2008) stated that neck pain may lead to a decline in productivity and absenteeism. Some students resorted to 'stacking the beanbags one on top of the other to sit "a bit more comfortably"'. Asset Manager Oliver noted, however, that for some individuals the bean bags were not ideal: 'It's all very well to assume everyone has the physical mobility to comfortably and enthusiastically use bean bags and gym balls, but the reality was different'.

This was the reason why other types of furniture were added later, such as firm cubes and differently shaped foam furniture. Initial planning of the room took into account that the flooring needed to be 'wheelchair-proof', but there was no consideration for people with other requirements because of temporary impairment. A firm cube for someone with crutches and a plaster cast around their leg was not an ideal solution either.

Outlook and recommendations

> 'I would have no hesitation in doing a soft room again, but I would only "allow" it with much better positioning on campus, in a better building, and preferably connected to a much stronger university learning approach.'
>
> —Craig Oliver

Feedback from students and staff over the years during which the soft room was in use showed that it presented a welcome change to traditional classroom settings. However, it also showed that it was not suitable for all types of learning and teaching approaches and that it had significant shortcomings in design that limited its use from the outset. Our research indicates that the room needs to incorporate positive physical stimuli (Davis 1984), a livelier colour scheme, softer lighting and an upgrade of current furniture to allow for happier room users. There is no reason why there should not be a mixture of seating possibilities, as long as they do not resemble 'normal' chairs and break the theme of a barrier-free environment. The ability to maintain air flow in the room through ventilation and open windows is imperative. In terms of smell, natural vanilla and strawberry scents could be installed to improve the overall experience of the room. Improvement to the room's sound through reverberation-cancelling equipment is suggested as a way to improve the acoustics.

The soft room was not part of the current phase of reconstruction of the university's original buildings that date back to the late 1960s. The soft room was 'a random room in a random building with no visibility when it should have been front and centre and probably part of a larger design theme of local informal space' (Oliver 2018) with no long-term plan attached to it. Craig Oliver, the Faculty Asset Manager, put it best:

> Ultimately, the job of the estate managers is to provide the facilities that the academics need to deliver their teaching experiences, and for the students to gain the best learning opportunities. . . . One of the overarching positive messages I took away from the project was a greater appetite to push the boundaries, primarily in terms of activating student usage of surfaces – so for example we now maximise writing surfaces wherever possible in any room that we do. It also reminded me that half doing a room really means that you can sabotage the outcomes of the space and the project. (Oliver 2018)

The effects of the COVID-19 pandemic on the restructuring of education and on the way we learn and teach are undoubtably far-reaching and lasting. Online spaces and blended learning opportunities will expand and open new doors to education and training for generations to come. The pandemic also exposed the shortcomings of online learning and made educational institutions painfully aware of the fact that technology alone will not nurture future generations. The loss of the 'student body' in schools and university settings has also meant a loss of physical experiential learning opportunities, networking, socialising and bonding amongst students and staff in an almost exclusive online environment. We strongly recommend pursuing the idea of barrier-free spaces in tertiary learning because the learning environment does have a profound effect on well-being and learning outcomes. These spaces need to be flexible in terms of learning approaches, and each approach needs to be shared amongst staff who teach across a unit. Design needs to take learning theories, subject and learner types into account. Learning environments need to be as multi-faceted, flexible and fast-paced as learning has become in the digital age. Spaces with different kinds of physical stimuli, multi-sensory fittings and access to digital resources need to be tested over time for flexibility and multi-purpose usage.

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Appendix: Research instruments

Questionnaire

1. When did you first use the soft space C5A407?

_____

2a. What do you think about the space?

	Excellent	Very good	Okay	Not great	Very bad
First impression					
Bean bag					
Colour scheme					
Lighting					
Flooring					
Balls, other furniture					
Whiteboard walls					
Shoe racks					
L&T atmosphere					

2b. Do you want to comment on any of the above items?

_____

3. In your opinion, how do people behave in the soft room?
Tick the answers you agree with!
In general, people
□ take good care of the room
□ do not care about the room
□ take their shoes off
□ keep the room clean
□ are more communicative
□ are bored in the room
□ treat the room like any other room
□ move around more easily
□ _____

4. In your opinion, how can the room be improved?
□ more bean bags / soft furniture
□ more hard furniture
□ add electronic equipment: _____
□ change lighting (_____)
□ _____

5. This question is about how you rate the appeal of the room in regard to the give senses (1 very strong to 6 very weak)

sense	1	2	3	4	5	6
sight						
sound						
touch						
smell						
taste						

6. How can the appeal of the room in regard to the five senses be improved?
sight:
sound:
touch:
smell:
taste:

7. Do you think there should be more rooms like C5A407on campus?
□ Yes
□ No

8. Would you agree to being interviewed by Matthew about your experience in the soft space?
□ Yes _____ (email)
□ No

9. The following questions are about you:
I am □ staff □ student (year: ___)
Subject I teach/learn in the soft space: _____
Age: □ 18–21 □ 22–25 □ 26–35 □ 36–49 □ 50 +

Interview guide for staff

Semi-structured interview questions for staff

1. How did you first hear about the soft space, C5A407?
2. Why were you interested in using the room for your class?
3. Are you aware of any other special rooms on campus?
4. Please tell me about your experiences with the soft room: what works well for you and your students?
5. Is there anything that does not work well?
6. How could the room be improved to better serve your and your students' needs?
7. If you had designed the room yourself, what would it look like?
8. Is there anything else you would like to tell me about?

Interview guide for students

Semi-structured interview questions for students

1. When did you first get to use the soft space, C5A407?
2. When you first entered the room, how did you feel?
3. Are you aware of any other special rooms on campus?
4. Please tell me about your experiences with the soft room: what works well for you and your classmates?
5. Is there anything that does not work well?
6. How could the room be improved to better serve your needs?
7. If you had designed the room yourself, what would it look like?
8. Is there anything else you would like to tell me about?