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INCLUSIVE DESIGN IN ACTION – A CASE STUDY DESCRIBING THE DESIGN OF SOCIAL AREA SEATING IN A UNIVERSITY (PRACTICE)

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Conference Key Areas: *Equality Diversity and Inclusion, Engineering Education*

Keywords*: Inclusive Design Engineering, Engineering Education, Student Engagement, Social Seating Engineering*

ABSTRACT

This practice paper outlines the inclusive design process used in the redesign of communal/social seating in an Engineering faculty in a University in Ireland. The old seating was not being utilised by the students. Engineering courses often present challenging assignments to students; literature shows that access to information, knowledge exchanges and opportunities for learning through social interaction can be crucial to student success.

Equality, Diversity, and Inclusion (EDI) has grown as an important agenda item across society. Therefore, the methodology used in this redesign was inclusive design. Inclusive design is a design framework that takes into account the diversity of the human race and embraces co-design to ensure no one is excluded. It is "…not

designing one product for all people; instead, it's designing a diversity of ways to participate so that everyone has a sense of belonging"(Holmes 2018).

The design team on this project was composed of a voluntary, diverse group of students and staff. The data collection methods employed was a design walk through of the University, a faculty-wide survey, and a design hackathon.

The inclusive design process resulted in various social seating designs that addressed the needs of a broad range of users, including those with physical disabilities and sensory impairments. The final designs are available for perusal in Appendix 2, that show a more inclusive space for students and staff to interact and collaborate.

The findings of this study highlight the importance of using an inclusive design process when designing academic environments. By involving a diverse group of stakeholders in the design process, the resulting spaces can better cater to the needs of all users. The recommendation is for other higher education institutions to consider implementing inclusive design principles in their design processes to ensure all members of their community are catered for, leading to a more inclusive and accessible academic environment for all.

1. INTRODUCTION

This practice paper describes the inclusive design process that was implemented during the updating of the communal seating areas in Atlantic Technological University (ATU) Sligo's Engineering block. The process has been documented as it showcases inclusive design in action. The Commission for Architecture and the Built Environment (CABE 2023), the advisor to the UK government on architecture, urban design, and public space, describes inclusive design as a design framework that "aims to remove the barriers that create undue effort and separation. It enables everyone to participate equally, confidently, and independently in everyday activities". Research shows that students learn most when they study in informal settings like cafeterias, dormitories, student unions (Hunter and Cox 2014; Matthews, Andrews, and Adams 2011; Bennett 2007; Terenzini, Pascarella, and Blimling 1996).

The original seating in the Engineering block was not utilised by students as a social space. Feedback gathered on the seating through a survey stated that the area was uncomfortable and badly lit, with unsuitable tables and with no charging technology or wheelchair access. Therefore, the purpose of the redesign was to create seating that would consider all the needs of the diverse population of the University. The volunteers on the diverse project design team consisted of lecturers, administrative staff, technicians, and students, including those differently abled and disabled. The team was supported by the university's disabilities experts and facilities staff at every decision point. Using Microsoft's cycle of exclusion framework (Microsoft n.d.) , which is based on the principles of inclusive design, the redesign process ensured that the diverse population's needs were accounted for. As described by Treviranus (2018), founder of the Inclusive Design research centre (IRDC) in Canada, the challenge of implementing successful inclusive design within products and environments is to maintain a unified aesthetic while adding affordances for difference.

Section 2 of the paper describes the principles of inclusive design and Microsoft's cycle of exclusion. Section 3 summarises the literature review findings on the

importance of communal or social seating in an educational environment. Section 4 outlines the methodology used in the redesign process, including details on the design hackathon, and supporting surveys. The results from the data gathered is outlined in section 5. Section 5 also gives the final designs for the seating areas.

It is hoped that this research can inform others on inclusive design and how it can be implemented though use of a diverse team and a co-design process.

2. INCLUSIVE DESIGN

The over-arching methodology employed by the social seating project was that of Inclusive design. Inclusive design grew out of the Universal Design movement, and places emphasis on inclusion and adaptation of education systems to individual differences (Gordon and O'Leary 2015). Inclusive design is “a methodology that enables and draws on the full range of human diversity. Most importantly, this means including and learning from people with a range of perspectives”(Microsoft n.d.). In this design methodology, diversity embraces all human differences, including ability, language, culture, gender, and age. This definition by Kat Holmes, while she worked at Microsoft, is expanded upon in her book titled ‘Mismatch’. In that, she describes inclusive design as not designing one product for all people; instead, it’s designing a diversity of ways to participate so that everyone has a sense of belonging (Holmes 2018). For the seating project, this meant that the design team were not trying to have one seat design intended to serve as many needs as possible. Instead, the team created multiple designs – each optimised for the identified needs of a subset of the university’s population. In keeping with the advice of the Canadian IRDC, all designs maintained a unified aesthetic (Treviranus 2018).

This project used the guiding framework for inclusive design, developed by the Inclusive Design Research Centre (IRDC) in Canada (Treviranus 2018). The three dimensions of the framework are:

1. Recognise, respect, and design with human uniqueness and variability.

2. Use inclusive, open and transparent processes, and co-design with people who have a diversity of perspectives, including people who can’t use or have difficulty using the current designs.

3. Realise that you are designing in a complex adaptive system.

Society has embraced a version of a ‘normal’ human being, one based on averages of data gathered on a tiny subset of humanity (Quetelet 1969), to allow for a single engineered solution to designing environments, products and services. Inclusive design eradicates this notion of a typical, average or so called ‘traditional’ student (Kelly 2017). This is why the three dimensions of the IRDC framework are not a set of static structures that explain how to engineer an inclusive solution, simply because current society does not allow for such a process without excluding portions of society. Inclusive design takes an alternate approach in that one designs for diversity, for the ‘vital few’ 20% on the outer regions of the normal distribution curve (Harvey and Sotardi 2018) as illustrated in Figure 1.

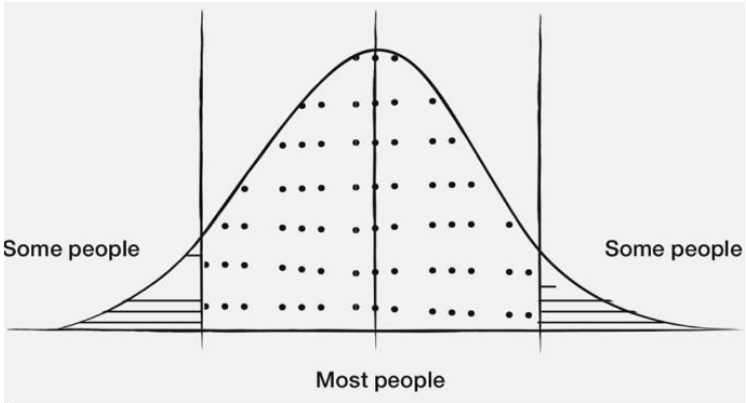


Figure 1. A normal distribution curve of the similarity between people(Harvey and Sotardi 2018)

Inclusive design is not achieved with separate designs; instead, it is achieved through the process of understanding the needs of our diverse world and incorporating them into the design brief. Ironically, by not solely designing for the middle segment, (the 80%), the product ends up being as easy to sell to that population as design for the 'normal' human being, while also reaching other audience segments, 'the vital' few 20% (Holmes 2018).

Microsoft built upon the 3 principles of inclusive design by considering who was being excluded with any given design. As Holmes (2018) stated, exclusion is only truly understood when it is lived. For this reason, the feedback gathered on the old seating in the Engineering block was of vital importance and was used to inform the first iteration of the new designs. The cycle of exclusion is illustrated in Figure 2 below.

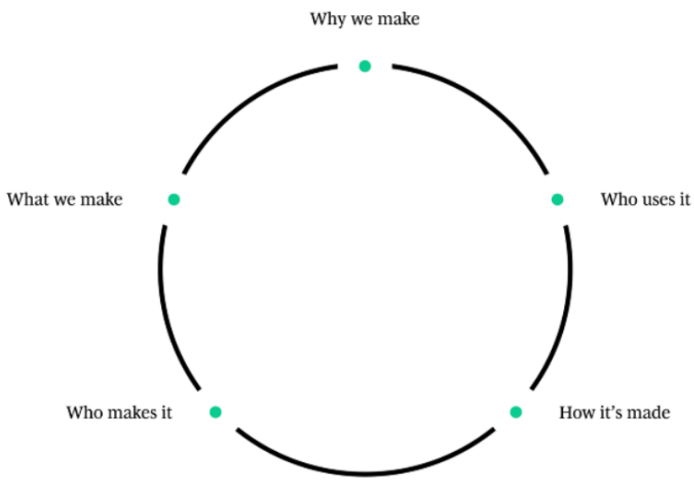


Figure 2. Microsoft's cycle of Exclusion(Microsoft n.d.)

Cultural context and pre-existing designs can perpetuate the cycle of exclusion. The designer holds the power to determine who is and is not able to participate in the new environment/product/service being designed (Holmes 2018). This knowledge was the rationale behind the diverse design team of both students and staff involved in this redesign project, as a diverse team offers the necessary voices on needs requirements, thereby ensuring less exclusion.

3. COMMUNAL/SOCIAL SEATING IN EDUCATION

Equality, Diversity, and Inclusion (EDI) has grown as an important agenda item across the Third level education sector. Research has suggested that the design of our learning spaces should become a physical representation of the institution's vision and strategy for learning – responsive, inclusive, and supportive of attainment by all (JISC 2006).

Aligning with the normal distribution representation given in Figure 1 above, the design team concluded that ‘Most people’ in ATU Sligo are able-bodied, neurotypical students and staff. In addition, 'Some People’ are neurodiverse, and “Some People’ are differently abled and disabled. The strength of inclusive design is that by focusing on the needs of the population on the outer sections, the inner ‘Most people’ are then naturally incorporated into the design.

Therefore, understanding the needs of both neurodiverse, differently abled and disabled was crucial for avoiding exclusion and creating enhanced learning and working environments for all. The following section draws on current literature that details the essential aspects of learning spaces, including the physical environment.

3. 1 Learning Spaces

To ensure that students and staff succeed in an academic environment, they must be provided with the necessary tools. This should include shared areas around the campus where they can meet to work or relax. Learning can be enhanced by making social seating spaces available that are attractive to just spend time in (Strange and Banning 2001) exploring new relationships and strengthening existing ones. In addition social seating can encourage learning through dialogue, problem-solving, information sharing and even studying alone in a supportive atmosphere (JISC 2006).

Collaboration, group work, project work and lecturer feedback are all important parts of an Engineering Faculty and can contribute to developing a sense of community among students (Amarathunge and Madhuwanthi 2020). Studies have shown this persistent sense of community results in higher academic performance with self-empowerment (Kuh 2001). In addition, learning results from interactions, whether they be with aspects of the environment, information, other people, or through some combination of these (AJ. 2007). Social seating areas help to increase this interaction, collaboration, and social engagement among students through multiple processes (Jamieson et al. 2000).

Seating areas and other public areas around campus also often provide social capital, where social capital is defined as the information, resources and opportunities derived from social interactions (Lin 2002). Importantly, studies have shown that the difficulties associated with Engineering courses foster a need for students to access social capital (Seymour, Hunter, and Harper 2019). Because well-designed communal seating enables collaboration, personalisation, flexibility, and inclusion (JISC 2006), it can provide students with access and the ability to obtain this social capital, to overcome some of the difficulties they may face and enhance their overall education experience.

3.2 Physical Environment Considerations for Inclusion

ATU Sligo became the first autism-friendly Technological University in December 2022. The work of Dr Magda Mostafa, developer of the Autism Friendly University Design Guide in 2021, has been used to inform ATU (Mostafa 2021). The Autism Friendly University Design Guide has a focus on the built environment, supports, strategies and guidelines to achieve an autism friendly university. “Research has shown that the architectural environment can play a conducive role in the facilitation of inclusion and support of access for autistic individuals, particularly in learning environments”(Mostafa 2008, 2021). Sensory barriers that were identified in The Autism Friendly University Design guide (Mostafa 2021)were as follows:

- Acoustics
- Color
- Texture and Materiality
- Lighting
- Smell

Several barriers to those with autism were also identified In *Living with Autism as a University Student at Dublin City University: Developing an Autism Friendly University report (Sweeney et al. 2019)*. The barriers most relevant to the social seating project were:

- Having heightened sensory awareness of noise, bustling environments, smells, and lighting
- Bright colours like red on walls and fluorescent lighting
- Hard seating surface
- Dimly lit spaces
- High noise levels in eating areas such as canteens

To ensure inclusion for those disabled, measurements around the seating areas of interest were taken. A wheelchair user took the design team on a tour of the Engineering faculty and explained the access issues that needed to be avoided. Examples included desk heights, closed-in spaces/booth type designs, platform for seating and power access in hard-to-reach areas.

4. METHODOLOGY

The methodology used for the seating project was qualitative. The first data collection method used was a design walk through with the diverse design team. Measurements were taken of the seating areas, and access issues were discussed. Second, a survey of all Engineering students and staff in the Engineering faculty was taken. Following this, a lecture was given to all members on inclusive design, and then finally, a design hackathon was used to get input into the end designs of the seating.

A qualitative study was chosen as it was the lived experiences, the observations from the hackathon and the survey that could make the most contribution to the new designs. The following sections briefly discusses the survey and the Hackathon.

4.1 Hackathon

Hackathons are short-term and intense events where diverse groups gather to solve a defined problem (Heller et al. 2023). Design Thinking was the strategic and practical approach taken to the design hackathon for the social seating. Design thinking emerged from the design philosophy and practice at Stanford in the Hasso Platter Institute of Design, known as the d.school. Design thinking is a humanistic approach to design which facilitates creativity and innovation. It translates problems and needs into design with people at the centre. It provides a framework which gives people the confidence to collaborate to solve problems (Auernhammer and Roth 2021).There are five phases: Empathise, Define, Ideate, Prototype and Test. Design thinking has a shared history with "Wicked problems", a term coined by Horst Rittel to describe complex problems whose solutions are not right or wrong.
The hackathon itself consisted of 8 people, separated into two teams of four. Each team was asked to complete 3 tasks that would get them to think about inclusive design and solving design issues.The tasks were:

1. Design an ideal seating area for your Team members (increased communication and understanding others needs)
2. 'Finding the Essence' - this involved teams listing goals and insights for the social seating
3. Design the Engineering seating areas that meeting their teams needs.

The outputs from the Hackathon are given in Appendix 2.

4.2 Survey

A survey of the wider Engineering faculty was taken so that input from all Engineering students and staff was considered as part of the design. The survey, consisting of 5 open ended questions and 3 closed ended questions, was distributed using Microsoft Forms to 1,577 suitable respondents. The areas of question were: are people currently using the Engineering section for seating; if so, then what are they using it for, what was missing, what they would like to see and how important the seating area was for certain functions in their learning and professional life. A copy of the survey is available in Appendix 1. NVivo was then used to analyse the results. The open-ended questions in the survey were first grouped to answer the topics that the results section will focus on.
One team member coded the categories from the survey questions using open coding (Corbin and Strauss 1990). A list of subcategories was created that emerged from the data. Using open coding, each term was allocated to a particular subcategory and then compared for similarities or differences. For example, coding the question that referred to preferred seating resulted in known social seating area answers such as 'Student Union' or 'D Block' added to the Subcategory called 'Social Seating'. The subcategories were viewed by other team members and after some further iterations and catergorisation the results were determined. The resulting codebook can be viewed in Appendix 3.

5. RESULTS

5.1 Participant Information

There were 43 responses to the survey. There was an equal response from people who used and who did not use the seating area in Engineering. All participants had several suggestions on what improvements could be made to make the area more inviting and usable. The observations from the survey are discussed in section 5.2.

There were 8 participants in the Design Hackathon who volunteered from a request sent to the Engineering Faculty. A summary of these participants is given in Table 1. The observations from the hackathon are discussed in section 5.3.

Participant	Area of Study	HA Team
HA Student 1	Computing year 1	Team 1
HA Student 2	Computing year 2	Team 1
HA Staff 1	Lecturer - Mechanical	Team 1
HA Staff 5	Estates	Team 1
HA Student 3	Civil Engineering year 3	Team 2
HA Staff 2	Lecturer - Computing	Team 2
HA Staff 3	Administrative	Team 2
HA Staff 4	Technician – Engineering Technology	Team 2

Table 1: Hackathon participant information

5.2 Survey results

This section is structured into the main topics the survey focused on:

1. Usage of the Engineering Section
2. Other University Seating Area preferences
3. Suggestions for improving seating area in Engineering

5.2.1 Usage of Engineering Section

Survey Participants were almost evenly split between those who used the seating area and those you did not.

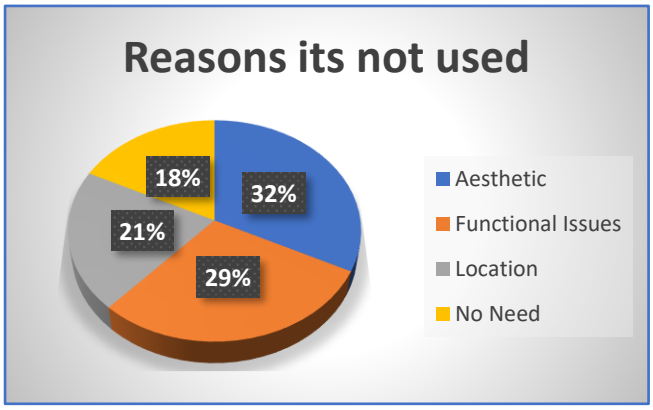


Figure 3: Reasons the seating in Engineering is not used

The majority did not use the seating because of aesthetic and functional reasons citing uncomfortable and uninviting seating, bad lighting, lack of charge points or tables as well as issues with heat, cold and draughts.

Concerns were also raised about the location of the seating being too far from food facilities and in busy areas. Interestingly, a minority of

participants indicated that they had no need for social seating as they went home when classes were over.

5.2.2 Other University seating area preferences

When asked about their preferences for communal seating throughout the university, most participants preferred private and quieter areas in the college or the busier canteen and social areas suitable for meeting people.

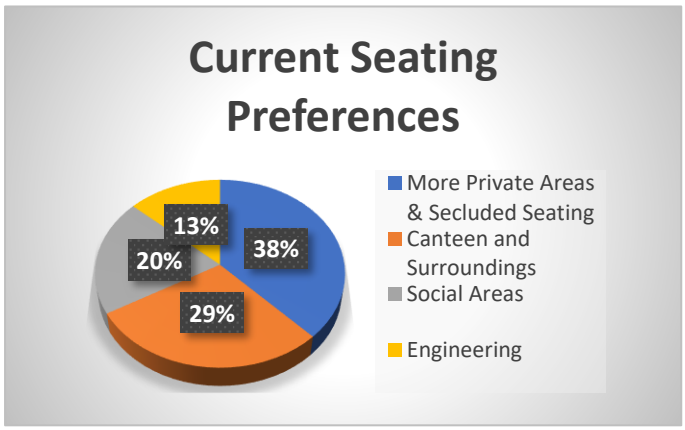


Figure 4: Preferred Seating areas in university

Interestingly, while 23 respondents said they used the seating in the Engineering area only 6 participants mentioned it as a preference. All 6 participants listed the 2nd floor as their preferred location in the Engineering area.

When asked about their requirements for communal seating, most respondents (52%) liked communal seating areas because it provided them with a space to do group and individual project work. Some preferred spaces that were quiet, whiles others liked meeting new people. Participants also mentioned comfortable seats with partitions that blocked sound and reduced anxiety as a requirement for a preferred seating area. One respondent described how different areas on the college are preferred for different reasons.

"The area outside the library provides private spaces but lacks access to monitors and power sockets. The social learning area beside the coffee dock in the D block provides access to power sockets and monitors but lacks privacy."

Respondents also preferred certain areas due to their location and what it allowed them to do, such as proximity to labs, central to the campus, to use laptop and tables for food or books. Surprisingly, only 2 of the participants that preferred the canteen mentioned the closeness to food/coffee as the reason. To a lesser extent, participants stated that areas should be well lit, warm and colourful.

5.2.3 Suggestions for improving seating in Engineering

When asked for change or input on the current seating area, the majority of participants want a change to the seats themselves (62%), and the addition of heat, power and light to the areas (29%). With regards to the seats, feedback on requirements from the participants was as follows:

"More comfortable seating - the wooden bench type design currently is hard to sit on for over 10 mins, the walls are painful after a period also as you lose heat directly from your back if you lean back".

"At the moment you slide off the bench and if you're using a computer, you're having to learn forward over the table in order to be comfortable at all using it an elevated table and some separate seating I think would improve the area."

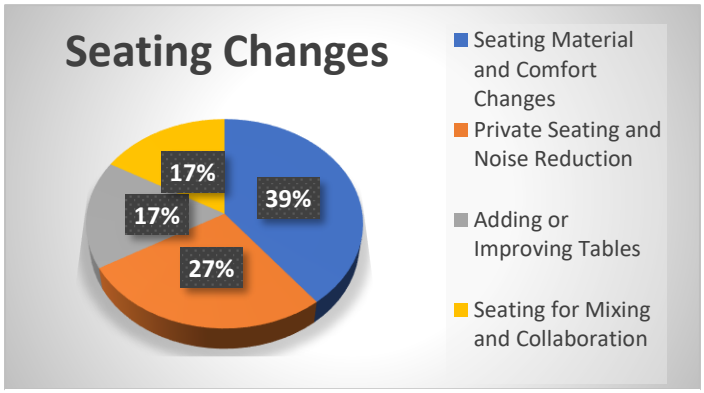


Figure 5:Recommended Seating Changes

With regards to the seating(Figure 5), participants requested an improvement to its comfort with softer, padded seating material and the addition of back support.

Following this, participants requested making seating more private, reduce noise or creating a division between traffic. This contrasts with the participants that state meeting people and casual discussions are more important for seating areas (**Error! Reference source not found.**).

A student that disclosed their autism described how private secluded seating reduced their anxiety, and other respondents mentioned they liked privacy for studying, calls and to reduced distractions.

Respondents also suggested improving the social aspects of the seating, changing the seating type to catalyse collaboration, meeting people, discussion, and project work.

"I use the canteen but would like an area within Engineering where you could meet others within the department."

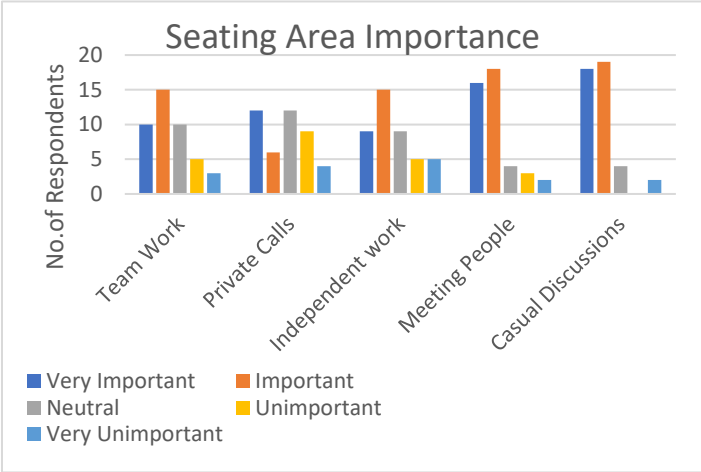


Figure 6: Importance of seating area functions

The respondents also indicated the importance of tables at seating areas with references to the lack of tables or incorrect table height. There were also suggestions to elevate tables, add tables for laptop and books, add tables to support wheelchair users and add more tables.

"Tables located at some chairs at the correct level for coffee, eating, laptop and wheelchair users."

"An area to use laptops would be ideal since we have plenty of projects that need software, so we need an area to do it outside of the lecture rooms".

There were also frequent recommendations to add heat (13%), power (35%), and light (52%).

5.3 Hackathon results

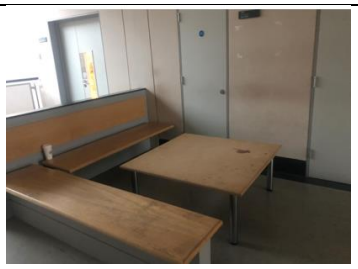
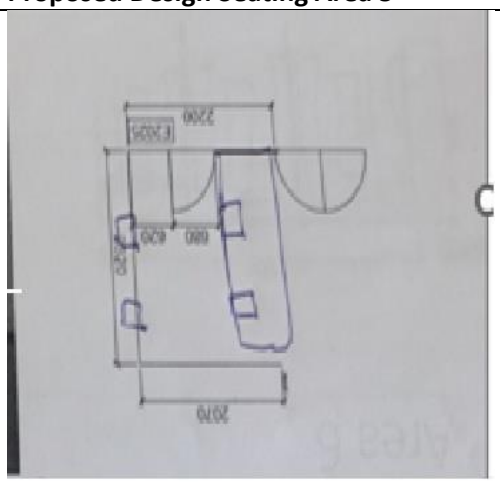
The hackathon provided a place for the participants to express their voice on what was important to them so that their communal seating needs could be understood. Team 1's needs included "Wheelchair Accessible", "Acoustics – quiet area, not echoey", "Comfortable seats" while Team 2 prioritised "Comfort - less Wooden Benches", "Tables at correct height" and "Brighter Colours".

Following this, the teams were asked for their inputs on why the old seating areas were not used and their goals for the new areas (Table 2).

Team	Goals	Insights
Team 1	Student wise: Respite and a workspace for projects	Currently very dark. It seems like a transition place that students leave to go elsewhere.
Team 2	Staff wise: Place became alive/ more use by students and a place to give student feedback.	Students don't feel like they belong there.

Table 2: Hackathon goals and insights for seating area

The overall output from the hackathon event were several Images and descriptions (Appendix 2) on suggested designs for the various social seating areas in the Engineering block. An example of the proposed seating for two of the areas are given in **Error! Reference source not found.**. The full set of designs that the teams illustrated or suggested are in Appendix 2 and was one of the main contributories to the final design proposal.

Team	Current Area 5	Proposed Design Seating Area 5
Team 1		

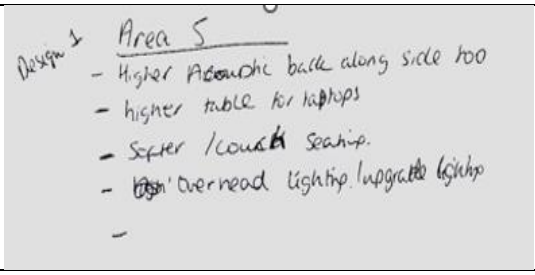
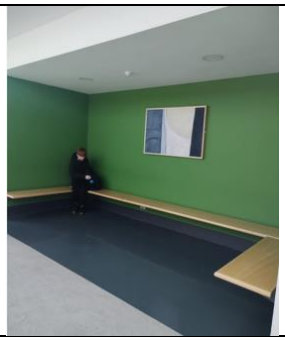
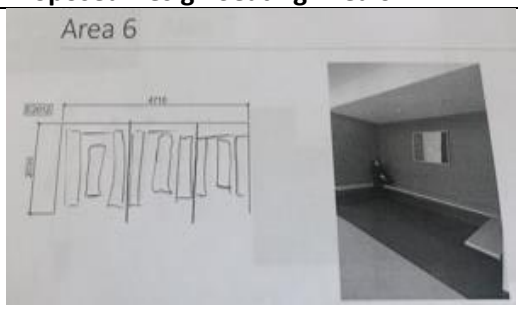
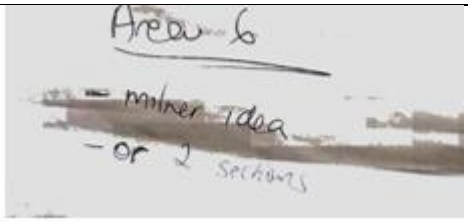
Team 2		
	Current Area 6	**Proposed Design Seating Area 6**
Team 1		
Team 2		

Table 3:Suggest Design for two Seating areas

5.4 Overall Results Conclusion

The literature review, design walk through, the survey and the hackathon results highlighted several areas that should be included in the design proposals. By implementing the inclusive design framework, and being aware of the cycle of exclusion, the needs of all the Engineering faculty were considered.

Underpinned by the findings in the Autism Friendly University Design guide and informed by the disability office and the lecture on inclusive design, both the survey and the hackathon were used to complete the final seating designs.

The Engineering Faculty seating is distributed over three floors. The design of the seating would be an iterative process, designing one floor at a time and using the feedback to further improve designs of other areas. This is to ensure we meet the 3rd principle of inclusive design that recognises any design is part of a complex adaptive system. Therefore 5 areas in total were designed in this iteration, with each of the areas being on the second floor of the Engineering building as the 2nd floor was the one most referenced in preferred seating areas in the survey.

Using the same two examples given in the hackathon results (Namely areas 5 and 6), the final design was as follows:

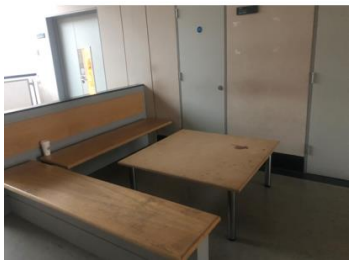
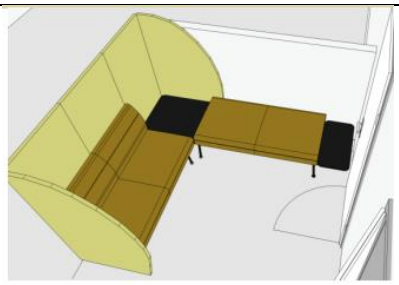
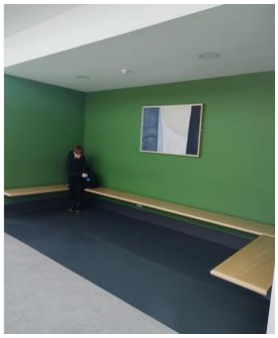
Area	Proposal
Area 5  	 **Proposal Description:** L-Shape sofa comprising 2 seats and 2 cushions, 1 large table elements and 1 small adjustable table element. SIZE : 2305 x 2010. Surround screens. 1310 mm High. 3 rectangular and 2 curved end. Selected fabric Charge outlets in tables: 2 USB charger (5V/DC 2,1A) with BS Plug
Area 6 	 4-person booth with screens. Cabin with visual and acoustic protection for a maximum of 4 users. Table with painted base and melamine top. Black painted legs Charge outlets in tables: 2 USB charger (5V/DC 2,1A) with BS Plug Acoustic wall panel 2000 x 1100. Eclipse COSY Light. 8W LED. Desk through fix 68cm High with white shade

Table 4: Design Proposals for Areas 5 and 6

Area 5 above is open to the main corridor, so the side screen is for a little privacy and some noise reduction. This space is suitable for group work, social gatherings, student/staff feedback etc. This space is wheelchair accessible and in close proximity to a lift. The table for this area is adjustable and has the power points placed on it for ease of access.

Area 6 targets those that prefer privacy. It is designed to help reduce anxiety with extra lighting and power. Seating is much softer, as hard seats are listed as a barrier to autistic people. This private area could also provide respite to other differently abled members of the faculty (Santiago 2020).

The final design for all 5 areas is given in Appendix 2.

6. SUMMARY

This study utilised an inclusive design approach that involved a hackathon and a survey to develop a proposal for the renovation of social seating areas in the Engineering Faculty of a University. The goal of this approach was to create a more inclusive and welcoming environment that caters for the needs and preferences of diverse users. The project was guided by the inclusive design framework, which indicates that in providing for the ‘vital few’, you provide for the needs of all.

The proposal addressed several issues identified in the existing social seating areas, such as limited seating options, uncomfortable and hard seating, inadequate lighting and charging capabilities. By incorporating inclusive design principles, such as recognising variability and co-designing into the design of the new social seating areas, a more user-friendly and accessible space was created.

The proposed design includes a variety of seating options, comfortable textures, adjustable lighting and charging capabilities, as well as features to reduce noise such as acoustic panels and tables and seating that can include wheelchair users. These features make the social seating areas more welcoming and accessible for users with different abilities and preferences. It should be noted that it was not one design that was placed in each of the 5 areas. Instead, each area was optimised for a particular cohort of students and staff, while ensuring that all areas have a similar look and feel.

This study demonstrates the importance of adopting an inclusive design approach that considers the needs and perspectives of diverse users in the design of social spaces. The proposed design can inspire other universities and institutions seeking to create more inclusive and user-friendly environments.

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APPENDIX 1: SURVEY QUESTIONS

1.Do you currently use the seating in the Engineering Block?

2. Why do you not use the seating in the Engineering Block?

(Only for people who answered 1 above)

3. If there was anything you would change about the current seating area, what would it be?

4. Can you please rate the current Engineering seating areas on each of the following:
(This refers to the leisure seating area in the corridors)

	Excellent	Good	Average	Not Good	Poor
Lighting	○	○	○	○	○
Comfort	○	○	○	○	○
Usable	○	○	○	○	○
Privacy	○	○	○	○	○

5. Have you any further input you would like to make on the seating Area in Engineering?

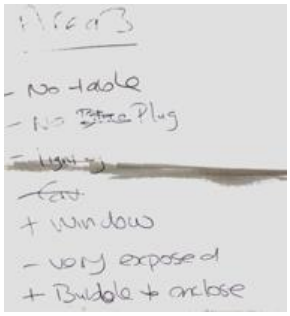
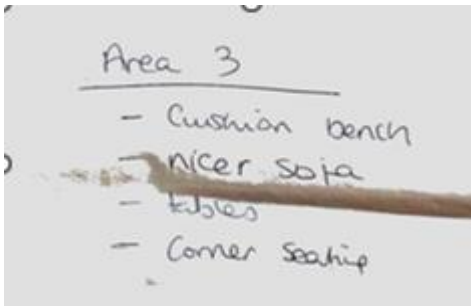
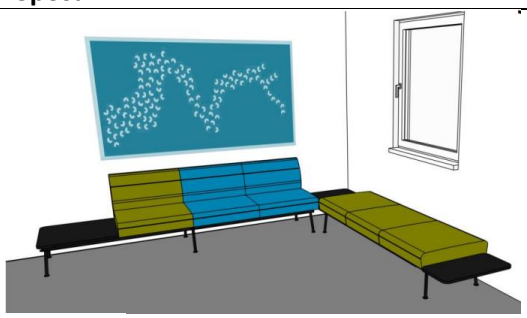
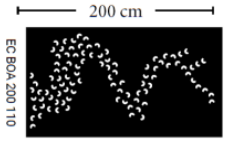
6. Where is your current preferred seating area in the college?

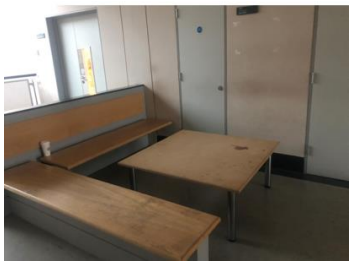
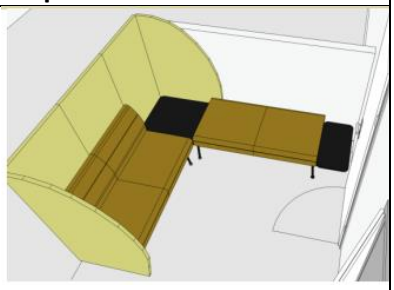
7. Why do you like that area?

8. Can you please rate how important a public seating area is to you for the following functions:

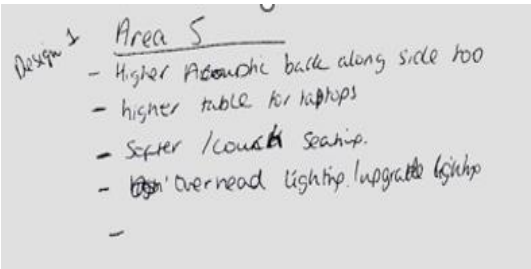
	Very Important	Important	Neutral	UnImportant	Very Unimportant
Team Work	○	○	○	○	○
Private Calls	○	○	○	○	○
Independent Work	○	○	○	○	○
Meeting People	○	○	○	○	○
Casual Discussions	○	○	○	○	○

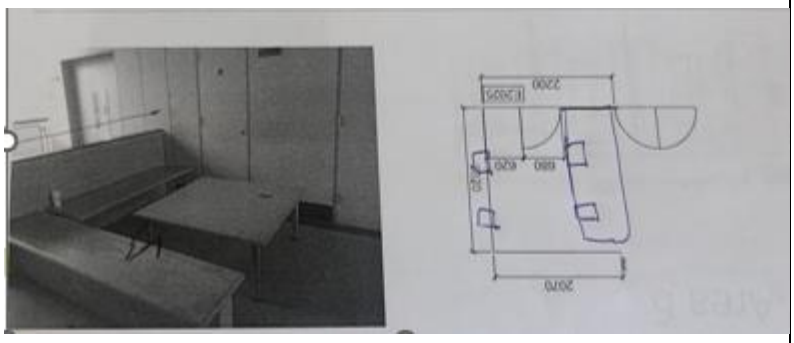
APPENDIX 2: DESIGN PROPOSAL FOR SEATING AREAS WITH HACKATHON IDEAS

Area	Proposal
Area 3 **Hackathon Ideas:**   	  **Proposal description:** L-Shape sofa comprising 3 seats and 3 cushions, 2 large table elements and one small adjustable table element. SIZE :3250 x 2925mm. Charge outlets in tables: 2 USB charger (5V/DC 2,1A) with BS Plug Acoustic wall panel 2000 x 1100. Eclipse COSY Light. 8W LED. Desk through fix 68cm High with white shade

Area	Proposal
Area 5 	

Hackathon Ideas:

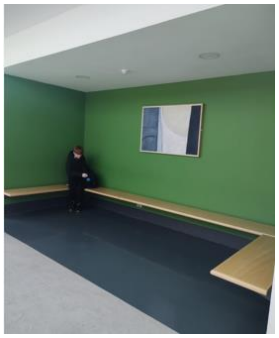
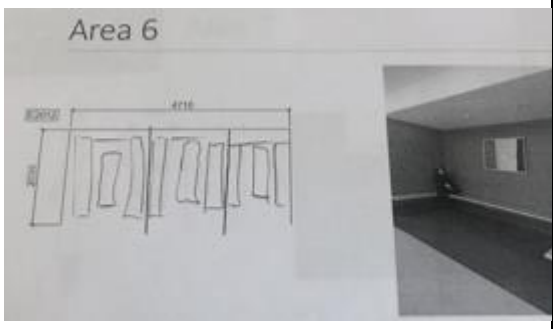
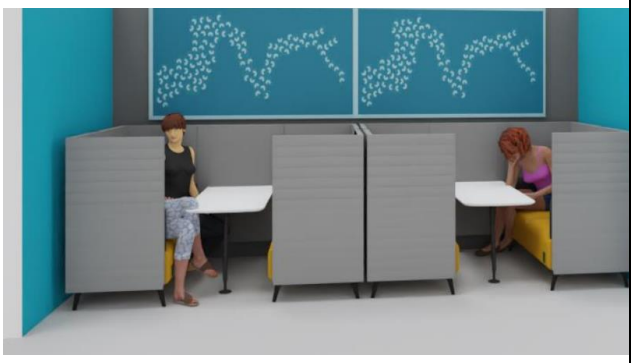


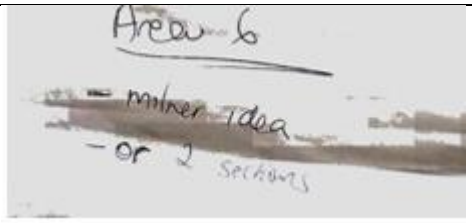


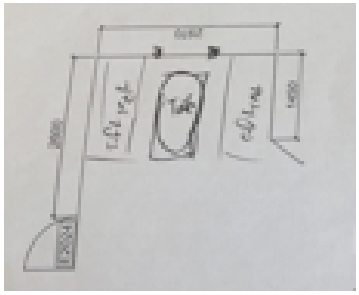
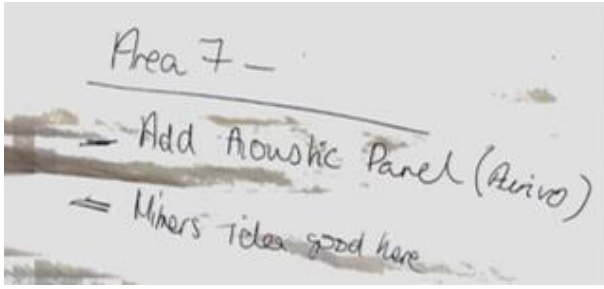
Proposal Description:
L-Shape sofa comprising 2 seats and 2 cushions, 1 large table elements and 1 small adjustable table element. SIZE : 2305 x 2010.

Surround screens. 1310 mm High. 3 rectangular and 2 curved end. Selected fabric

Charge outlets in tables: 2 USB charger (5V/DC 2,1A) with BS Plug

Area	Proposal
Area 6  **Hackathon Sketches:**  	 4 person booth with screens. Cabin with visual and acoustic protection for a maximum of 4 users. Table with painted base and melamine top. Black painted legs Charge outlets in tables: 2 USB charger (5V/DC 2,1A) with BS Plug Acoustic wall panel 2000 x 1100. Ecilpse COSY Light. 8W LED. Desk through fix 68cm High with white shade

Area	Proposed Design
Area 7 **Hackathon Ideas:**  	 **Design Description:** L-Shape sofa comprising 2 seats and 3 cushions, 1 lrge table elements and 1 small table element. SIZE :2925 x 1980 Surround screens. 1310 mm High. 2 rectangular and 1 curved end. Selected fabric Nemo round coffee table 800mm D Charge outlets in tables: 2 USB charger (5V/DC 2,1A) with BS Plug COSY Light. 8W LED. Desk through fix 68cm High with white shade

APPENDIX 3: SEATING AREA NVIVO CODE BOOK

Nodes

Name	Files	References
Current Preferred Seating Area (RQ5)	1	45
Canteen and Surroundings(Theme)	1	13
Canteen	1	10
Canteen - no other option	1	2
Outside Canteen	1	1
Engineering (Theme)	1	6
Engineering 2nd Floor	1	5
New Pod in Engineering	1	1
More Private Areas and Secluded Seating(Theme)	1	17
Computer Labs	1	1
Free Lecture Room	1	2
Library	1	4
Office	1	1
Outside Library	1	7
Reception	1	2
Social Areas (Theme)	1	9
B-Block	1	2
Couch	1	1
D Block	1	5
Student Union	1	1
Don't user (RQ2)	1	34

Name	Files	References
Aesthetic (Theme)	1	11
Uncomfortable	1	7
UnInviting	1	4
Functional (Theme)	1	10
Bad Light	1	6
Cold	1	2
No Charging	1	1
Unsuitable Tables	1	1
Have no need for it (Theme)	1	6
Don't need	1	6
Location (Theme)	1	7
Limited Food Access	1	2
Out of the way	1	2
Too Busy	1	3
Liked Seating (RQ3)	1	67
Aesthetic (Theme)	1	8
Bright	1	4
Calm	1	1
Colourful	1	2
Feels Nice	1	1
Functional Reasons(Theme)	1	16
Access to Lectures	1	1
Access to Studio Classes	1	1
Central	1	1

Name	Files	References
Coffee Nearby	1	1
Food is nearby	1	1
Functional Tables	1	1
Meeting People is Easy	1	2
No other options	1	2
Only Option	1	1
Only sit at Meals	1	1
Space for Laptop Use	1	1
Table	1	1
Table for Laptop	1	2
Heat, power and light(Theme)	1	8
Full of Light	1	1
Good lighting	1	3
Light	1	1
Warm	1	1
Well Lit	1	2
Seating Area Types(Theme)	1	34
Blocked Sound	1	1
Chat and Work	1	1
Comfortable	1	6
Mixed Needs	1	1
No Distractions	1	2
no other people	1	1
Partitions for Privacy	1	1

Name	Files	References
Plenty of seating	1	2
Privacy	1	3
Quiet	1	3
Reduces Anxiety	1	1
Relaxing	1	2
Seat Comfy	1	2
Secluded	1	1
Seperate Seating	1	1
Social Aspect	1	2
Socialable	1	1
Spacious	1	3
Unlike the E-Block	1	1
Recommended Changes Overall	1	106
Aesthetic Changes	1	7
Add Plants	1	1
Colour and Attractiveness	1	6
Add Colour	1	1
Attractive and Inspiring	1	1
Brighter Colours	1	1
Improve Colours	1	2
Some Colour	1	1
Food and Drink Supports(Theme)	1	2
Coffee Facilities	1	1

Name	Files	References
Water Taps	1	1
Heat,Power and Light	1	31
Add Lighting	1	16
Improve Light	1	12
Improve Lighting	1	2
Lighting after 5pm	1	1
Add or Improve Heat	1	4
Improve Heat	1	2
Improve Heat (2)	1	2
Charging and Power Additions	1	11
Charge Points	1	7
Charging	1	1
Monitors for Group work	1	1
Phone Charging	1	1
Sockets_Charge Points	1	1
Seating Changes	1	66
Adding Tables or Table Additions	1	11
Add tables for Books and Laptops	1	1
Elevate Tables	1	1
Higher Tables	1	1

Name	Files	References
Improved Table height for WheelChair	1	1
More Tables	1	1
Seating with Tables	1	1
Support Laptop	1	1
Usable Tables	1	4
Private Seating and Noise Reduction	1	18
Division between traffic	1	1
Individual Seating	1	2
Make Less Busy	1	1
Privacy	1	4
Private Pods	1	2
Reduce Noise	1	4
Seating for private conversations	1	1
Secluded Seats	1	1
Semi Enclosed Seating	1	1
Study Areas	1	1
Seating for Mixing and Collaboration	1	11
Collaborative Seating	1	3

Name	Files	References
Improve for meeting others	1	2
Mixed Seating Types (Social and Private)	1	1
More Seats	1	1
Open plan Seating	1	1
Replicate Business Area	1	2
Seating for Meeting	1	1
Seating Material_Comfort Changes	1	26
Avoid Goldfish Booths	1	1
Improve Seating Material	1	1
More Comfort	1	11
Seats for Comfort	1	9
Seats with Back Support	1	2
Soft Seating	1	2