Student Wants, Needs, Preferences, and Engagement with Learning in Social Informal Learning Spaces on Higher Education Institution Campuses

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Abstract

This PhD thesis uses mixed methods research methodologies to examine the wants, needs, and preferences of students with regards to Social Informal Learning Spaces, and the ways in which students engage with learning whilst studying within Social Informal Learning Spaces on UK Higher Education Institution campuses.

The researcher combines observations with questionnaires and interviews to collect quantitative and qualitative data from students to build up a holistic picture of their use of Social Informal Learning Spaces to find out who uses Social Informal Learning Spaces, what student wants, needs and preferences are when choosing Social Informal Learning Spaces

The study also examines why students choose to study in Social Informal Learning Spaces, where on campus they choose to study, where Social Informal Learning Spaces should be located, when students choose to study in Social Informal Learning Spaces, and how students engage with learning whilst studying within Social Informal Learning Spaces.

This research suggests that students seek out conveniently located, comfortable, and naturally lit Social Informal Learning Spaces on campus where they can study before, between, or after formal learning sessions, where they are free to consume their own food and drink, and which provide access to multiple power outlets and wi-fi.

Students prefer Social Informal Learning Spaces where they are relatively free from rules and supervision, utilising internet connected personal devices to engage with learning platforms and online resources either on their own, or with one or two friends, surrounded by like-minded individuals engaged in similar tasks, and where they are free to both study and engage in interactions with other students when they feel they wish to do so.

The research proposes a hierarchy of students wants, needs and preferences with regards to Social Informal Learning Spaces, which will be useful to future researchers and Social Informal Learning Space designers.

Keywords & Search Terms

Social Informal Learning Spaces, SILS, Social Learning Spaces, SLS, Informal Learning Spaces, ILS, Learning Spaces, Informal Learning, Technology Enhanced Learning, Pedagogy Space Technology Framework, PST Framework.

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List of Key Terms

- **Social Informal Learning Spaces (SILS)** - Shared physical spaces which facilitate group or solo social learning in safe and comfortable environments, becoming a third place, neither home nor classroom, in which students can study in a relaxed and informal atmosphere, surrounded by other students engaged in similar tasks (McDonald, 2019).
- **Formal Learning Spaces (FLS)** - Shared physical spaces such as lecture theatres, classrooms, or seminar rooms, where students engage in teacher-led learning activities (McDonald, 2019).
- **Formal Learning** - Teacher-led learning, typically provided by an education or training institution which is intentional, structured and leads to certification, which usually takes place within FLS e.g. lectures or seminars (OECD, 2020).
- **Informal Learning** - Student-led unstructured intentional or non-intentional learning, which does not directly lead to institutional certification, which results from daily life activities e.g. solo or group social learning activities within SILS (OECD, 2020).
- **Social Learning** - Community of Practice (CoP) Theory defines social learning is that which occurs when people with a common interest or passion interact on a regular basis (Lave & Wenger,1991).
- **Solo Social Learning** - some students feel inspired to learn by being surrounded by others also engaged in similar tasks and whilst their interactions with those around them is limited, they are considered to be engaged in solo social learning (Laurier, 2008; Hunter & Cox, 2014).

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Author's Declaration

This thesis is my own work, and has not been submitted in substantially the same form for the award of a higher degree elsewhere. Any sections of this thesis which have been published, or submitted elsewhere, have been clearly identified.

Signature

Damian McDonald

Date: 22/7/23

Chapter 1: Introduction

1.1 Chapter Overview

This introductory chapter explains the background of this study, the context of the study, and explains the central ideas and concepts surrounding Social Informal Learning Spaces, and examines why Social Informal Learning Spaces have become a vital element of Higher Education Institution campus infrastructure, and what can be done to ensure that when such spaces are created, they are fit for purpose, and provide students with everything that they need to enable them to work in an environment and atmosphere which is conducive to study.

Included in this chapter is an overview of Social Informal Learning Spaces, which includes information defining what Social Informal Learning Spaces are (1.2.1), why Social Informal Learning Spaces are important in the context of Higher Education Institutional campuses (1.2.2), the differences between formal learning and informal learning (1.2.3), how students engage with learning in Social Informal Learning Spaces (1.2.4), and outlines the essential attributes of Social Informal Learning Spaces (1.2.5).

Also included in this chapter are the context of this research (1.3), the research problem (1.4), research aims (1.5) and research questions (1.6), along with the research paradigm, ontology, and epistemology (1.7), the research significance (1.8), theoretical frameworks (1.9), ethics (1.10), an explanation of the thesis structure (1.11), and the contributions the study makes to scholarship, practice, and policy (1.12), followed by a chapter summary (1.13).

1.2 Social Informal Learning Spaces

This section of the chapter defines what Social Informal Learning Spaces are, and why they are important in the context of Higher Education Institution Campuses**.**

1.2.1 What are Social Informal Learning Spaces?

Social Informal Learning Spaces can be defined as shared spaces which facilitate group or solo social learning in safe and comfortable environments, becoming a third place, neither home nor classroom, in which students can study in a relaxed and informal atmosphere, surrounded by other students engaged in similar tasks (McDonald, 2019).

The creation of Social Informal Learning Spaces, which support learner-centred and constructivist pedagogies, has become a subject of interest over the last two decades for Higher Education Institutions around the world who wish to provide first class campus facilities in which students can have a world-class learning experience (Radcliffe et al, 2008).

Social Informal Learning Spaces have become increasingly prevalent on Higher Education Institution (HEI) campuses in recent years (Harrop & Turpin, 2013; Hunter & Cox, 2014; Jamieson, 2009), and it should be noted from for the benefit of clarity that whilst Social Informal Learning Spaces exist in both the physical and virtual realms, this study examines the engagement with learning and the wants, needs, and preferences of students with regards to physical Social Informal Learning Spaces on HEI campuses.

Maximising the potential and utilisation of existing space on HEI campuses has become increasingly important since the cap on UK student number controls was removed in the 2014/15 academic year, with the UK government predicting the numbers of students in full time post-compulsory education will increase by 60,000 students per year, a potential increase of around 20% of full time undergraduates (Hillman, 2014). In 2018 there were 700,000 full time undergraduate degree applications through UCAS, 533,000 of which were accepted, which is an increase of 97% since 1994 (Bolton, 2019), and the Higher Education Policy Institute (HEPI) have estimated 300,000 additional higher education places will be needed by 2030 (Beech, 2018).

There have been many attempts to design and develop Social Informal Learning Spaces suitable for HEI campuses, but what is often missing from that design process is input from the students, which is vitally important if we aspire to the maximisation of Social Informal Learning Spaces utility, and ensure that they facilitate the kinds of social learning activities which they are intended to encourage. (Cox, 2017, Harrop & Turpin, 2013; Hunter & Cox, 2014).

When Social Informal Learning Spaces are created which do not consider the wants and needs of the students, and the kinds of learning that will occur in them, they run the risk of not being fit for purpose, creating environments which provide a poor use of available space, and yield a low return on investment (Boddington & Boys, 2011; Cox, 2017, Harrop & Turpin, 2013; Hunter & Cox, 2014; Jamieson, 2009; Matthews et al., 2011).

One piece of research which sought to address these issues was the study by Harrop and Turpin (2013), and whilst it does examine the attitudes, behaviours, and preferences of students using Social Informal Learning Spaces, it is now almost ten years old, and since it was undertaken, things have moved on, particularly with regards to the use of mobile technologies for educational purposes (Educause, 2019).

When the Harrop & Turpin (2013) research took place, 80% of students were using laptops, but only 60% were using smartphones, and 30% were using tablets for educational purposes (Educause, 2013), whereas by 2018, 92% were using Laptops (+12%), 98% of students were using smartphones (+38%), and 35% were using tablets for educational purposes (+5%) (Educause, 2019).

Whilst use of mobile technologies within Formal Learning Sessions (FLS) still seems to be actively discouraged by teaching staff, with around 50% discouraging use of smartphones, and a similar number discouraging the use of laptops (Educause, 2019), it can be argued that the rise in mobile device ownership, and the increasing desire of students to use them for educational purposes, is one of the key drivers in the need for increased Social Informal Learning Space provision, providing safe, comfortable and relaxed Wi-Fi enabled spaces in which they can make full use of those devices in their studies (Boddington & Boys, 2011; Cox, 2017, Harrop & Turpin, 2013; Hunter & Cox, 2014; Jamieson, 2009; Matthews et al., 2011).

The work of Radcliffe et al (2008) has been a major influence on this research, and will be discussed in greater detail in a subsequent section of this chapter (1.13.3), but whist their Pedagogy - Space - Technology (PST) Framework for Designing and Evaluating Learning Places development work provided an excellent way of assessing the utility of Social Informal Learning Spaces, and the ways that students make use of them, the data collected and presented in the form of case studies which utilised the framework were all conducted in 2007/2008, and many things, not least the ubiquity of mobile technologies amongst students, have changed a great deal since that time (Educause, 2019).

There has also been a move within post-compulsory education from the traditional Instructivist, teacher-centric, models of education (Boys, 2010; Cunningham & Walton, 2016; Jamieson, 2013) towards student-centric social constructivist models, which suggests effective student learning takes place not in isolation, but through the interactions of students with one another both inside and outside traditional teaching spaces, and in order to facilitate those interactions outside the classrooms and lecture theatres, it is vitally important that students are provided with the necessary Social Informal Learning Spaces in which those interactions can take place (Berger & Luckman, 1966; Kolb & Kolb, 2005; Vygotsky, 1978).

It is also important to not only consider Social Informal Learning Spaces as just entities in themselves, but that we also consider the institutional learning landscape of our institutions as a holistic entity, as opposed to a collection of discrete elements (Dugdale, 2009; Cox, 2018).

In addition to the educational benefits of providing Social Informal Learning Spaces, which some research suggest may be a positive correlation between their adequate provision and the academic success of the students who use them (Doshi et al., 2014), research also suggests that the provision of forward-thinking additions to that learning landscape such as Social Informal Learning Spaces may be important when it comes to attracting and retaining students, particularly those who come to us from overseas, for whom the portfolio of learning spaces within our learning landscape is regarded as symbolic of institutional success and status (Matthews et al., 2011; Cox, 2017).

Whilst the opportunities to create new physical spaces on HEI campuses may be limited, if we can gain a clearer understanding of Social Informal Learning Spaces and their user behaviours, attitudes, and preferences, it may be possible to not just create new Social Informal Learning Spaces, but redesign and repurpose existing spaces which will facilitate student participation in social informal learning (Dirckinck-Holmfeld et al., 2011).

Social Informal Learning Spaces are often referred to in research literature, and at various Higher Education Institutions, using a variety of terms from “Informal Learning Spaces”,
“Social Learning Spaces” and “Flexible Learning Spaces” through to “Student Commons”, “Learning Commons” and “Social Learning Hubs” (White, 2022), but the one thing that they all have in common is that they are spaces in which students engage in informal learning.

Research suggests that more actual learning takes place in Social Informal Learning Spaces than in the classroom (Brown & Lippincott, 2003) with Boyer (1987) suggesting that over 50 percent of student learning in Higher Education takes place outside the classroom, and if this is indeed true, it underlines the importance of creating Social Informal Learning Spaces on Higher Education Institution campuses in which students can engage in those activities.

Reviewing the literature suggests that Social Learning Spaces and Informal Learning Spaces are two of the most commonly used terms, and whilst both types of spaces can be effective for facilitating student-led learning, there are some key differences between the two:

Typically characterized by a high degree of collaboration and communication between learners, examples of social learning spaces can include classrooms, where learners are able to share their knowledge and experiences with each other by engaging in active learning activities, which can help lead to a deeper understanding of the material being studied (Ellis & Goodyear, 2016).

Informal Learning Spaces, on the other hand, are environments in which learning takes place outside of traditional educational settings such as classrooms. These spaces are typically more relaxed and less structured than Social Learning Spaces, and they usually lack the formal instructional support that is found within classrooms, so the learning is entirely self-directed. Examples of informal learning spaces can include not just on campus learning spaces, but also museums, libraries, and community centres where learners are able to explore and learn on their own, without the guidance of an authority figure (Harrop & Turpin, 2013).

Social Learning Spaces are typically more structured than Informal Learning Spaces, with clear goals and objectives, whilst Informal Learning Spaces are often more open-ended and flexible, allowing learners to pursue their own interests, and learn at their own pace (Ellis & Goodyear, 2016).

However, as previously stated, when reviewing the research literature, it would appear that the terms Social Learning Spaces and Informal Learning Spaces are often used interchangeably, as they share many commonalities in terms of the learning activities which are taking place within them, but in Towards Creative Spaces: Rethinking the Architecture of Post-compulsory Education, Jos Boys, suggests the use of the hybrid term Social Informal Learning Spaces (Boys, 2009), combining both Informal Learning Spaces and Social Learning Spaces both literally and conceptually, and by using the term Social Informal Learning Spaces throughout this thesis, it will enable the researcher to embrace concepts and ideas presented in existing research where both the terms Social Learning Spaces and Informal Learning Spaces, are used.

The use of the term Social Informal Learning Spaces will also increase the searchability of the research findings for a worldwide audience, no matter which of the terms are commonly used within their particular educational communities, or which of the terms they choose to use in literature review searches.

1.2.2 Social Informal Learning Spaces in Higher Education

The world of Higher Education is changing, so there is an increasing need to adapt to the current and future needs of our students in order to ensure the education we deliver remains relevant, and the provision of Social Informal Learning Spaces present Higher Education Institutions with the opportunity to create spaces which will enable students to pursue their learning ambitions in new and innovative ways (Arvanitakis & Hornsby, 2016).

It is important to not only think about Social Informal Learning Spaces as just entities in themselves, but that we also consider the institutional learning landscape of our institutions as a holistic entity, as opposed to a collection of discrete elements, and consider how Social Informal Learning Spaces work alongside our existing infrastructure, particularly with regards to their close proximity to formal learning spaces such as lecture theatres and classrooms, enabling students to move from one to the other with relative ease, and in short periods of time, in order to optimise their use (Dugdale, 2009; Cox, 2018).

Social Informal Learning Spaces can help to create “Sticky Campuses”, where students choose to spend their time between formal learning and teaching activities, rather than in traditional libraries or their places of residence, which enable them to spend time not only studying, but also interacting with their fellow students in spaces which have been specially designed to facilitate interaction in multiple ways (Acker & Miller, 2005).

Research suggests that suggest that the use of Social Informal Learning Spaces by students on Higher Education institution campuses also has a positive correlation with student engagement (Matthews et al., 2009), and that there may also be a positive correlation between the provision of Social Informal Learning Spaces and the academic success of the students who use them (Doshi et al., 2014).

However, there appears to be a lack of understanding of Social Informal Learning Spaces by both architects and the Higher Education Institution staff who commission them, possibly due to a lack of evidence to support their assertions (Temple, 2008)

This sentiment is further underlined by the work of Strange & Banning (2001) which suggested this area of study is “Perhaps the least understood, and the most neglected” in the pantheon of educational research, which further emphasises the importance of more evidence based evaluations of Social Informal Learning

Spaces (Deed & Alterator, 2017) to back up such assertions, and ensure that this under-researched topic receives the attention it deserves (Temple, 2008).

Along with the potential educational benefits of Social Informal Learning Spaces, research also suggests that the provision of forward-thinking additions to that learning landscape such as Social Informal Learning Spaces may be important when it comes to attracting and retaining students, particularly those who come to us from overseas, for whom the portfolio of learning spaces within our learning landscape is regarded as symbolic of institutional status and success (Matthews et al., 2011; Cox, 2017).

Social informal Learning Spaces can require significant investment on the part of the Higher Education Institutions. For example, the University of Manchester spent £24m on creating their Alan Gilbert Learning Commons, a state-of-the-art purpose-built facility incorporating group study rooms, computer clusters, relaxation pods, and a café, providing over 1000 flexible learning spaces for their students (Manchester, 2012). The potentially huge investments which may be required to provide such spaces make it imperative that we ensure that their construction, and the provision of the facilities, furniture and working environments within them, are conducive to the kinds of learning behaviours we seek to promote, so that the students can enjoy and benefit from their use, and the Higher Education Institutions which create them can see returns on their investment.

1.2.3 Informal Learning and Formal Learning

Informal learning, defined by Matthews et al. (2011) as learning which takes place outside the classroom, increasingly involves student use of personal learning devices to access virtual learning spaces and online resources, effectively enabling them to learn anytime and anywhere (Doshi et al., 2014; Kvavik & Caruso, 2005; Riddle & Souter, 2010).

However, informal learning still has to take place somewhere, and Higher Education Institutions are now facing an increasing need to provide a more expansive range of Social Informal Learning Spaces in which student interactions with those resources can take place, and whilst the opportunities to create new physical spaces on Higher Education Institution campuses may be limited, the researcher believes that if we can gain a clearer understanding of Social Informal Learning Spaces and their user behaviours, attitudes and preferences, it may be possible to not just create new Social Informal Learning Spaces, but redesign and repurpose existing spaces which will facilitate student participation in social informal learning (Dirckinck-Holmfeld et al., 2011).

One of the conceptual problems which occurs when we try to consider the differences between informal and formal learning is that, whilst they often seem to be considered in the literature as being binary opposites, such as in Matthews' (2011) definition, which suggests informal learning as learning which takes place outside of the classroom, it is also entirely possible for informal learning to take place within a classroom, such as when students are engaged in active learning, and indeed it is also entirely possible for formal learning to take place outside the classroom, for example when students are on field trips, which suggests that the concepts of informal learning are far more nuanced and interconnected than they might first appear to be, as suggested in Towards Creative Learning Spaces (Boys, 2010).

Whilst both Formal Learning Spaces and Informal Learning Spaces have the potential to be used both formal and informal learning, for the benefit of clarity, this research considers Social Informal Learning Spaces as those real-world spaces specifically created on Higher Education Institution campuses which have been designed to encourage the kinds of social, informal, and networked learning which occurs without formal teacher-led intervention (Ellis & Goodyear, 2016).

It is important to note that many Higher Education Institution campus libraries have been at the leading edge of Social Informal Learning Spaces research and creation, and have sought to accommodate changing student needs by creating Social Informal Learning Spaces within their buildings which incorporate robust Wi-Fi networks, contain informal and flexible furniture, have more relaxed rules regarding noise and student behaviour, have reduced or no supervision, and allow the consumption of refreshments, whilst still retaining areas within those buildings that provide a more traditional library environment (Bilandzic & Foth, 2013; Crook & Mitchell, 2012; Leander et al, 2010; Matthews et al., 2011; Yoo-Lee et al. 2013).

1.2.4 How do Students Engage with Learning in Social Informal Learning Spaces?

Students are attracted Social Informal Learning Spaces places where they can meet up with friends, and many students become attached to particular Social Informal Learning Spaces where they can engage in social, informal, and networked learning relatively free from externally imposed restrictions (Lefever & Bashir, 2011).

However, it is worthy of note that when students have been observed in Social Informal Learning Spaces in previous studies, they appear to form their own, self-regulated, modes of behavioural acceptability (Bryant et al., 2009, Crook & Mitchell, 2012; Harrop & Turpin, 2013; Hunter & Cox, 2014).

Students working in Social Informal Learning Spaces may be considered to be forming communities of practice (Bickford & Wright, 2007; Hunter & Cox, 2014; Wenger, 1998), which can be defined as "A group of people who come together to share common interests or goals aimed at improving their skills by working alongside more experienced members, and being increasingly involved in complicated tasks" (Lave & Wenger, 1991), a definition which was further developed by Wenger and Snyder to become "Groups of people informally bound together by shared expertise and a passion for a joint enterprise" (Wenger & Snyder, 2000), and whilst students working in a Social Informal Spaces may not be working on a shared project, in most cases they do have a shared a goal of working on their individual studies.

However, it should be noted that not all of the students in Social Informal Learning Spaces choose to engage in what one might imagine to be typical community of practice behaviours when it comes to social learning i.e. via interactions with their fellow students, but choosing instead to engage in solo informal learning, but feeling inspired to learn by being surrounded by others also engaged in similar tasks (Laurier, 2008; Hunter & Cox, 2014), with the option of interacting with others should they choose to do so during study breaks (Laurier, 2008; Hunter & Cox, 2014; O'Connor, 2005).

Other students deliberately seek out spaces where they are able to work in silence and will not be disturbed depending on the learning tasks in which they are engaged, suggesting that whilst it may not be possible to create a definitive conceptual blueprint for Social Informal Learning Spaces that will prove suitable for all of the students of the time, by creating a diverse portfolio of Social Informal Learning Spaces across HEI campuses, it should be possible to create a range of spaces which will suit the needs of the majority of students the majority of the time (Harrop & Turpin, 2013).

Social Informal Learning Spaces may be used for short periods of less than one hour, for example between formal teaching sessions, and therefore they need to be in close proximity to those formal learning spaces to minimise travel time, and maximise utility (Harrop & Turpin, 2013; Hunter & Cox, 2014).

Social Informal Learning Spaces may also be utilised for longer periods of time, sometimes for four hours or more, in which case students are prepared to travel across campus to Social Informal Learning Spaces they are familiar with, which they believe will offer them the environment they need to facilitate their particular learning tasks (Cunningham & Walton, 2016; Hunter & Cox, 2014; Matthews et al., 2011).

Social Informal Learning Spaces should therefore be designed to support a wide range of potential activities and behaviours by providing such elements as reconfigurable and ergonomically suitable furniture (Cha & Kim, 2015; Harrop & Turpin, 2013; Matthews et al.
2011; Scannel et al., 2016; Sommer & Olsen, 1980).

1.2.5 What are the Essential Attributes of Social Informal Learning Spaces?

Research suggests that Social Informal Learning Spaces are often characterised by their use of flexible, moveable furniture, and access to technologies such as computers, printers and wi-fi, which facilitate independent learning, all of which are placed within environments designed to encourage self-directed learning, promoting collaboration and social connection between students (Berman, 2020), and the flow of both people and information, free from formal supervision (Harrop & Turpin, 2013).

The work of Barrett et al. (2013) in schools also suggests that there are various elements within learning spaces such as the colour of carpets and natural lighting which may improve student learning outcomes, and further research within Higher Education contexts indicates controllable and task suitable artificial light (Gaines & Curry, 2011) supplementing natural light, and accompanied by views of the external world are also preferred by students when studying (Cha & Kim, 2015, Cox 2018).

Many Social Informal Learning Spaces have been designed to reflect the changes happening in the world outside education, and with office design in recent years moving away from the formality of traditional paradigms towards more flexible environments which facilitate collaboration and interaction between colleagues (Bernstein & Turban, 2018), so it makes sense for Higher Education Institutions to provide students with not just knowledge and skills, but also the experience of collaborative and collective working they will need to succeed when they enter the workplace, by providing them with the opportunities to work in environments which reflect those workplaces, and encourage the working practises they will encounter after they graduate.

Appropriate acoustic treatments which minimise potential audio distractions (Scannel et al.,
2016) should also be considered, and both robust Wi-Fi networks (Cox, 2018; Cunningham &
Walton, 2016; Harrop & Turpin, 2013; Hunter & Cox, 2014; Matthews et al., 2011; May & Swabey, 2015; Souter et al., 2010) and access to power sources into which devices can be plugged to recharge (Cox, 2018; Cunningham & Walton, 2016; Harrop & Turpin, 2013; Hunter & Cox, 2014; Matthews et al., 2011; May & Swabey, 2015; Souter et al., 2010) are also expected by students to be provided.

1.3 Research Context

The researcher is a Senior Learning Technologist at a leading Russell Group Higher Education Institution in the United Kingdom where the research has been conducted.

This Higher Education Institution is in top 100 of the QS World University Rankings 2020 (QS, 2020), with a Teaching Excellence Framework Gold Rating for delivering consistently outstanding teaching, learning and outcomes for our students (TEF, 2020), and it has a large and diverse student population consisting of almost 40000 undergraduates and postgraduates.

Working on this Higher Education Institution campus has given the researcher an ideal setting for this research, and being an insider-researcher, has meant that the researcher has had have access to support and resources which might not be readily available to researchers from outside, along with a high level of understanding of the context in which phenomena is being studied (Sikes & Potts, 2008).

However, it should be noted that being an insider-researcher could potentially lead to a loss of objectivity or bias with regards to the results and conclusions drawn from them, and may create ethical and methodological issues which also need to be considered, particularly with regards to the consequences of the study (Atkins & Wallace, 2012).

Then again, it could also be argued that the researcher, whilst being an insider at the institution being studied, is also an outsider, due to the fact that they are not a student at the institution, and therefore could be regarded as both an insider and an outsider researcher in the context of this study, which means they have the potential to utilise this dual perspective in the analysis of the data collected.

Having said that, the fact that the researcher does not have any formal relationship with the student subjects has helped to mitigate many of the potential problems associated with being an insider-researcher**.**

Research suggests Technology Enhanced Learning researchers and practitioners should be involved in Social Informal Learning Space design, development, and implementation to ensure that pedagogical theory has an equal footing with architecture and design theory and institutional policy when it comes to the creation of these spaces, because if the pedagogy is ignored, it can lead to Social Informal Learning Spaces being created which are not fit for purpose, and therefore are under-utilised by the students (Bligh & Crook, 2017; Boddington & Boys, 2011; Boys, 2010; Fisher, 2017).

Social Informal Learning Space can be catalytic agents for positive change, and affect the activities and practises which occur within them (JISC, 2006), and the power of built pedagogy, and its ability to define how people learn within these spaces, has become increasingly important (Oblinger, 2006). When designed correctly, Social Informal Learning Spaces can encourage positive learning behaviours for students that study within them, encouraging them to collaborate and interact, or to study alone, surrounded by others engaged in learning (Laurier, 2008; Hunter & Cox, 2014; Oblinger, 2006), with the option of interacting with others during study breaks (Laurier, 2008; Hunter & Cox, 2014; O'Connor, 2005), thus enhancing the student learning experience.

In Spaces Between Places: Social Informal Learning Spaces on Post-Compulsory Education Institution Campuses, the researcher conducted a literature review based on interrogating the search terms "Social Learning Spaces" and "Informal Learning Spaces" (McDonald, 2019).

The researcher reviewed the most often-cited journal articles pertaining to Informal Learning Spaces and Social Learning Spaces, and also those papers cited within them, which have subsequently been used to inform the research questions, approach, methodology, and rationale behind this thesis.

This initial literature review suggested that Social Informal Learning Spaces research may still be regarded as an emergent field within Technology Enhanced Learning, with no citations found for articles created before 2011, despite search terms including articles published from 2004 onwards, and in Learning Spaces In Higher Education: Under- Researched Topic (Temple, 2008), the author suggests the study of Learning Spaces in Higher Education Institutions has attracted very little attention from researchers and scholars, and that the lack of research in the field to date has been disappointing, not least because there has been so much research in other areas (Temple, 2008).

Bligh and Crook (2017) suggest there is a need for more research in this area to create a better understanding of the field, and that Social Informal Learning Spaces themselves should be viewed as an integral part of the technologies which mediate learning, but they also acknowledge that there are many difficulties which may be encountered when researching the complexities of how learning and learning spaces are related, and how such evaluations may take place.

The researcher was an active member of the research team which created the NMC Horizon Report (Higher Education Edition) for well over a decade. A collaborative effort between EDUCAUSE Learning Initiative (ELI) and the NMC, the Horizon Report is a research project which identifies and describes emerging

technologies which will have an impact on teaching, learning, and creative inquiry in education to help inform future choices of educators, administrators, policy makers and learning technologists which support, improve, or extend teaching, learning, and creative inquiry in higher education across the globe..

In 2017, the expert panel identified six key trends, six significant challenges, and six important developments in educational technology, and one of the significant key trends identified by the researcher, discussed with expert panel, and presented in the final report was Redesigning Learning Spaces to accommodate the changing nature of Higher Education, which was already moving away from the traditional sage-on-the-stage model of face-to-face lectures being the primary method of teaching, towards the incorporation of active learning strategies in formal teaching spaces (Morrison, 2014) and encouraging informal learning practices within flexible Social Informal Learning Spaces which facilitate student interaction and social learning paradigms, where students can partake in informal, non-instructor led activities which encourage experimentation, curiosity, and creativity, and the development of lifelong learning mindsets (Adams Becker et al, 2017).

In the United States, Higher Education Institutions were early adopters of the concept of providing Social Informal Learning Spaces for their students, and these spaces were designed in accordance with accessibility legislation, which stated that all Universities had to provide students with disabilities equal and integrated access to both online and physical learning spaces (Adams Becker et al, 2017), and whilst accessibility is not the primary focus of this research, it should be noted that all three of the Social Informal Learning Spaces investigated in this research provided at least some accommodations for students with disabilities which comply with British accessibility legislation, by providing access to, adaptable furniture within, and accessible technologies within those spaces.

More recent research suggests this early trend towards embracing active learning practises, blending formal and informal learning in Formal Learning Spaces, and creating Social Informal Learning Spaces, which give digitally literate students a place where they can use connected technologies to not only collaborate with their peers and mentors, but also gain access to a wide variety of resources and knowledge communities has continued to gain traction at Higher Education Institutions around the world (Yondler & Blau, 2021).

The move towards student-centric social constructivist models (Boys, 2010; Cunningham & Walton, 2016; Jamieson, 2013) has been accompanied by increase in the ubiquity of personal learning devices amongst the student population, with an estimated 98% of students having access to smartphones, 92% having access to

laptops, and 35% having access to tablets (Educause, 2019), and this device availability, along with accessibility to robust Wi-Fi networks, combined with the online availability of resources, has played an integral part in the blurring of the boundaries between formal and informal learning in both virtual and physical learning spaces (Leander et al., 2010).

The researcher's interest in the field of Social Informal Learning Spaces came about when he was asked to lead on a project to reimagine an unloved and underused formal learning space at the institution where he works, and bring it into the 21st century.

The room was intended to be the first of its kind on our campus, and as well as providing a vital space for students to study, it would also have been used in the marketing of the Faculty's programmes, hoping to attract new students by showing them the new state-of-the-art facilities in the prospectus and during campus tours.

The first stage of the task was to find out as much as possible about Social Informal Learning Spaces by reviewing the available literature not just about space and furniture design, but also about the pedagogical benefits which such spaces afford, and the kinds of activities those spaces facilitate and encourage in the students which make use of them.

The next stage was to invite some prospective space and furniture designers onto campus to look at the room, and take measurements to enable them to create some potential design ideas which would make the most of the available space.

Once the design company was approved by the Faculty, the researcher was then flown out with the Director of Learning and Teaching to the company's headquarters in Munich to see what kinds of furniture was available, and spend some time with the creative team to exchange ideas about what might be possible, and to talk about project budgets and create a timeline for the project.

Several weeks later, the room designs were completed, and sent to the researcher with an exciting and unexpected proposal: the company would provide all of the furniture, fixtures, and fittings for free in return for being able to use the new space as a showcase for their designs which they would be able to invite future potential customers to visits.

This seemed like a win-win situation for both the Institution and the design company - the School would get the cutting edge facilities they so badly needed, and the company would gain a foothold in the Higher Education market in the UK which they could use to show other potential customers their designs in action.

However, with the designs in place, and the deal on the table, it soon became clear that the room itself would need a considerable amount of work to update its infrastructure in order to accommodate the new furniture, fixtures, and fittings, including new doors floors and electricity points, and it was at this point that the project ground to a halt.

Whilst the researcher believed he had presented the Institution with a golden opportunity to reinvent and reinvigorate teaching in the School by creating a space which would be second to none on the campus, and one of the first of its kind in the UK, the Faculty would not approve the budget to improve the space, and the project was shelved.

However, all of the hard work and research was not wasted, as the researcher went on to work with cross-Faculty teams to help to design other Social Informal Learning Spaces in other more forward thinking Faculties on campus, which have proved to be very popular with both staff and students.

When the opportunity was presented to pick a topic for further research, the researcher returned once again to Social Informal Learning Spaces, knowing that not only was there a dearth of up to date research in this area, and therefore a lot to be discovered, but also that the results of that research would help to build a firm foundation onto which the Social Informal Learning Spaces of the future could be built.

1.4 Research Problem

Much of the literature reviewed focusses on the built environment i.e. the physical attributes of Social Informal Learning Spaces such as the furniture, the lighting, and the way that such spaces should be designed, and very few pieces of research look at how and why and how students actually use these spaces, and it is vital to consider the end users when designing spaces to ensure they are fit for purpose, and have the potential to be fully utilised when built.

The research which does exist about Social Informal Learning Spaces which focusses on the student end users is much more limited, and whilst some of those papers have been reviewed in the literature review, it is notable that not only did the research take place many years ago, but they also used single data collection methods such as questionnaires or ethnographic sweeps, and this research builds upon those foundation,

but uses multiple data collection methods to create a more holistic picture of Social Informal Learning Spaces and their users.

1.5 Research Aims

The aim of this research is to investigate everything which may affect students engaging with learning within Social Informal Learning Spaces, including examining the wants, needs, and preferences of students, so that those findings can then be used to inform the future design, development, and refurbishment of Social Informal Learning Spaces on HEI campuses and beyond, and build a solid foundation upon which future research into Social Informal Learning Spaces can be based.

1.6 Research Questions

In order to ensure that current Social Informal Learning Spaces are fit for purpose, and that future Social Informal Learning Spaces can be designed appropriately, the researcher has created an overarching research question (ORQ), which is then divided into seven subsequent and more focussed research questions.

The Pedagogy - Space - Technology (PST) Framework selected for this study (Radcliffe, 2009) was created to facilitate the design, development, and post-occupancy evaluation and of Social Informal Learning Spaces, by bringing together the three distinct but closely inter-related elements:

- **Pedagogy** (What types of learning are we trying to encourage?)
- **Space** (Which elements of the design will encourage those types of learning behaviour)
- **Technology** (How is technology deployed within those spaces to encourage those learning behaviours?)

The Pedagogy - Space - Technology (PST) Framework enables one to consider the three aspects and their interrelationships by positing three questions:

- **Pedagogy** (What types of learning can be observed taking place?)
- **Space** (Which aspects of the design of the space work, and which do not?)
- **Technology** (Which technologies are most effective at enhancing learning within these spaces?)

The Overarching Research Question (ORQ) encompasses all three of those elements:

ORQ: What are the wants, needs and preferences of students with regards to Social Informal Learning Spaces, and how do they engage with learning whilst studying within those spaces? (Pedagogy / Space / Technology)

In order to fully answer the ORQ, it is therefore necessary to create a series of research sub-questions as viewed thought the lens of the Pedagogy - Space - Technology (PST) Framework:

- RQ1. Who uses Social Informal Learning Spaces? (Pedagogy)
- RQ2. Why do students choose to study within Social Informal Learning Spaces? (Pedagogy)
- RQ3. What are the wants, needs, and preferences of students when choosing Social Informal Learning Spaces? (Pedagogy / Space / Technology)
- RQ4. Where do students choose to study when not engaged in formal teaching activities? (Space)
- RQ5. Where should Social Informal Learning Spaces be located on campus? (Space)
- RQ6. When do students use Social Informal Learning Spaces? (Pedagogy)
- RQ7. How do students engage with learning within Social Informal Learning Spaces? (Pedagogy / Technology)

As can be seen above, whilst some RQs relate to only one particular aspect, others relate to two or three different aspects of the framework, which is unsurprising bearing in mind their complex interrelationships between the three elements, and these interrelationships have all been considered when creating the research instruments for this study to ensure all aspects of the PST framework have been included to create a holistic answer to the research problem.

The motivation lying behind all of the questions is to find out as much as possible about not only what students want and need to be provided with by creating Social Informal Learning Spaces, but also what technologies they use to engage with learning, and what kinds of behaviours they exhibit whilst actually learning within in Social Informal Learning Spaces in order to create a practical and useful piece of research based upon which future Social Informal Learning Spaces at the Higher Education Institutions can be created.

1.7 Research Paradigm, Ontology and Epistemology

To answer the research question, the researcher has conducted an extensive literature review, created, piloted, and deployed the analytical instruments, then analysed the data to reach the findings and conclusions. (Artino & Gehlbach, 2012).

Adopting a pragmatic research paradigm, the researcher believes the best research methods are the ones which guide one to a solution to the problem (Patton, 1990), and that the truth is whatever leads to that solution (Robson, 2002).

Coming from an ontological perspective, believing that reality is created by ideas, and an epistemological position that means that any way of thinking or working which leads to a solution is useful, the researcher has conducted mixed methods research, collecting, and analysing both qualitative and quantitative data.

1.8 Research Significance

The results of this research will be important to those involved in the research, planning, creation, and running of Social Informal Learning Spaces both inside and outside Higher Education Institutions, from Estates Management through to educational specialists, and will help to ensure that future investment in such spaces yields positive outcomes by providing everything students need in order to enhance their learning experience by addressing the gap in the current knowledge base regarding the wants, needs, and preferences of students of student users of Social Informal Learning Spaces, and how they engage with learning within these spaces on Higher Education Institution campuses.

Most of the existing research reviewed regarding Social Informal Learning Spaces on Higher Education Institution campuses does not include the perspectives of the students (Boddington & Boys, 2011; Cox, 2017; Ellis & Goodyear, 2016; Hunter & Cox, 2014; Jamieson, 2009; Matthews et al., 2011), and it is this area in particular which this research seeks to address.

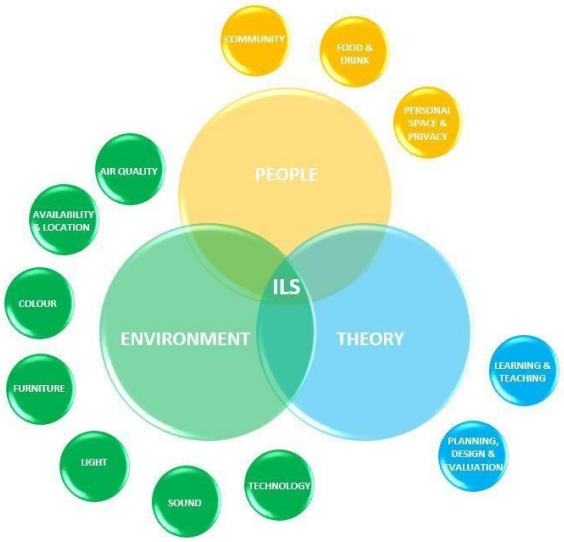
Research by Ellis & Goodyear (2016) and Harrop & Turpin (2013) suggests that one of the best ways to gain insight into Social Informal Learning Spaces student behaviours is to observe them in situ, taking note of how they interact with, and work within, the spaces, and as well as surveying students, the researcher has also conducted a series of observations in existing Social Informal Learning Spaces, recording and mapping student activities, and the ways in which they interact with, and within, the built environment, along with a focus group.

1.9 Theoretical Models and Frameworks

A wide variety of research has been synthesised into the creation of models and Frameworks to be used in the design of Social Informal Learning Spaces, and whilst most are used to assess the effectiveness of Social Informal Learning Spaces once they have been created, and were therefore not considered as potential frameworks for this research, they are still worth mentioning, as they give additional context to the research:

1.9.1 People Environment Theory (P.E.T.) Framework

Developed by the researcher during a previous research project, the People, Environment, Theory (P.E.T.) Framework (McDonald, 2019) was created to encapsulate the disparate elements which go into making Social Informal Learning Spaces (Fig. 0):



(Fig. 0) People environment Theory (P.E.T.) Framework (McDonald, 2019)

Whilst the People, Environment, Theory (P.E.T.) Framework (McDonald, 2019) successfully captured the elements needed for that particular project, which was about the design of a specific Social Informal Learning Spaces on our campus, the researcher felt that searching the literature for a more established, tried, and tested model would add more credibility to the research, and also ensure that the research questions could all be fully answered.

1.9.2 The JELS Project & FELS Model

The JELS Project (Pearshouse et al., 2009) reviewed the tools, methods and frameworks used to evaluate Social Informal Learning Spaces, and used a variety of research methods to create a picture of learning space design, leading to the creation of their Framework for Evaluating Learning Spaces (FELS model).

The JELS Project key findings were:

- Most research was done after Social Informal Learning Spaces had been created.
- Most research was for internal use and not published.
- The strongest driver of research was the National Student Survey (NSS)
- Only 20% of research used Web 2.0 technologies to conduct evaluations.
- Less than 1/3 of the research used baseline data, limiting impact assessment.
- Research activity over and above that regarding the student experience was not encouraged by Institutions.
- A need for the educational sector to conduct more research in this field.

Utilising the JELS framework produced a great deal of useful data, providing outstanding levels of granularity regarding every aspect of the process, showing it to be a useful tool for the post-construction evaluation of Social Informal Learning Spaces at an institutional level.

The feedback received was very positive, with students praising the new Social Informal Learning Spaces for their technology-rich environments, their flexible layouts which facilitated different ways of studying and collaborating with others, and the visual impressiveness of the spaces which they felt motivated them and enhanced their learning, suggesting that this research-based process involving the students at every stage of the design and development processes is the right way to go when creating Social Informal Learning Spaces which are fit for purpose.

1.9.3 The Dynamic Engaging Ecological Participatory (DEEP) Learning Spaces Model In 2012, the University of Leicester created the Dynamic Engaging Ecological Participatory Learning Spaces (DEEP) Model (Wood et al., 2012), and it examines the experiences of both staff and students using three newly created Social Informal Learning Spaces, based on the analysis of qualitative and quantitative questionnaire data, and outlines the interlinked variables involved in creating a successful ILS (Table. 1):

Variable	**Definition**
Dynamic	Space / Time
Ecological	Environment / Systems-Based Approach
Engaging	Pedagogy / Multiple Learning Approaches
Participatory	Co-Constructivist / Consultative

(Table. 1) Dynamic Engaging Ecological Participatory (DEEP) Model (Wood et al., 2012)

Impressive in ambition and scope, particularly when it comes to the large number of staff and students surveyed, where the Dynamic Engaging Ecological Participatory (DEEP) model falls down is that does not offer enough in the way of significant details which would enable it to be used for the creation of Social Informal Learning Spaces, focussed as it is on spaces which have already been created, but it does offer some interesting ideas and perspectives particularly regarding how pedagogy should be an important consideration when creating Social Informal Learning Spaces

1.9.4 The Harrop and Turpin (H&T) Model

Created by Harrop and Turpin (2013), the H&T model brings together Architecture, Learning Theory, and Placemaking in an attempt to create a holistic model of Social Informal Learning Spaces, not dissimilar conceptually to the one which will be used to inform this research project (Table. 2):

Principle	**Definition**
Community	How Space Supports Social Interaction
Conversations	How Space Encourages Interaction
Destination	Where Learners Study
Human Factors	Ergonomics / Sound / Lighting
Identity	How Space Feels / How Space Used
Refreshment	Food & Drink
Retreat	Privacy / Personal Space
Resources	I.T. Access
Timely	Space Availability

(Table. 2) Harrop & Turpin (H&T) Model (Harrop & Turpin, 2013)

Whilst the H&T (Harrop & Turpin, 2013) model addresses many of the areas which the researcher will be considering throughout this research project, like the like the Dynamic Engaging Ecological Participatory Learning Spaces (DEEP) Model (Wood et al., 2012), their model does not provide enough in the way of detail, although it is interesting to note the categories, and how they focus more on how students feel, interact with, and use Social Informal Learning Spaces

1.9.5 The Space for Knowledge Generation (SKG) Model

The Spaces for Knowledge Generation (SKG) model was the result of an Australian project which applied social constructivist learning theories (Berger & Luckman, 1966; Kolb & Kolb, 2005; Vygotsky, 1978) to create a model to aid in the construction of Social Informal Learning Spaces (Souter et al., 2010).

Several Australian institutions were visited, where they ran staff-student forums out of which they subsequently built case studies, enabling them to create a model containing seven principles for ILS design which they went on to use to created their prototype designs for Social Informal Learning Spaces (Souter et al., 2010) (Table. 3):

Principle	**Definition**
Aesthetics	Symmetry / harmony / Simplicity / Fitness for purpose
Affordances	Provision of Furniture & Equipment
Blending	Blending Technologies into Learning Environment
Comfort	Mental & Physical Wellbeing
Equity	Accommodating Diversity of Learners
Flow	State of Mind of the Learner / Movement Through Physical Space
Repurposing	Flexibility of Space for Multiple Uses

(Table. 3) Spaces for Knowledge Generation (SKG) model (Souter et al. 2010)

Although the Spaces for Knowledge Generation (SKG) model is informed by learning theory, like many such models, the emphasis is on the creation of Social Informal Learning Spaces, as opposed to the end users, and would not facilitate the answering of the research questions for this research project.

1.9.6 Radcliffe's Pedagogy - Space - Technology (PST) Framework

Radcliffe's (2009) Pedagogy - Space - Technology (PST) Framework for Designing and Evaluating Learning Places was developed to guide the design, development and post occupancy study of learning spaces by exploring the interrelationships between the Pedagogy, Space and Technology elements, giving each element an equal weighting, in order to create a holistic view of learning environments, and is based on the research carried out by Oblinger (2005), Jamieson et al (2000), Johnson and Lomas (2005), Long and Ehrmann (2005) and Bransford et al (2000) about the convergence of Pedagogy, Space and Technology

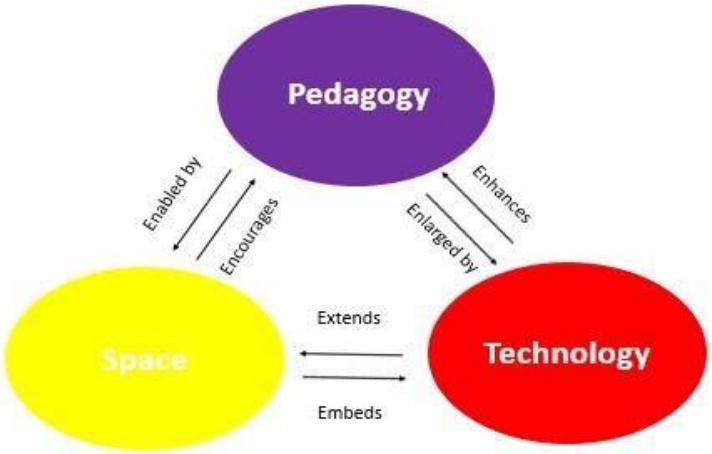
elements in the creation of innovative learning spaces on Higher Education Institution campuses (Radcliffe et al, 2008).

Created as part of the Next Generation Learning Spaces (NGLS) project at the University of Queensland, Australia, the Pedagogy - Space - Technology (PST) Framework explores the complex interdependence and interrelationships between the three elements (Pedagogy - Space – Technology) to seek to understand the ways in which students use Social Informal Learning Spaces so that future spaces can be designed, and current spaces can be redesigned, which fully accommodate their learning needs (Radcliffe et al, 2008).

The Pedagogy - Space - Technology (PST) Framework uses a question driven process derived from reviewed learning space literature, and the researchers' own experiences of designing Social Learning Experiences, and is designed to facilitate the bringing together of various stakeholders from across a Higher Education Institution to consider the various aspects of Social Informal Learning Space design and use to enable them to co-create the design of future spaces or assess the effectiveness of existing Social Informal Learning Spaces so that their layouts and designs may be adapted to increase usability and usage by students (Radcliffe et al, 2008).

After creating the Pedagogy - Space - Technology (PST) Framework, the team then created a series of Social Informal Learning Space case studies using spaces at the University of Queensland, which suggested that the Pedagogy - Space - Technology (PST) Framework was extremely useful in assessing and evaluating those spaces. They then called upon other researchers at other Higher Educations to conduct their own research using the framework, creating a further 18 case studies, which once again suggested the value and utility of the Pedagogy - Space - Technology (PST) Framework in evaluating these kinds of spaces which had, up until that point, been under-evaluated and under-researched (Radcliffe et al, 2008).

Having examined all the frameworks and models outlined above, the researcher has chosen the Pedagogy - Space - Technology (PST) Framework (Radcliffe, 2009) for this study, as not only has it been robustly field tested and evaluated over a number of years, and at a number of Higher Education Institutions across the world, but it also enables the researcher to ensure that all areas related to the behaviours of the student users of Social Informal Learning Spaces, as well as the spaces themselves, along with the technologies used, are addressed within the study (Fig. 1):



(Fig. 1) Pedagogy-Space-Technology (PST) Framework (Radcliffe, 2009)

The framework provides a list of questions to be asked as part of the evaluation process, and they have been used to inform the creation of both the student questionnaire (P.31) and the user mapping exercise (P.43) in the appendix of this proposal (Table.4):

Focus	Conception & Design	Implementation & Operation
Pedagogy	What type(s) of learning are we trying to encourage?	What types of learning can be observed taking place?
Space	Which elements of the design of the space will encourage those types of learning behaviour?	Which aspects of the design of the space work, and which do not?
Technology	How is technology deployed within the spaces to encourage those learning behaviours?	Which technologies are most effective at enhancing learning within these spaces?

(Table. 4) Adapted From: Pedagogy-Space-Technology (PST) Framework Questions (Radcliffe, 2009)

1.10 Ethics

There are no major ethical concerns or potential risks with the research, and ethical approval was sought and gained from the University of Lancaster on the 17th of December 2020 using the following criteria:

- The researcher will not be working with either children or vulnerable adults.
- The researcher will prioritise respect for the subjects and prioritise their wellbeing.
- The researcher will obtain informed prior written consent from those subjects.

- The researcher will only collect data which is relevant to the research.
- Data will be stored in an appropriate encrypted and secure repository.
- Data will be kept only for the duration of the study.
- All data will be anonymised.
- The researcher will ensure compliance with institutional rules as well as UK GDPR legislation in terms of both data collection and storage throughout.

1.11 Thesis Structure

This thesis follows the University of Lancaster recommended thesis structure, and contains six chapters followed by references and bibliography and an appendix.

Chapter 1 provides context to the research, and discusses some of the research which already exists in this field, whilst the literature review in Chapter 2 collates and curates a wide variety of research about, and related to, Social Informal Learning Spaces, and examines where the gaps in the literature exist which this research will endeavour to fill.

Chapter 3 describes the research design, the research methodologies, the reasons why they were chosen, and how they were implemented to collect the data, and Chapter 4 presents the results and findings extrapolated from the collected data.

Chapter 5 presents the discussion of the results and findings from Chapter 4, presenting them in the context of the research questions, and Chapter 6 presents the conclusions gleaned by the researcher from the research.

1.12 Contribution to Scholarship, Practice, and Policy

This research contributes to the knowledge and scholarship in the field of Social Informal Learning Spaces by building upon the existing research in this area, much of which is over a decade old, and bringing it up to date with regards to what is actually happening with regards to the use of Social Informal Learning Spaces on Higher Education Institution campuses by students who have returned to normal working practices now that the Covid-19 pandemic has finally passed.

This contemporary contribution to the pantheon of Social Informal Learning Space research will enable those designing and creating such spaces will be provided with a solid foundation upon which to build their own research or design of such spaces in the future, and that it will also be of use to policy makers when making financial decisions about what kinds of facilities students need to facilitate first class on campus educational experiences that will prepare them for the world in which they will work when they graduate.

1.13 Chapter Summary

This chapter provided an overview of the entire research project including the background to the research, the context of the research, and the research problems which the researcher was seeking to address by finding answers to the proposed research questions.

Conducting a range of data collection activities in order to create a holistic picture of student attitudes towards, behaviours within, and interactions with on campus Social Informal Learning Spaces will has not only enabled the researcher to answer the research questions, but has also help to build a foundation on which further research in this field can be built, and the final section of this chapter describes how the thesis is structured.

Whilst this chapter by necessity does include information gleaned from some of the reviewed literature, the following literature review chapter (Chapter 2) takes a wider ranging view of previous research, and takes a deeper dive into the details of what Social Informal Learning Spaces are, and why they are such an important element of Higher Education Institution Campus infrastructure.

Chapter 2: Literature Review

2.1 Chapter Overview

This literature review examines the existing research about Social Learning Spaces and Informal Learning Spaces in order to place this research in context, and to enable the researcher to gain additional subject knowledge from different perspectives, which will help to support or refute the arguments made when writing about the study's findings, and therefore inform the conclusions drawn from this study (Bell, J., 1993).
Included in this chapter are the literature review search methods and results (2.2), the literature review results, analysis and discussion (2.3), and the rationale behind the literature review structure (2.4).

The literature reviewed is then discussed as viewed through Radcliffe's Pedagogy-Space Technology (PST) Framework (Radcliffe, 2009), separating each of the components of this model into discreet numbered sections (2.5.1: Pedagogy, 2.5.2: Space, 2.5.3: Technology).

2.2 Literature Review: Search Methods

The SCOPUS database was selected for this study, as it claims to contain the largest database of peer-reviewed literature across a range of academic disciplines (Elsevier, 2023), and provides a range of analytic tools which enable quick, reliable, and replicable results.

The initial search term Social Informal Learning Spaces produced 30,363 results, but most of the books and journal articles which appeared from this search were of little or no relevance to this study, suggesting the search term was too broad.

However, when quotations marks were places around "Social Informal Learning Spaces", zero results appeared, suggesting this search was then too narrow, and that the term coined by Boys (2009) has thus far failed to make its way into the academic lexicon, and underlining the need to include Social Learning Spaces and Informal Learning Spaces in both the literature search, and the search terms provided for this thesis.

Removing the word "Informal" from the search term, and searching for Social Learning Spaces provided 387,296 results, most of which, once again, were not relevant to this study.

However, by re-introducing the quotation marks, and searching “Social Learning Spaces” 68 books and journal articles were found, and by reviewing the abstracts, most of which appeared to be relevant, it became clear that this was a much more suitable search term.

By replacing “Social” with “Informal” to create the search term “Informal Learning Spaces”, 144 books and journal articles were found, some of which were also highlighted by the search for “Social Learning Spaces”, and some of which presented new books and journal articles to review.

The researcher reviewed the available literature surfaced by both revised search terms, examining at not only the information contained within them, but also the papers referenced throughout, to broaden the search further, and identify other potentially relevant key sources of information and insights.

2.2.1 Literature Review: Search Results

The Elsevier Scopus database was access through the University of Lancaster library website, and the following search terms used:

Search 1: Social Informal Learning Spaces

The following criteria were used for the initial search (Table. 5):

Title:	Social Informal Learning Spaces
Limit To:	All Fields

(Table. 5) Social Informal Learning Spaces Search Criteria

This search provide 0 results.

Search 2: Social Learning Spaces

The following criteria were used for the initial search (Table. 6):

Title:	Social Learning Spaces
Limit To:	All Fields

(Table. 6) Social Learning Spaces Search Criteria

Searching for Social Learning Spaces produced a total of 387,296 results, so the search was further narrowed by placing quotation marks around “Social Learning Spaces”, and changing ALL FIELDS to ARTICLE TITLE, ABSTRACTS, KEYWORDS, which narrowed down the search to 532 results. Further limiting the search to the last ten years (2013 - 2023) and ENGLISH LANGUAGE brought the number of results down to 63 (See Table. 7).

Document Type	**No.**
Article	29
Book Chapter	26
Conference Paper	6
Book	2
Conference Review	1
Total	63

(Table. 7) Final Social Learning Spaces search results typology

The abstracts of the 63 articles were reviewed to ensure they were relevant to the creation, study and/or design of physical Informal Learning Spaces, as opposed to virtual Informal Learning Spaces, which made up most of the content, reducing the number of articles to 17 (27%).

This surprisingly low number of relevant results suggested this field of research regarding Informal Learning Spaces is relatively new and emergent, or perhaps that there is little academic interest in the field, that the SCOPUS database is not as comprehensive as Elsevier would like us to believe, that the wrong search parameters were used, or perhaps that the phrase “Social Learning Spaces” may not be widely accepted as a descriptor for the kind of physical spaces we are interested in researching.

Search 3: Informal Learning Spaces

SCOPUS was searched again using the following parameters (Table. 8):

Title:	Informal Learning Spaces
Limit To:	All Fields

(Table. 8) Informal Learning Spaces Search Criteria

This initial search produced 35,19 results, then the search was further narrowed by placing quotation marks around “Informal Learning Spaces”, and changing ALL FIELDS to ARTICLE TITLE, ABSTRACTS, KEYWORDS, which narrowed down the search to 157 results. Further limiting the search to the last ten years (2013 - 2023) and ENGLISH LANGUAGE brought the number of results down to 144 (Table. 9):

Document Type	**No.**
Article	77
Conference Paper	35
Book Chapter	22
Review	4
Book	3
Conference Review	2
Editorial	1
Total	144

(Table. 9) Final Informal Learning Space search results typology

Of those 144 results, reviewing the abstracts reduced the number of relevant hits to 31, (22%), mainly due to the fact that most of the papers were about virtual Informal Learning Spaces opposed to the physical Informal Learning Spaces.

The top papers identified pertaining to both Social Learning Spaces and Informal Learning Spaces, and thee papers referenced within them were then analysed.

2.3 Literature Review: Results, Analysis & Discussion

The search term “Social Learning Spaces” produced a lower number of relevant items (n=63) with a higher percentage of relevance (17/3 = 27%), whilst the search term “Informal Learning Spaces” produced a higher number of relevant items (n=144), but with a lower percentage of relevance (31/144 = 22%).

Social Learning Spaces papers have been cited more often than Informal Learning Spaces (ILS = 119 : SLS = 397), although it should be noted that one particular Social Learning Spaces paper, The Changing Social Spaces of Learning: Mapping New Mobilities (Leander et al., 2010) accounts for

56% of those citations (224, n=397), being cited almost twice as many times as all of the Informal Learning Spaces papers combined by a ratio of 224:119. Whilst Social Learning Spaces citations peaked in 2017 (n=34) their citations dropped in 2018 (n=32) and 2019 (n=12), whilst Informal Learning Spaces articles seem to be gaining more traction in 2017 (n=27) 2018 (n=22) and 2019 (n=26).

It is also interesting to note that none of the top ten Social Learning Spaces or Informal Learning Spaces papers exist in both lists, and that 50% (n=10) of the Social Learning Spaces papers come from Australian Universities (3 from Queensland University of Technology, 1 from Queensland University, 1 from University of Ballarat) whilst 60% (n=10) of the Informal Learning Spaces papers came from UK Universities (2 From the University of Sheffield, 2 from Sheffield Hallam University, 2 from Loughborough University).

Whilst Loughborough University is the only institution to appear on both lists, the data suggests that the use of the terms Informal Learning Spaces and Social Learning Spaces may be dependent on geographical or cultural factors within the HEIs which produced the papers e.g. whilst Social Learning Spaces is more often used in Australia, Informal Learning Spaces is used more in the UK.

No Informal Learning Spaces or Social Learning Spaces citations before 2011 suggest this is still an emergent field, and whilst none of the top ten articles appeared in the same journals, suggesting that no particular publication predominates in this field, it is interesting to note that 4 out of the top 5 Social Learning Spaces papers and 1 of the top ten Informal Learning Spaces papers were published in journals dedicated to librarianship.

This is unsurprising, given that a great many Social Learning Spaces and Informal Learning Spaces exist with libraries, and therefore many researchers working in or with libraries are at the forefront of research and publication in this field, and it also echoes the findings of Cox (2017; Cox, 2018) who suggested that whilst this is still a relatively new and unexplored area, much of the existing research was undertaken by people working within the library sector charged with the task of reimagining their libraries, and making them fit for purpose for 21st century students (Yoo-Lee et al., 2013).

The terms Social Learning Spaces and Informal Learning Spaces appear to be used interchangeably, albeit not within the same papers, therefore whilst both should appear in the keywords of this paper, it is appropriate to use the term Social Informal Learning Spaces throughout, as it seems to be the emergent term used to describe the learning spaces we are studying, the meaning of which is most widely understood at UK HEIs, and it also helps to delineate this paper from virtual Social Learning Spaces studies.

Once identified, the top ten papers from both Social Learning Spaces and Informal Learning Spaces searches were reviewed, as were the citations and references contained within them, to identify authors and papers that have made a significant contribution the field, and those identified works were also reviewed along with the original papers they cited to ensure a sufficient breadth and depth of knowledge needed was attained to facilitate the writing of the Discussion & Conclusions sections of this paper.

2.4 Literature Review: Structure

The books and papers reviewed revealed a range of relevant information to be presented in this literature review, which is organised and presented throughout this chapter as viewed through the lens of the Pedagogy-Space-Technology (PST) Framework (Radcliffe, 2009), discussed in Chapter 1, to bring together the information in a cogent way which will aid in its application to the research findings and conclusions of this study.

2.5 Literature Review: Pedagogy - Introduction

Pedagogy is defined in Radcliffe's PST Framework (Radcliffe, 2009) as the types of learning which can be observed taking place, and this section examines the relevant research pertaining to this particular aspect of Social Informal Learning Spaces.

2.5.1 Literature Review: Pedagogy

Informal learning, defined by Matthews et al. (2011) as learning which takes place outside the classroom, which increasingly involves student use of personal learning devices to access virtual learning spaces and online resources, effectively enabling them to learn anytime and anywhere (Doshi et al., 2014; Kvavik & Caruso, 2005; Riddle & Souter, 2010), and research suggests that more learning actually takes place in (Social) Informal Learning Spaces than in formal classrooms (Brown and Lippincott, 2003).

Students therefore need access to spaces which facilitate Informal Learning, and HEIs are now facing an increasing need to provide a more expansive range of Social Informal Learning Spaces which encourage the kinds of social, informal, and networked learning that occurs without formal teacher-led intervention (Ellis & Goodyear, 2016).

One of the conceptual problems which occurs when we try to consider the differences between informal and formal learning is that they often seem to be considered in the literature as being binary opposites, such as in Matthews' (2011) definition, which suggests formal learning is that which takes place inside the classroom, and informal learning takes place outside of the classroom.

However, it is also entirely possible for informal learning to take place within a classroom, such as when students are engaged in active learning, and it is also possible for formal learning to take place outside the classroom, for example whilst students are on field trips, which suggests that the concepts of informal learning are far more nuanced and interconnected than they might first appear to be, as is suggested within Jos Boys' Towards Creative Learning Spaces (Boys, 2010).

Students need a variety of places in which to study when not engaged in formal, teacher-led learning activities within lecture theatres, classrooms, studios, and seminar rooms and some research suggests students often prefer learning spaces outside of traditional libraries (Beagle, 1999; Bennett, 2006; Bodnar, 2009).

It is important to note, once again, that many libraries have been at the leading edge of Social Informal Learning Spaces research and creation, and have sought to accommodate changing student needs by creating Social Informal Learning Spaces within their buildings which incorporate robust Wi-Fi networks, contain informal and flexible furniture, and also have more relaxed rules regarding noise and student behaviour, reduced or no supervision, and the consumption of refreshments, whilst still retaining areas within those buildings that provide a more traditional library study environment, which is predominantly for quiet, solo study (Bilandzic & Foth, 2013; Crook & Mitchell, 2012; Leander et al, 2010; Matthews et al., 2011; Yoo-Lee et al. 2013).

Social Informal Learning Spaces should facilitate social interaction amongst students and provide students with an environment in which they can engage in collaborative learning, and whilst a correlation between Social Informal Learning Spaces and positive academic outcomes cannot be directly claimed, research does suggest that by providing Social Informal Learning spaces for students can, albeit indirectly, make a positive contribution to student success.
(Matthews et al. 2011).

A lot of ideas surrounding the ways in which students use and interact within Social Informal Learning Spaces are based on the concept of social constructivism, which suggests the social and psychological elements of education are closely interrelated, that one cannot exist without the other, and that learners are members of a community and are empowered to learn is social situations (Dewey, 1897), and therefore Social Informal Learning Spaces should be designed to facilitate those social situations.

Students are attracted to places in which they can meet up with friends, and form communities of practice (Bickford & Wright, 2007; Hunter & Cox, 2014; Wenger, 1998), and many student Social Informal Learning

Space users become attached to particular spaces where they can engage in social, informal, and networked learning relatively free from externally imposed restrictions (Lefever & Bashir, 2011).

It is interesting to note, however, that when students have been observed in Social Informal Learning Spaces, they appear to form their own, self-regulated, modes of behavioural acceptability which create an environment conducive to study (Bryant et al., 2009, Crook & Mitchell, 2012; Harrop & Turpin, 2013; Hunter & Cox, 2014).

Research by Lave and Wenger (1991) also suggests that all learning is situated, that both the participants and the conditions under which learning takes place are inextricably linked, and that the divide between formal and informal learning suggested by luminaries like Diane Laurillard (2002) may not be quite as distinct and separated as her widely accepted Social Constructivist learning model might suggest (Boys 1990).

Research also suggests that not all student Social Informal Learning Space users choose to engage in what one might imagine to be social learning i.e. via interactions with their fellow students, but choose instead to engage in solo informal learning, but feel inspired to learn by being surrounded by others also engaged in similar tasks (Laurier, 2008; Hunter & Cox, 2014), with the option of interacting with others should they choose to do so during study breaks (Laurier, 2008; Hunter & Cox, 2014; O'Connor, 2005).

Other students deliberately seek out spaces where they are able to work in silence and will not be disturbed (Harrop & Turpin, 2013) depending on the learning tasks in which they are engaged, suggesting that whilst it may not be possible to create a definitive conceptual blueprint for Social Informal Learning Spaces that will prove suitable for all of the students all of the time, but by creating a diverse portfolio of Social Informal Learning Spaces across a Higher Education Institution campus, it should be possible to create a range of spaces which will suit the needs of the majority of students the majority of the time (McDonald, 2019).

Social Informal Learning Spaces may be used for short periods of less than one hour, for example between formal teaching sessions in FLS, and therefore they need to be in close proximity to those FLS to minimise travel time, and maximise utility (Harrop & Turpin, 2013; Hunter & Cox, 2014), but they may also be utilised for longer periods of time, sometimes for four hours or more, in which case students are prepared to travel across campus to Social Informal Learning Spaces they are familiar with, which they believe will offer them the environment they need to facilitate their particular learning tasks (Cunningham & Walton, 2016; Hunter & Cox, 2014; Matthews et al., 2011).

According to Lomas and Oblinger (2006), students have expressed a preference for Social Informal Learning Spaces which enable them to utilise learning tools such as PCs, laptops, and other mobile devices to connect indirectly with resources, staff, and students, underlining the importance of robust wi-fi connectivity and the availability of power points, which also allow them to connect directly with other students face to face should they wish to do so.

Whilst students value the time they spend in Formal Learning Spaces, such as lecture theatres, classrooms and laboratories, they also value the time they spend with their peers talking about themselves and their studies (Lomas & Oblinger, 2006), and this is where Social Informal Learning Spaces really come into their own, as they present valuable opportunities for students to develop their social skills, which is vitally important not just whilst they are studying, but also when they graduate and are working in the real world, where many of them will be expected to work and interact within shared workspaces.

Returning to campuses after the Covid pandemic lockdown, during which face to face communication was prohibited, and most, if not all, communication with their tutors and student colleagues was online, students need Social Informal Learning Spaces now more than ever where they can interact with fellow humans in a more naturalistic way and get used to working with, and around, others.

The research of Rhona Sharp (2014) looks at learners within Social Informal Learning Spaces, and in What Does It Take To Learn In Next Generation Learning Spaces?, she identifies six attributes which learners need to succeed in whilst studying in those environments. They need to be Engaged, Connected, Confident, Adaptable, Intentional, and Self-aware – see definitions below:

1. **Engaged:** based on the phenomenographic research work of Ellis et al. (2012), students need to be consciously engaged with the learning experience to be able to effectively participate.
2. **Connected:** Students must be adept at communication within digital environments using technology, and they must value those interactions to succeed (Sharp, 2014).
3. **Confident:** Not only must students be digitally competent, but they must also be confident in the use of those technologies (Seale et al, 2010), and / or confident to initiate interactions with other students (Jeffrey et al, 2011).
4. **Adaptable:** Students must also have resourcefulness and a broad range of strategies to be able to prioritise and overcome challenges and demands (Andrews & Tynan, 2012).

5. **Intentional:** Awareness of what they need to do, and taking ownership of their own learning journeys are also important, and students need to know how to utilise available technologies to meet their individual learning needs (Brown et al 2013).

6. **Self-Aware:** Students must be aware of their own learning needs and preferences (Anagnostopolou et al, 2009) and understand their individual needs when it comes to creating spaces and times specifically set aside for learning purposes (Holey, 2009).

It becomes clear when considering all of the above that the Pedagogy and Technology elements of Social Learning Spaces are inextricably linked with the Space element, as suggested in Radcliffe's PST Framework (Radcliffe, 2009) in terms of the facilitation of student study, which helps to validate both the model, and its use in this research, and once again underlines the vital importance of creating Social Informal Learning Spaces for our students on our campuses.

However, we should not forget Social Informal Learning Spaces are not just about studying, and research by Kumar & Bhatt (2015) suggests that students use these spaces for a variety of purposes and, indeed, it may very well be that these other uses of the spaces contribute to their informality and atmosphere: their study at the University of Nebraska suggested that whilst students did use Social Informal Learning Spaces for individual study (4%), group study (31%), and group discussions (60%), 12% used Social Informal Learning Spaces for unwinding by themselves, 9 % used them for socialising with other people, and 23% of students use Social Informal Learning Spaces for eating and drinking, underlining the need for all of those things to be considered and accommodated when designing these spaces, but it should be noted that none of the above activities are necessarily mutually exclusive.

2.5.2 Literature Review: Space

Space is defined in Radcliffe's PST Framework as the elements of the design of spaces which encourage the desired types of (social) learning behaviour, and this section examines the relevant research pertaining to this dimension of Social Informal Learning Spaces (Radcliffe, 2009).

Whilst the use of technology by students within Social Informal Learning Spaces has been somewhat under-researched (Cox, 2017; Hunter & Cox, 2014; Jamieson, 2009; Matthews et al., 2011), many of the environmental factors conducive to creating effective Social Informal Learning Spaces have received more academic attention, (Gifford, 2014), and there is a range of research available regarding the spaces themselves.

Research does suggest that student perceptions often focus on the way things look and feel, such as the layout and type of furniture, along with other factors such as air quality and temperature, sound and light levels, the colours of the wall and floors, along with the location of the spaces all of which can have an effect on the student choices of places in which they choose to study (Yang et al., 2013).

Paul Temple (2011) suggests that the physical form of the university i.e. its layout and buildings, and the spaces within those buildings may be linked not only to the "Brand" of the university (Temple & Shattock, 2007), but that the facilities for working and socialising provided on a campus may also increase not just the sense of community, but also the academic success of the students who study there.

Students often struggle to plan and utilise their time effectively, and so by providing Social Informal Learning Spaces on campus in close proximity to where students are attending scheduled formal learning sessions is important, and is the adequate provision of enough seating capacity within those spaces to accommodate them, especially at peak times, to help students make the most of their time on campus, and avoid feeling frustrated when confronted with the lack of availability of places to study (Riddle & Souter, 2012)

Ken Graetz (2006) posits students are affected not just physically, but psychologically by the environments in which they choose to study, and that aspects of the physical spaces can positively or negatively affect their learning, and so when designing Social Informal Learning Spaces we must consider not just the fixtures, the fittings and the furniture, but also things like the air quality, temperature and the availability of natural light and the effects they may have on students learning behaviours, and we will go on to look at some of the research in this area later in this chapter.

In the last decade, the design of Social Informal Learning Spaces has become more widely recognised as important when it comes to engaging and motivating students to engage in learning (Cha & Kim, 2015), and in 2012, Teesside University utilised the Radcliffe Pedagogy, Space, Time (PST) model (2008) to help them reimagine and redesign one of their existing spaces.

Collaborating with both staff from across the various departments and students at the Institution, they set out to redesign existing traditional library spaces and turn them into Social Informal Learning Spaces using action research to inform their decisions.

By interviewing students, they were able to gain a greater understanding of their wants, needs and requirements for the proposed Social Informal Learning Spaces using photographs to guide and stimulate the conversations.

The interviews were followed with more intensive focus groups, with designers, staff and students working together to evaluate the spaces which had been created, and the final spaces were evaluated using the JELS framework (Pearshouse et al, 2009):

2.5.3 Space: Furniture

Social Informal Learning Spaces need to work equally well for students who wish to work alone (Laurier, 2008; Hunter & Cox, 2014; O'Connor, 2005), and students who want to learn with others, and the range, flexibility and reconfigurability of the furniture needs to reflect those various learning possibilities, as well as being able to accommodate various group sizes (Bodnar, 2009; Cunningham & Walton, 2016; Harrop & Turpin, 2013; Hunter & Cox, 2014, Matthews et al., 2011).

The amount of furniture is also an important consideration – too much, and the Social Informal Learning Spaces feel overcrowded, too little and the spaces lose the perceived sense of community (Scannel et al., 2016; Kantrowitz & Evans, 2004).

Students may occupy Social Informal Learning Spaces for less than an hour, or for more than four hours at a time (Hagerstrand, 1973; Harrop & Turpin, 2013; Hunter & Cox, 2014), and therefore the tables and chairs provided must be comfortable, and accommodate a wide range of occupational timescales without having a detrimental effect on the occupants' wellbeing (Cha & Kim, 2015; Hunter & Cox, 2014; Matthews et al. 2011; Souter et al., 2010).

Research suggests group tables should be large, circular, and moveable to facilitate group work, but these larger tables may also be used by one or more students for individual study (Bryant et al., 2009, Crook & Mitchell, 2012; Cunningham & Walton, 2016; Harrop & Turpin, 2013; Hunter & Cox, 2014; Solomon et al., 2010). Tables provided for individual study should be large enough to enable students to be able to spread out their belongings to demarcate their personal space (Cunningham & Walton, 2016, Harrop & Turpin, 2013; Hunter & Cox, 2014; Vondracek, 2007), and Scannell et al (2016) suggest that it may also be useful to provide study carrels for those students seeking greater privacy).

Students seem to favour positions against windows and walls away from high traffic areas to increase their feelings of personal privacy and safety (Cox, 2011; Hunter & Cox, 2014; O'Connor, 2005), therefore it is important to consider not only the layout of the furniture, but also the architecture and design of the space itself.

A diverse range of comfortable, ergonomically suitable, and moveable seating should be provided, from more formal chairs for use at tables, to less formal soft chairs and couches (Cha & Kim, 2015; Harrop & Turpin, 2013; Matthews et al. 2011; Scannel et al., 2016; Sommer & Olsen, 1980).

The presence of vegetation within Social Informal Leaning Spaces may also increase student perceptions of wellbeing and suitability of a space, by evoking primal human preferences for environments (Harrop & Turpin, 2013; Matthews et al. 2011).

2.5.4 Space: Air Quality & Temperature

Air quality in Social Informal Learning Spaces is another factor which can significantly impact on student perceptions of a space in which they wish to study (Yang et al., 2013), but whilst both air quality air and temperature are mentioned in passing in the papers reviewed, no empirical data are presented regarding either factor, and no specific optimal provisions are suggested (Cox, 2018; Cunningham & Walton, 2016; Harrop & Turpin, 2013; Hunter and Cox (2014); Souter et al., 2010; Yang et al., 2013).

However, the UCISA (2018) HE Learning Spaces Toolkit suggests three recommendations:

- It should be possible to open windows for natural ventilation.
- Individuals respond differently to environmental factors, so there is a need to provide local user controls.
- If controls are provided, clear instructions should be produced and positioned alongside those controls.

2.5.5 Space: Sound

The effects of sound on learning are complex, involving factors such as decibel level, frequency, and reverberation, which can influence certain tasks, but very little research has been done to investigate the acoustic properties of Social Informal Learning Spaces in HEIs (Scannel et al., 2016).

However, research which is not specifically related to Social Informal Learning Space suggests that low frequency sound, such as from traffic or wind turbines, can interfere with tasks such as proofreading, whilst high frequency sounds can make verbal communication difficult, but can also, paradoxically, provide a level of speech privacy, and although sound may be an important factor to consider when creating Social Informal Learning Spaces , the research suggests students do not always perceive sound in predictable ways (Scannel et al., 2016).

Whilst background noise such as ventilation systems in empty spaces may be detrimental to study, sound such as speech in places occupied by people may be either conducive or detrimental to study, depending on the particular student's point of view, and their wants and needs at that time (Cunningham & Walton, 2016; Harrop & Turpin, 2013; Hunter & Cox, 2014; Scannel et al., 2016).

Some students may actively seek semi-supervised Social Informal Learning Spaces, e.g. in libraries if they wish to ensure noise levels are minimised, and potential disruptive behaviours are kept in check, especially when revising for examinations (Cunningham & Walton, 2016).

Students have also been observed working in Social Informal Learning Spaces wearing headphones, effectively cancelling out the ambient environmental noise, but then adding their own, whilst also sending out a "do not disturb" message to other space users (Harrop & Turpin, 2013).

The research about the effects of listening to music whilst studying shows mixed results, with some research suggesting that listening to music enhances the study process (Borella et.al., 2019; Gonzales & Aiello, 2019), whilst others research suggests it has a negative effect (Ferreri & Varga, 2016; Kampfe et al., 2011). Various factors such as the type of music being listened to, the volume of the music being listened to, the personality types of the students, and the tasks in which students are engaged are all important considerations, and recent research does suggest that people tend to listen to music less when engaged in difficult tasks, and that younger people tend to listen to more music whilst they are studying than older people (Goltz & Sadakata, 2021).

The matter is further complicated by the fact that the effects of sound on learning can vary by age, gender, and personality (Belojevic et al., 2012), which makes it difficult to design Social Informal Learning Spaces with sound levels and acoustic qualities which are suitable for all students (Cox, 2018).

2.5.6 Space: Light

Research suggests natural light is important to students when they study, and they like to be near a window with views of the outdoors whilst studying (Benfield et al., 2015; Harrop & Turpin, 2013; May & Swabey, 2015).

This is not only because natural light and external views are aesthetically pleasing, but they also give students a connection to both the outside world and the time of day (Cha & Kim, 2015, Cox 2018), although it should be noted that some students find views of the outside world distracting, and consider internal views within a Social Informal Learning Space to be more important, (Cox, 2018).

Artificial light within a Social Informal Learning Space is also important, not least because the quality and quantity of artificial light can not only affect the student ability to achieve certain tasks, but it can also change the perceived colours of the surrounding environment,
e.g. cool fluorescent lighting can make pale coloured spaces seem larger, quieter, or cooler, whilst making spaces utilising warmer colour schemes feel smaller, warmer, and louder (Gaines & Curry, 2011 from Styne, 1990).

2.5.7 Space: Availability and Location

Many students use Social Informal Learning Spaces before, after, and in between formal teaching sessions (Beagle, 1999; Bennett, 2006; Bodnar, 2009), and both availability and location are important factors which must be considered (Bilandzic & Foth, 2016;
Cunningham & Walton, 2016; Harrop & Turpin, 2013; Hunter & Cox, 2014; Riddle & Souter, 2012).

Social Informal Learning Spaces are often utilised by students for short periods i.e. less than one hour, to fill gaps between formal teaching sessions, therefore proximity to Formal Learning Spaces is important (Hagerstrand, 1973; Harrop & Turpin, 2013; Hunter & Cox, 2014), as students can become frustrated, and choose to leave the campus, when suitably located Social Informal Learning Spaces are unavailable (Riddle & Souter, 2012).

However, Social Informal Learning Spaces are also utilised by students who stay for longer periods i.e. over four hours, and for those students, availability takes precedence over proximity, and they are prepared to travel across campus to Social Informal Learning Spaces they feel will offer them the learning environment they need, and where they will not have to "fight" for space (Hunter & Cox, 2014), although it should be noted that during term time that may often not be the case, as such spaces get very busy (Cunningham & Walton, 2016; Matthews et al., 2011).

Twenty-four access is also desirable, especially during examination periods when students have fewer formal learning sessions, and more solo or group revision sessions of extended duration (Harrop & Turpin, 2013), and Social Informal Learning Spaces should be available for use without students needing to book ahead (Scannel et al., 2016).

2.5.8 Space: Colour

Colour is another factor to consider, due to the physiological and psychological effects research suggests can affect attention levels, emotions, behaviour, and achievement levels (Gaines & Curry, 2011; Yang et

al., 2013), but there appears to be very little research specifically regarding the use of colour in Social Informal Learning Spaces (Al Ayash et al., 2015; Wang & Russ, 2019).

Whilst there is a great deal of inconsistency in the research regarding the effects of Social Informal Learning Space colour schemes on students, it is generally agreed that the presence of too much colour within a learning environment can be overstimulating, whilst too little can create environments which are stressful and unproductive, therefore a balance needs to be struck between the two extremes (Gaines & Curry, 2011).

When it comes to colour choice, research suggest strong or primary colours should be avoided in Social Informal Learning Spaces e.g. strong reds can increase heart rate, blood pressure, perceptions of sound, and sense of smell, and have also been shown to affect reading performance (Stone, 2001), and to create environments conducive to academic study, subtle greens, blues (Gaines & Curry, 2011), or pale yellows (Al Ayash et al., 2015), are thought to be the most favourable choices, not least because they are perceived to have a positive, yet calming, effect (Clarke & Costall 2008).

2.6 Literature Review: Technology - Introduction

Technology is defined in Radcliffe's PST Framework as the technologies which are most effective at enhancing learning within learning spaces, and this section examines the relevant research pertaining to this particular element of Social Informal Learning Spaces (Radcliffe, 2009).

Technology in the context of this study not only includes the technological affordances provided within the Social Informal Learning Spaces, such as the provision of desktop computers, but also the various technologies which the students bring with them, such as laptops or mobile phones, and the various online platforms and resources which they access using their connected devices, such as learning platforms or online library resources.

The literature review suggests there are very few studies which look at the technologies which are used by students whilst studying within Social Informal Learning Spaces, with most studies tending to focus on either the Pedagogy i.e. the kinds of learning which is taking place within Social Informal Learning spaces, or Space i.e. the physical attributes and affordances of the of the rooms themselves, but data is available about the general use of technologies whilst studying by HEI students, which will give useful context to this study.

2.6.1 Technology: Technology Usage

The move towards student-centric social constructivist models (Boys, 2010; Cunningham & Walton, 2016; Jamieson, 2013) in recent years has been accompanied by increase in the ubiquity of personal learning devices amongst the HEI student population, with an estimated 98% of students having access to smartphones, 92% having access to laptops, and 35% having access to tablets (Educause, 2019).

Device availability, along with accessibility to robust Wi-Fi networks, combined with the online availability of resources, has played an integral part in the blurring of the boundaries between formal and informal learning in learning spaces (Leander et al., 2010).

As part of the 2021/2022 Joint Industries Systems Committee (JISC) survey (JISC. 2022), students in UK HEIs were asked about which technologies they used whilst studying, and whilst the results are not specifically about the uses of technology in Social Informal Learning Spaces, they do help to illustrate the kinds of technologies which students use in
their studies, and their levels of use within in UK HEIs (Table. 10):

Technology	%
Mobile Phone	68
Laptop Computer	66
Desktop Computer	43
Tablet Computer	24
Headset / Mic	7
Additional Screen	5
Webcam	3
None Of The Above	2

(Table. 10) UK HEI Student Technology Use - JISC Survey Data (JISC, 2022)

The students were asked to tick all options which applied to them, and the fact that the percentages add up to more than 100% suggest that some students use more than one of the listed devices whilst studying. The JISC Survey (JISC, 2022) also asked HEI students which systems, platforms, and applications they used to support their learning (Table. 11):

Technology	%
Live Video Classes	62
Virtual Learning Environment	32
Learner Dashboard	32
Online Assessment Platform	31
Collaboration Tools	27
None Of the Above	16

(Table. 11) UK HEI Student Systems, Platforms & Technology Use - JISC Survey Data (JISC, 2022)

The students were asked to tick all options which applied to them, which accounts for the higher than 100% usage statistics, and suggest that many students used multiple systems, platforms, and applications throughout this period.

The use of live video classes initially appears to be much higher than one might expect for traditional HEI students, until one takes into consideration the fact that the data was from students talking about working practices during the Covid pandemic, when they were all forced to work off campus and attend remotely, in which case it becomes a surprisingly low number when one might expect most, if not all, traditional face to face lectures to have taken place online during this time.

Probably the most surprising aspect of this data is that 16% of the students surveyed said they did not use any of the systems, platforms and applications listed during this time, but as this is not directly relevant to this study, it has been noted, but will not be discussed further.

The JISC survey (JISC, 2022) also asked students to give an example of which apps or tools they had found useful for learning, which gives an insight into what else they might be using their devices for whilst studying (Table. 12):

Technology	%
Microsoft Teams	29
Showbie	8
Google Classroom	6
Google	5
Canvas	5
Microsoft Word	4
Moodle	4
Kahoot	3
LearnZone	2
YouTube	2

(Table. 12) UK HEI Student systems, platforms, and applications use - JISC Survey Data (JISC, 2022)

Students were only allowed to make one suggestion, and there were 9823 responses to the question, with 138 tools mentioned, but it is clear to see that Microsoft Teams, the online collaboration tool, was by far the most popular choice, with almost 1/3 of the students selecting it.

Showbie, Google Classroom, Canvas, Moodle and LearnZone are all learning platforms, Google is a search engine, Kahoot is a quiz tool, and YouTube is an online video sharing platform, and the data suggests students use a wide variety of systems, platforms and applications whilst studying.

One of the few research papers reviewed which did collect some data specifically about the use of the technologies by students within Social Informal Learning Spaces was the study conducted at Sheffield Hallam University by Harrop and Turpin (2013) (Table. 13):

Technology	%
PC	80
Laptop	7
PC & Laptop	1
Printed Resources Only	12

(Table. 13) Technology used by students in Social Informal Learning Spaces (Harrop & Turpin 2013)

Harrop and Turpin (2013) went on to note that in one of the Social Informal Learning Spaces studied, the number of students using desks with PCs was significantly more than the number of students using desks without PCs, and that the proportion of students using Social Informal Learning Spaces without using any digital technologies at all was also significant, and was backed up by further data analysis which suggest that some students actively prefer spaces without digital technologies where they can read and write without distraction.

The researchers also expressed their surprise at the relatively low numbers of students observed using laptops, which they believed may be due, as Clark (2007) suggested, to student concerns about security issues, but they also noted that the provision of easily accessible power points in some Social Informal Learning spaces raised the amount of observed laptop usage, and recommended that more power points should be provided in future Social Informal Learning Spaces, even where desktop PCs were provided (Harrop & Turpin, 2013).

Following on from the work of Kvavik and Caruso (2005) and their ECAR study, which looked at student technology use in 63 Higher Education Institutions, asking them to assess their levels of technological confidence and competence, Riddle (2009) conducted his own study of technology use by students at La Trobe University in Australia. He found that 100% (n=19) of the students in the study owned their own laptops, but many were reluctant to bring them onto campus. Those students then found it difficult to gain access to computer technology whilst on campus, particularly at peak times, due to lack of PC availability. The students also expressed a desire for more Social Informal Learning Spaces on campus with extended opening hours, not only with open access PCs, but with more robust wi-fi and a greater number of electrical power points than were provided for them at the time (Keppel & Riddle, 2011).

However, it should be noted that this study took place well over a decade ago, and as the data collected in this current research suggests that whilst robust wi-fi and electrical power points still remain the highest priority for students on campus, they do seem to be more at ease with brining their own devices such as laptops and mobile phones onto campus with them to use in their studies (JISC, 2022).

2.7 Literature Criticism

By viewing the papers reviewed in the Literature review through the lens of the Pedagogy - Space – Technology (PST) model (Radcliffe, 2009), and addressing each of the areas in turn, it is possible to summarise the criticisms of the reviewed literature:

2.7.1 Pedagogy

Much of the literature reviewed up to a decade or more ago, and in many Higher Education Institutions pedagogical practices have changed and developed since then, with lecturers moving towards the incorporation of active learning strategies in formal teaching spaces and away from traditional sage-on-the-stage model of face-to-face lectures being the primary method of teaching (Boys, 2010; Cunningham & Walton, 2016; Jamieson, 2013, Morrison, 2014).

Whilst Matthews et al. (2011) define informal learning as learning which takes place outside the classroom, and Brown and Lippincott (2003) suggest that more learning takes place outside the classroom a than within it, it is important to acknowledge that informal learning can also take place within the classroom, that informal and formal learning are not necessarily binary opposites, and that that the types of learning taking place both inside and outside classrooms can move between the two learning types even during one learning and teaching session, depending on the teaching methodologies being employed by the lecturer

The reviewed research also suggests that not all student Social Informal Learning Space users choose to engage in interactions with their fellow students whilst studying, but choose instead to engage in solo informal learning, surrounded by others also engaged in similar tasks (Laurier, 2008; Hunter & Cox, 2014), with the option of interacting with others should they choose to do so during study breaks but once again, all of the papers reviewed are over 10 years old, and it will be interesting to see of this is still the case with contemporary students (Laurier, 2008; Hunter & Cox, 2014; O’Connor, 2005).

2.7.2 Space

Whilst libraries have traditionally been at the forefront of the development of many Social Informal Learning Spaces within their environs, there has been a distinct move to create Social Informal Learning Spaces across Higher Education Institution campuses outside of library spaces to accommodate growing student numbers increasing the burden on existing infrastructure ((Harrop & Turpin, 2013; Hunter & Cox, 2014; Jamieson, 2009).

Research suggests that many elements of Social Informal Learning Spaces such as room location, layout, furniture, temperature, sound, and light levels may have an effect on students perceptions regarding the suitability of those spaces for study (Yang et al., 2013; Riddle & Souter, 2012), but often these elements are considered in isolation as opposed to how they interact with the other elements (May & Swabey, 2015; Scannel et. Al, 2016; Gaines & Curry, 2011), and often these studies are about learning spaces in general, as opposed to Social Informal Learning Spaces in particular (Al Ayash et al., 2015; Wang & Russ, 2019).

Furniture is also an important factor to consider when creating Social Informal Learning Spaces, and their types, reconfigurability and comfort levels can all have an effect on whether or not students choose to study in these spaces (Bodnar, 2009; Cunningham & Walton, 2016; Harrop & Turpin, 2013; Hunter & Cox, 2014, Matthews et al., 2011), with students needing furniture which can allow them to study for extended periods of time ((Cha & Kim, 2015; Matthews et al., 2011; Scannel et al., 2016; Sommer & Olsen, 1980.

2.7.3 Technology

The use of technology by students within Social Informal Learning Spaces has been somewhat under-researched, with most of the studies reviewed focussing on either the Pedagogy or Space elements of Social Informal Learning Spaces, and once again it should be noted that much of the reviewed research which does consider student technology use dates back several years (Cox, 2017; Hunter & Cox, 2014; Jamieson, 2009; Matthews et al., 2011).

In more recent times, student ownership of mobile personal internet-enabled devices, and the provision of both online resources and online learning sessions, has increased to the point where they have become an integral part of the student learning landscape and their everyday working practices and the need for, and use of desktop PCs within Social Informal Learning Spaces has consequently declined as the student desire to learn anytime anywhere has increased (Doshi et al., 2014; Kvavik & Caruso, 2005; Riddle & Souter, 2010; JISC 2022).

2.8 Chapter Summary

This chapter examined both the process of conducting the literature review through the lens of the Pedagogy-Space-Technology (PST) Framework (Radcliffe, 2009), and then discussed the research surfaced in each of the areas (Pedagogy - Space - Technology) to build a holistic picture of the salient work which has already been conducted in this field.

The literature review identified that there are gaps in the literature, especially regarding the student wants, needs, preferences, and interaction with learning within Social Informal Learning Spaces, not least because many of those of the papers which do address the subject of this thesis were created over a decade ago, suggesting there is indeed a gap which needs to be filled by this research.

The researcher has also brought together research from many disparate fields such as architecture and design, acoustics, and psychology, as well as from the field of Education, which suggests the value of this research in bringing together all the information from all of these disciplines into one coherent thesis.

The literature reviewed was then used to inform the creation of the data collection instruments discussed in the next chapter of this thesis (Chapter 3), and the subsequent discussion of the results and findings which can be found in chapter 4.

Chapter 3: Research Design

3.1 Methodology: Chapter Overview

In this chapter, the researcher discusses the methodology and methods used to design the data collection instruments and includes descriptions of the rationales behinds why particular decisions were made during the creation of those data collection instruments (3.2)

The research then talks about the deployment of the research instruments during the Social Informal Learning Space Observations, including a section about how and why the Social Informal Learning Spaces were chosen (3.3), before going on to explain how the questionnaire was developed and how the subjects for the Questionnaire and the Focus group were selected, and the researcher concludes the chapter by discussing the potential pros and cons of insider research.

The instruments have been designed to enable the researcher to answer the following research questions, as set out in Chapter 1 (1.6):

ORQ. What are the wants, needs and preferences of students with regards to Social Informal Learning Spaces, and how do they engage with learning whilst studying within those spaces?

RQ1. Who uses Social Informal Learning Spaces?

RQ2. Why do students choose to study within Social Informal Learning Spaces?

RQ3. What are the wants, needs, and preferences of students when choosing Social Informal Learning Spaces?

RQ4. Where do students choose to study when not engaged in formal teaching activities?

RQ5. Where should Social Informal Learning Spaces be located on campus?

RQ6. When do students use Social Informal Learning Spaces?

RQ7. How do students engage with learning within Social Informal Learning Spaces?

The data collected were analysed using appropriate methodologies, and then discussed as viewed through the chosen lens of the Pedagogy - Space - Technology framework (Radcliffe, 2009).

3.2 Methodology: Research Design

Research suggests mixed methods case study methodologies are the most widely used and most appropriate methodology in the field of learning space research and, according to Yin (2003), such methodology allows the researcher to explore phenomena involving individual or collective behaviours within particular boundaries such as time and place, time and activity (Stake, 1995) or by definition and context (Miles & Huberman, 1994), and binding the case helps to ensure the research remains within scope (Baxter & Jack, 2008).

Case studies utilise a constructivist research paradigm, which fits well with the researcher's research philosophy, and is based on the idea that reality is a social construction, and is appropriate when answering "how" and "why" questions, when it is not possible to affect the behaviour of the subjects of the study, and the boundaries between the phenomena and their context are both relevant and unclear (Baxter & Jack, 2008).

By allowing for the collection and analysis of multiple forms of data, and the exploration of a phenomena through multiple lenses, an illustrative case study methodology is the most suitable method for this research, not least because it has the potential to reveal multiple things about Social Informal Learning Spaces and their student users, allowing the researcher to identify both commonalities and differences in user behaviours across a range of Social Informal Learning Spaces (Baxter & Jack, 2008).

To investigate the wants, needs, preferences, and behaviours of student users of Social Informal Learning Spaces on Higher Education Institution campuses, the researcher decided the best way to answer the research questions would be to adopt a mixed methods methodology, and create and deploy a questionnaire, make observations of students working within Social Informal Learning Spaces on a single Higher Education Institution campus, and facilitating a student focus group.

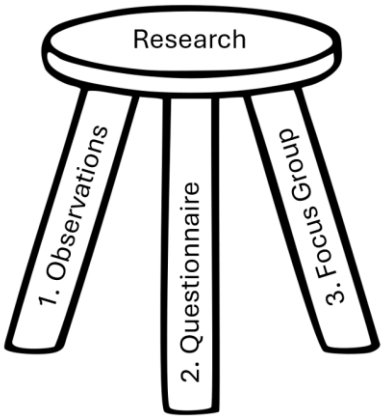
Habermas posits that the things people say are not merely decontextualized statements, but derive meaning from the contexts in which they are placed, and that discourse should be empowering and free from domination or repression, requiring a level of mutual understanding between participants (Habermas, 1970).

The size of the samples must also be considered, and it was unclear at the outset how large the sample sizes for each of the data collections would be. Whilst it was originally anticipated that it would be possible to email the online questionnaire to all members of our students community, this proved not to be the case, but according to the Advance HE (2016) report Rising Response Rates, a typical response rate of

25% for a national survey can be expected, and with a combined student population of almost 38000, that would suggest 9500 responses, which would have created an overwhelming amount of data to analyse.

The researcher recently attended a seminar about research methods within their institution, where it was suggested that internal surveys produced an average response rate of around 2.5%, which would provide around 950 sets of data for analysis, which is still a significantly large number of data sets, and not dissimilar to the amount of data collected during the observations, which should allow the conclusions which can be drawn from that data to be useful, and the combination of both qualitative and quantitative types of data, collected and analysed using the methods outlined above, have enabled the researcher to answer the research questions adequately.

To increase the objectivity, validity, and reliability of the results of this study, and to help to mitigate against potential insider researcher bias, the researcher has chosen to deploy three distinct methods of data collection, to create a three legged stool of research data, which can be placed upon the uneven surface of research which has gone before, to create a steady platform on which to build the discussion, and the subsequent conclusions of this study (Fig 2):



(Fig. 2) Three Legged Stool of Mixed Methods Research (McDonald, 2023)

1. Observations of the students within Social Informal Learning Spaces
2. A questionnaire to collect qualitative data from students
3. A focus group to collect qualitative data from students

The results of the large data set from the observations will be used to underpin the results of the relatively small data sets from questionnaire and focus group, and each of the three sets of data will be analysed in Chapter 4 (Results & Findings), and then discussed in Chapter 5 (Discussions), and once again in chapter 6 (Conclusions) when viewed through the lens of the Pedagogy - Space -Technology theoretical model (Radcliffe, 2009).

3.3 Methodology: Social Informal Learning Space Observations

3.3.1 Social Informal Learning Space Selection

The Higher Education Institution studied has many rooms which could be regarded as Social Informal Learning Spaces around the campus both inside and outside the library, and many rooms which might not be conventionally regarded as Social Informal Learning Spaces, such as empty classrooms and building atria, which may be used as Social Informal Learning Spaces by students.

However, the institution does have eleven formally designated Social Informal Learning Spaces spread across the campus which are known as General Study Spaces, and each of these was visited on three occasions, at different times and on different days in January 2022 to assess their suitability for this study based on the following criteria:

1. **Ease of access** - it was important that the researcher was able to gain unhindered access to the Social Informal Learning Spaces in order to facilitate data collection.
2. **Geographical location** - the Social Informal Learning Spaces needed to be located at different points across the campus, to try and gain a wide variety of data, and eliminate location as a factor, but also needed to be easily reached without having to travel the entire length and breadth of the campus each time sweeps took place.
3. **The number of students using them** - some of the Social Informal Learning Spaces had little or no occupancy during the visits, and were therefore eliminated from inclusion, as the data sets would have potentially been too small to be of use.
4. **The ability to collect data without disturbing the students** - the whole point of Social Informal Learning Spaces is that they are spaces in which students study, and the researcher wanted to ensure that no students were disturbed from their work during the data collection sweeps.

Of the eleven designated Social Informal Learning Spaces General Study Spaces on our campus, three were selected which the researcher felt best met the above criteria, and they were assigned the names Social Informal Learning Spaces X, Y and Z.

Maps of the three Social Informal Learning Spaces were created to facilitate data collection during the ethnographic sweeps, along with descriptions of the spaces:

3.4 Observation Data Collection

The Social Informal Learning Space student observation data collection took place over a period of three months, from January 2022 to March 2022, and consisted of a series of visits to three different Social Informal Learning Spaces across our campus on different days of the working week (Monday to Friday) and at different times of the working day (From 8am to 6pm) to enable the researcher to conduct a series of non-invasive ethnographic sweeps.

Ethnographic sweeps are a tried and tested way for researchers to record qualitative and quantitative data with the minimum of disruption to the participants, and are used in a wide variety of disciplines from anthropology to architectural design to observe the individual and collective behaviors of people in social activity spaces (Given & Leckie, 2023).

Traditionally in ethnography, researchers embed themselves with the group which they wish to study, which was not necessary in this case, because the researcher was already embedded withing the Higher Education Institution being studied, and ethnographic researchers usually spend an extended period of time observing the behaviors of the group, asking questions, listening to the interactions of the group members, and making notes (Bryman, 2008).

However, at least for this part of the research, the researcher limited the activities to conducting swift and silent observations, and the ethnographic sweeps of the room were conducted in such a way as to minimize the disruption of the students, with the researcher making notes on pre-prepared paper plans of the rooms about where the students were sitting, and what equipment and resources they were observed to be using.

From this data a series of 50 room maps for each location was created, one for each date, location and time, with each seating location within each of the Social Informal Learning Spaces given a number, and the results were tabulated to provide an analyzable data set of not just individual genders, positions, and equipment and resource use, but also to provide an overall picture of the ebb and flow of the numbers of students using each of the Social Informal Learning Spaces at various times throughout the days of the working week.

3.5 Questionnaire Development

Questionnaires are a useful data collecting instrument used in many different areas of research to elicit qualitative or quantitative data, and can be very useful when relatively large data sets are required, and the researcher may not be able to speak to all of the individuals in person (Cohen et al, 2011).

However, as Cohen et al (2011) also point out, whilst this method may be relatively easy to administrate and analyse when compared to some other data collection methods, it may give rise to data sets which are unsophisticated and have limited scope when it comes to their analysis, which is why it was decided early on that this would be only one of three data collection methods used, alongside the observations and the focus group.

Most effective when used in conjunction with other research methods, as in this case, the questions within questionnaires need to be unambiguous, clear, and easy to understand (Kumar, 2019), especially if the interviewer is not going to be with the respondents when they fill it out, and it is also important that the questions are not leading, which may skew the results, and that the questions should be set out in a user-friendly manner, and be in a logical order (Grix, 2019).

3.5.1 Pilot Questionnaire

The questions in the questionnaire were created after reviewing the literature, which enabled the researcher to decide which areas of the student thoughts, feelings and experiences of working within Social Informal Learning Spaces should be focussed upon, and which would subsequently enable the researcher to create a detailed and balanced picture of the subject being studied (Altrichter, 2008), by facilitating the capture of data which would allow the analysis of relationships between variables of interest (Castro et al., 2011).

The initial pilot questionnaire was created and piloted with a small group of students (n=6) to ensure the fitness for purpose of the data collection instrument by sending a Bristol Online Surveys link out via email to six students, who were asked to fill it out independently, and the survey also included some questions asking the subjects to give some feedback about the questionnaire itself, which would be omitted from the final survey.

After the initial pilot, the researcher removed some of the questions, amended some of the remaining questions to improve their clarity, added to the information given before the questionnaire to ensure that subsequent participants had all of the information they needed to be able to fill out the questionnaire

independently without the researcher being present, and also removed the open ended qualitative questions which it was felt by the researcher and the pilot group would be able to be answered more fully and completely within a focus group.

It is always important to consider during the creation of a questionnaire that enough questions are asked to enable the researcher to answer the research questions, but not to overwhelm the subjects by asking too many questions, and whilst the first iteration of the questionnaire originally contained 75 questions, which the subjects in the pilot session felt was too much, and that some of them were too similar and repetitive in nature, so the researcher took on board this feedback and reduced the final number of questions on the questionnaire to 45.

3.5.2 Questionnaire Data Collection

Unable to obtain permission to send out the questionnaire to all of the students across the Higher Education Institution, the researcher collected the data from a subset of the institution consisting of 27 members of the current (2022/2023) cohort of the Laidlaw Leadership and Research Scholarship Programme.

As one of the creators of the scholarship programme, which aims to develop a new generation of leaders and researchers by investing in talented and motivated undergraduate students, giving them the knowledge, skills, and experience to become active global citizens and future leaders inside and outside academia, the researcher was able to introduce and deploy the online questionnaire during a break during a scheduled Laidlaw Scholarship event.

The scholars on the programme come from many different academic disciplines from all of the Faculties across the institution, and is made up of a mix of male and female students from a wide variety of socio-economic backgrounds, and therefore can be considered to be a microcosm of the wider undergraduate community, which makes them an ideal subject group for this research, although it should be noted that by their very nature they are particularly engaged students, which may potentially have had an effect on the collected data.

However, it should be noted that whilst the researcher has access to the group as one of the leaders of the programme, he has no direct influence over the student grades or learning outcomes, and was therefore not in a position to exert any undue influence over how the students responded to the questionnaire.

The questionnaire was uploaded to Bristol Online Surveys, and a link sent out to all of the students, but rather than having the students answer completely independently in their own time, a one hour session was scheduled during a Laidlaw Scholarship event for the data collection to take place.

The researcher introduced the survey to the group, explaining its purpose, how the data was going to be used, how the subjects' anonymity would be preserved, and how the relevant data protection rules and regulations would apply, and then asked the students to take their time, answer all questions fully, and how they could ask questions if necessary.

The students were also asked to answer the questions openly and honestly, and not talk to their colleagues about their answers in order to try and mitigate against potential collusion, and a potential skewing or homogenisation of the data being collected.

The session went remarkably smoothly, with very little conversation between the students as they filled out the survey answers, and there were no questions asked of the researcher after the verbal introduction, suggesting that the verbal instructions, which were repeated on the online questionnaire, and the questions themselves, were clear and unambiguous.

The majority of the students answered all of the questions well within the allotted one hour timescale, and then talked quietly amongst themselves until everyone had completed their questionnaires, and it became clear during the data analysis that all of the respondents had answered most, if not quite all, of the questions during the time given to them..

3.6 Focus Group Interviews

Focus groups are a useful way of gaining a deeper level of information and understanding about a particular subject or area of interest from a group of individuals, and this is a method of data collection often used in educational research, which can be very useful when and trying to elicit information from a group of people who have a shared experience regarding the subject matter which is being discussed (Watts & Ebbutt, 1987).

However, whilst focus groups do have a lot of potential to enable researchers to answer research questions, there are some limitations to the effectiveness of focus groups, such as a lack of control of the way the conversation is flowing, which can only be mitigated somewhat by intervening and asking the right questions at the right time. The data can be difficult to analyse, focus groups can be difficult to organise,

transcription often takes far more time than it would with one to one interviews, and sometimes one or more participants may dominate the conversation, not allowing the other participants to have their say, leading to the potential for problems such as group effects, which may skew the data in one direction or another depending on the views of the dominant personalities (Bryman, 2008).

One-to-one interviews can prove invaluable when a researcher is interested in the views, feelings, or perceptions of individual, and are particularly useful when dealing with matters of a sensitive nature, where confidentiality is paramount (Livingstone, 2013), and whilst both focus groups and interviews are commonly used in research, the researcher decided to favour the former over the latter, due to the non-sensitive nature of the questions being asked, and the added potential for group interaction allowing participants to spark off one another's ideas (Grix, 2019), which indeed proved to be the case when the focus group took place.

As previously stated, it is important to ask the right questions at the right time, to keep the conversation flowing, whilst being mindful of what is being said, who is saying it, and how the group reacts to what they have said**,** and to ask any pertinent questions to move the conversation along or to elicit information from the quieter members of the group.

3.6.1 Focus Group Data Collection

A one hour meeting with 11 students was convened on campus in April 2022 in Social Informal Learning Space X, one of the spaces which was being studied, the idea being that if the students were actually in a Social Informal Learning Space whilst answering the questions, it might help to inspire them, direct their focus to the task in hand, and give them a greater understanding of the subject.

The most under-utilised of the three Social Informal Learning Spaces studied, Social Informal Learning Space X was empty when the focus group took place, which allowed us to pull together two of the high tables, re-arrange the seats, and talk without running the risk of disturbing other students and interestingly, none of the students had ever visited that space before and, in fact, almost all of them admitted they had no idea it even existed.

Having already answered the questionnaire, and having agreed to participate in the focus group, all of the students felt that they knew what was happening and why, but once the students had agreed they were happy to be recorded, and iPhone recording had started, the researcher took the time to explain what was

going to happen once again, how their anonymity was to be assured, and that the recording would be deleted after the data had been transcribed in accordance with data protection regulations.

After the initial question had been asked: What is your favourite Social Informal Learning Space and why? The conversation was very free flowing, with some students making multiple comments, often prompted by the answers of the other people within the focus group, so much so that the researcher had to ask the students to slow down, and try not to talk over each other, and to bear in mind that the conversation would late be transcribed.

The potential problem of two or more students talking at the same time was ameliorated by the researcher handing one of the students a pencil, and nominating it as the "talking stick" i.e. only when was holding the pencil was one allowed to talk. The students were most amused by this development, but as requested they proceeded to pass the "Talking Stick" to one another across the table to give everyone a chance to contribute, and whilst this did slow down the pace of the conversation as intended, it did not appear to impede the data collection, and the researcher felt that it was the right decision, which was borne out when the transcription process took place.

3.7 Data Analysis

3.7.1 Social Informal Learning Space: Observation Data

Observations were conducted within three Social Informal Learning Spaces on campus on various days and at various times between 08:00 and 18:00 over a period of twelve weeks to gain an understanding of how students choose to work within, and interact with, those spaces.

The observation data was examined and then transferred into Excel spreadsheets to enable the researcher to compare and contrast the data from the different Social Informal Learning Spaces, and then subsequently to bring all that data together into a master spreadsheet to facilitate its discussion, and to allow conclusions to be drawn from it.

The researcher did not anticipate how many students would be observed during the data collection process, and that such a large volume of data would be created, which mean that it took a great deal of time and effort to not only create the spreadsheets, but to analyse the data and to be able to draw useful conclusions from it.

However, despite the large data set, the data collected from the Social Informal Learning Space observations is just quantitative, which did mean that once it was placed into Excel spreadsheets it was relatively easy to manipulate and interpret, with Excel enabling the researcher to produce illustrative charts and graphs to present the information in a clear graphic manner in the results and discussion section.

3.7.2 Social Informal Learning Space: Questionnaire Data

All of the data collected from the questionnaire can be considered to be quantitative research, as it provided quantitative data in terms of the numbers of responses to the various possible answers, which were subsequently analysed using quantitative data analysis methods utilising the available tools provided by Excel.

Data collected from each Likert scale question was collated into frequency tables, and then analysed using the Excel tools, enabling the researcher to identify patterns in the data relevant to the research question by determining the mean, median and mode responses, and which were then be represented in the findings with a variety of histograms and pie charts.

3.7.3 Social Informal Learning Space: Focus Group Data

The data from the open-ended questions used in the focus group provided qualitative data, was collected via an iPhone recording, after which it was transcribed, and analysed by the researcher to identify themes and patterns within the qualitative data using thematic analysis, which emphasises the ways that versions of reality are accomplished though language (Bryman, 2008), and it enabled the researcher to read and interpret the meaning of the words in order to allow exploration of the conversations which took place (Cohen et al, 2007)..

A widespread approach to qualitative data analysis (Bryman, 2008), thematic analysis is a method used by researchers which offers the potential of drawing complex, rich and detailed information from qualitative data by enabling them to identify, analyse, and report themes which emerge from that data, which are those elements of the qualitative data which capture something pertinent to the research, and have some sort of relevance or meaning to the research questions being asked (Braun & Clarke, 2006).

By assigning symbolic meaning to information within the data by assigning a series of codes to the various sections of data (Miles and Huberman, 1994), the researcher identified patterns and areas of interest, which

enabled links to be made between responses from the various subjects regarding areas of interest that are salient with regards to the research questions (Cohen et al, 2007).

As suggested in Techniques to Identify Themes (Ryan & Bernard, 2003), the researcher manually coded the data by looking for repetitions, categories, differences, and similarities contained within it, to identify the following emerging themes, which were then grouped together under the three headings taken from the Pedagogy - Space - Technology (PST) Framework (Radcliffe, 2009), and which will discussed in detail in Chapter 4:

Pedagogy: Emerging Themes

- Studying
- People
- Noise

Space: Emerging Themes

- Convenience
- Availability
- Food & Drink
- Comfort

Technology: Emerging Themes

- Power Sockets
- Wi-Fi
- PC Availability

It should be noted that he researcher's original intention was to collect data from focus groups at Social Informal Learning Spaces across several HEI campuses, but gaining permissions to do was not possible, due to the ongoing Covid-19 situation at the time, and so data were only collected from a single group of scholars from the Institution studied.

3.8 Insider Research

The researcher works at the Higher Education Institution where the research takes place, and therefore this study may be considered to be a piece of insider research, a term often associated with sociologist or anthropologists conducting ethnographic field research (Sikes & Potts, 2008).

Insider research is a relatively new research trend, a great deal of which takes place within the field of education, with many educators now engaging in practitioner enquiry, which forms part of the field known as action research (Hellawell, 2006).

Defined by Naples (2003) as the study of one's own society or social group, and Loxley and Seery (2008) suggest that insider research is undertaken by researchers who share the same characteristics of the group being studied, and whilst the researcher is indeed a member of the society being studied i.e. the Higher Education Institution, and does share many characteristics with the subjects, neither definition seems particularly apposite in this case.

However, the definition of insider research by Merton (1972) as research which is undertaken by one who has an intimate knowledge of the community and its members does indeed confirm that that, in this case, the research has indeed been conducted by an insider researcher, albeit one who works on the periphery of the group being studied, so whilst the researcher is a staff member at the Higher Education Institution where the research took place, the actual group studied was made up of students, and therefore from this perspective the researcher may actually be considered to be at least a partial outsider, which should help to mitigate against any potential insider researcher problems.

Insider researchers often already live or work in the setting where the study is taking place, and can be considered to be "researching professionals" as opposed to "professional researchers" (Wellington & Sikes, 2006), and that is also certainly true in this case, with the researcher holding prior experience, understanding and knowledge of the group which is being studied (Greene, 2014).

One of the criticisms often levelled at insider research is that there may be potential problems associated with the objectivity, validity, or reliability of the results due to the pre-existing position of the researcher within the group being studied (Sikes & Potts, 2008), and Aguiler (1981) suggested that insider research, and subjective involvement, may become a barrier when it comes to objectivity.

Being an insider researcher may also potentially lead to bias or a loss of objectivity with regards to the interpretation of the results and the conclusions drawn from the collected data, and may also create methodological or ethical issues which also need to be considered, especially with regards to any consequences of the study (Atkins & Wallace, 2012).

Greene (2014) suggests that insider researchers may have problems with confidentiality, if they have access to information which an outsider researcher may not have, power dynamics, if they are in a position of potential influence over the subjects studied, and that insider researchers may become over familiar with the subjects, which again might negatively affect the results of the study, but none of these aspects have been a particular feature of this study.

There are also potential advantages to being an insider researcher, and in this case working at the Higher Education Institution where the study takes place has meant that the researcher has a great deal of prior knowledge of the culture, and has been able to take advantage of the ability to blend in with the subjects (Aguiler, 1981), move freely about the campus, and observe and interact with the students (Bell, 2005), and undertake data collection whilst also being able carrying out regular working duties.

The researcher has also been able to effectively utilise existing contacts within the organisation to gain access the students who participated in the study by filling out the questionnaires and taking part in the focus group, which would not have been possible if the researcher came from an outside organisation.

Lincoln and Guba (1985) suggest there are several ways to mitigate against potential insider researcher bias such as persistent observation, prolonged engagement, and triangulation i.e. the use of multiple sources and types of data (Denzin, 1978), all of which have been employed during this research to mitigate against potential insider researcher bias, and have helped to increase the objectivity, validity, and reliability of the results of this study.

The researcher acknowledges they have been in a privileged position to be able to undertake this research in the way that it has been undertaken, but by using a variety of data collection methods to collect both qualitative and quantitative data using a variety of methods from a relatively large group of the student population (745 observed individuals / 27 questionnaire respondents / 11 Focus Group members) the researcher believes they have managed to mitigate against many of the potential problems which insider research might present.

3.9 Chapter Summary

In this chapter, the methodologies for creating the data collection instruments are discussed, along with the rationale behind which Social Informal Learning Spaces were selected for study during the observation phase, and how and why the students were selected for the questionnaire and the focus group phases of the research.

Following on from the data collection instrument design, and room and subject selection, the researcher then talks about the actual process of data collection from the Social Informal Learning Space Observations, questionnaire, and focus group, including how the data was collected and why the data was collected in those particular ways.

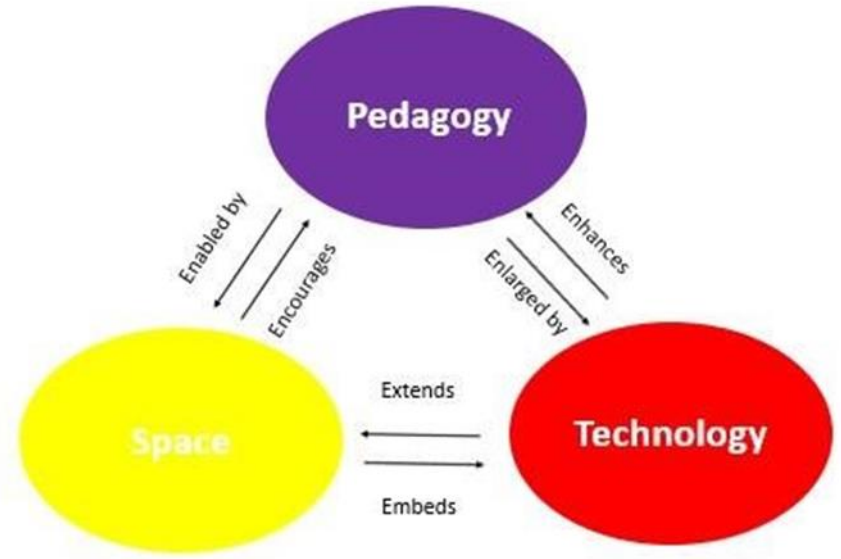
The researcher concludes the chapter by discussing the potential pros and cons of insider research.

In Chapter 4 the researcher will present and analyse the results from the data collection.

Chapter 4: Results & Findings

4.0 Results and Findings: Chapter Overview

This chapter examines the results, and presents the findings from, the data collected from the Social Informal Learning Space observations (4.2), the questionnaire (4.3), and from the focus group (4.4). The results and findings section contains observations, tables of collected data, and heat maps of the Social Informal Learning Space layouts. The data is interpreted through the lens of the Pedagogy-Space-Technology (PST) Framework (Radcliffe, 2009) discussed in Chapter 1 (Fig. 3):



(Fig. 3) Pedagogy-Space-Technology (PST) Framework (Radcliffe, 2009)

Focus	Conception & Design	Implementation & Operation
Pedagogy	What type(s) of learning are we trying to encourage?	What types of learning can be observed taking place?
Space	Which elements of the design of the space will encourage those types of learning behaviour?	Which aspects of the design of the space work, and which do not?
Technology	How is technology deployed within the spaces to encourage those learning behaviours?	Which technologies are most effective at enhancing learning within these spaces?

(Table. 14) Pedagogy-Space-Technology (PST) Framework Definitions (Radcliffe, 2009)

It should be noted at this point that Chapter 4 does form, by necessity, a large part of this thesis due to the rigorous and systematic analysis of a very large data set which was needed to enable the researcher to create a wide ranging and detailed holistic picture of the student use of Social Informal Learning Spaces to enable the answering of the research questions.

4.1 Social Informal Learning Spaces Observations

4.1.1 Pedagogy: Introduction

Pedagogy is defined in Radcliffe's PST Framework (Radcliffe, 2009) as the types of learning which can be observed taking place, and whilst during the observations it was not possible to find out what tasks the students were engaged in without disturbing them, it was possible to record group sizes and patterns of Social Informal Learning Space usage, and use them to infer the types of learning taking place.

4.1.1.1 Pedagogy: Group Sizes

The key concept behind Social Informal Learning Spaces is to create spaces which are conducive to social informal learning, and examining the data from Social Informal Learning Spaces X, Y and Z together paints and interesting picture of the kinds of learning happening within the Social Informal Learning Spaces.

When the data from all three Social Informal Learning Spaces are collated, on average, 47% (348/745) of students were working on their own, 49% (363/745) were working in pairs, and 5% (34/745) in groups of three. No groups of four or more were observed working together during the observations. This suggests that Social Informal Learning Spaces are most often used for solo work, or very small groups, which most often consisted of just two people (Table. 15):

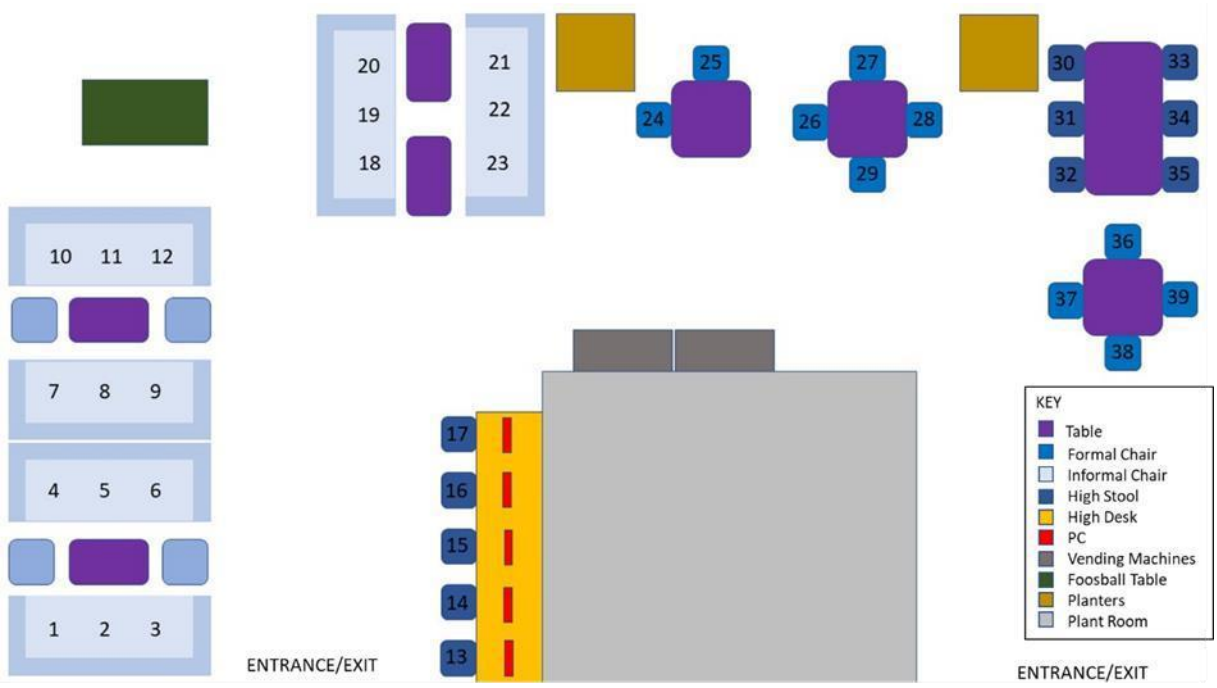
Group Size	**1**	**2**	**3**	**4+**	**TOTAL**
Social Informal Learning Space X	68	36	0	0	104
%	**65**	**35**	**0**	**0**	**100**
Social Informal Learning Space Y	238	36	16	0	290
%	**82**	**12**	**6**	**0**	**100**
Social Informal Learning Space Z	42	291	18	0	351
%	**12**	**83**	**5**	**0**	**100**
TOTAL	**348**	**363**	**34**	**0**	**745**
%	**47**	**49**	**5**	**0**	**100**

(Table. 15) Group Sizes Observed In Social Informal Learning Spaces X, Y & Z

It is interesting to note the differences between the three Social Informal Learning Spaces in terms of observed group sizes, which suggests Social Informal Learning Space Y may more be conducive to solo work, whilst Social Informal Learning Space X and Social Informal Learning Space Z are more suitable for working in small groups.

In Social Informal Learning Space Y, 82% (238/290) of students worked on their own, compared to in 65% (68/104) Social Informal Learning Space X, and 12% (42/351) in Social Informal Learning Space Z, and this suggests students are more likely to work on their own in Social Informal Learning Space Y than in the other two spaces.

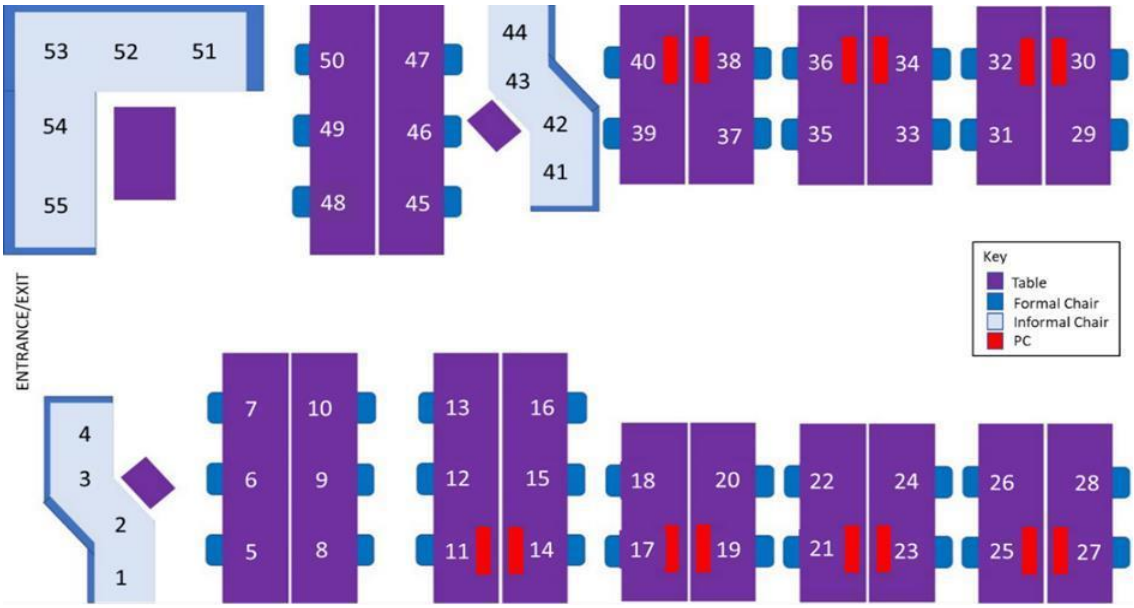
Social Informal Learning Space Y has a very rigid layout, and mostly contains fixed formal desks in rows, and the lack of moveable chairs and tables to gather around may go some way to explaining why students find it more suitable for solo work, as opposed to working in groups of two or more, suggesting the layout of, and furniture within Social Informal Learning Spaces has an influence on the kinds of learning which happens there (Fig. 4):



(Fig. 4) Social Informal Learning Space X Room Numbering

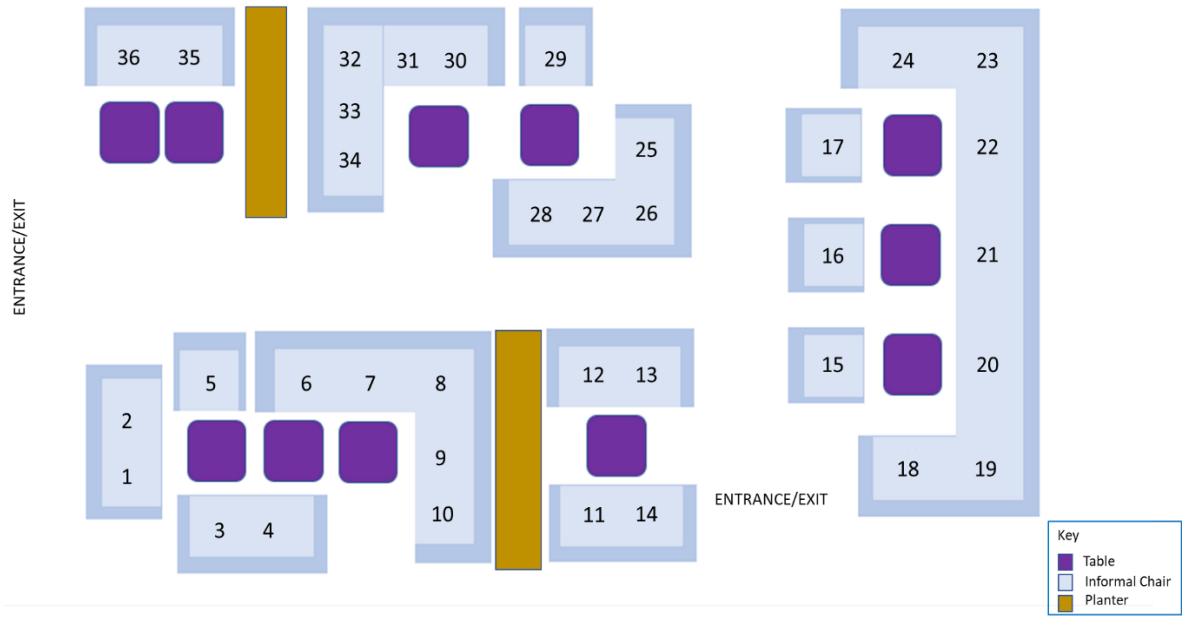
Social Informal Learning Space X has a much more informal layout than Social Informal Learning Space Y, with combination of fixed and moveable, formal and informal furniture, and in Social Informal Learning Space X, 35% (36/104) of students studied in pairs, compared to 12% (36/290) in Social Informal Learning

Space Y, which may be what makes the room more flexible, and conducive to working in small groups (Fig. 5):



(Fig. 5) Social Informal Learning Space Y Room Numbering

However, Social Informal Learning Space Z was not only the most popular of the three Social Informal Learning Spaces, with 47% (351/745) of the students observed during this study working within it, despite it being of a similar size and capacity to Social Informal Learning Space X, but 83% (291/351) of students worked in pairs whilst in Social Informal Learning Space Z, and 5% (18/351) in groups of three, meaning it was also the most popular of the three Social Informal Learning Spaces for small group work (Fig. 6):



(Fig. 6) Social Informal Learning Space Z Room Layout Numbering

The furniture in Social Informal Learning Space Z, consisting of mainly informal chairs and banquettes with moveable tables along with its layout may go some way towards explaining both the space's popularity, and it's facilitation of group social informal working, as may its geographical location on campus and its proximity to the location of the students' formal teaching spaces, but there is another factor which must be considered which may affect its popularity , and that is the provision of food and drink.

Whilst Social Informal Learning Space X has vending machines, providing opportunity for obtaining sustenance whilst working, Social Informal Learning Space Y has no such facilities either inside the space or in close proximity, but Social Informal Learning Space Z is directly adjacent to a café serving a range of hot and cold food and beverages throughout the day, suggesting that students favour Social Informal Learning Spaces with access to food and drink facilities, particularly when choosing to engage in social informal learning with others.

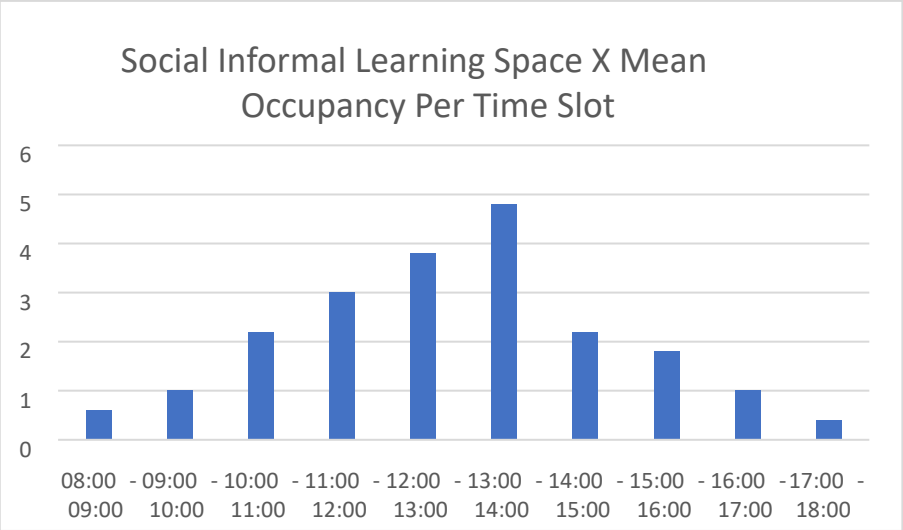
4.1.1.2 Pedagogy: Social Informal Learning Space X - Patterns of Use

Observations of Social Informal Learning Space X were conducted at hourly intervals from Monday to Friday across a period of several weeks, and the room occupancy data is presented below (Table. 16):

SILS X	MON	TUE	WED	THU	FRI	TOTAL	MEAN
08:00 - 09:00	0	1	0	2	0	3	0.6
09:00 - 10:00	1	0	2	1	1	5	1
10:00 - 11:00	3	2	3	2	1	11	2.2
11:00 - 12:00	2	4	4	1	4	15	3
12:00 - 13:00	3	4	6	4	2	19	3.8
13:00 - 14:00	4	3	9	5	3	24	4.8
14:00 - 15:00	2	1	3	4	1	11	2.2
15:00 - 16:00	3	1	3	2	0	9	1.8
16:00 - 17:00	2	0	2	1	0	5	1
17:00 - 18:00	1	0	0	1	0	2	0.4
TOTAL	21	16	32	23	12		
MEAN	2.1	1.6	3.2	2.3	1.2		

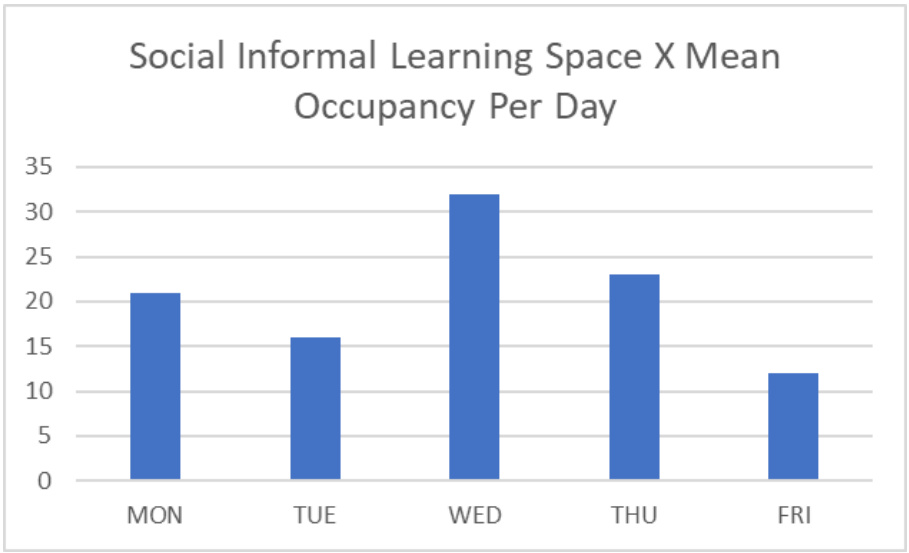
(Table. 16) Social Informal Learning Space X Occupancy Data

Plotting the mean timeslot data across all five of the days shows the pattern of usage of Social Informal Learning Space X, which starts low at 08:00 to 09:00, grows to a peak between 13:00 and 14:00, and then tails off between 17:00 and 18:00 (Fig. 7):



(Fig. 7) Social Informal Learning Space X Mean Occupancy Per Time Slot

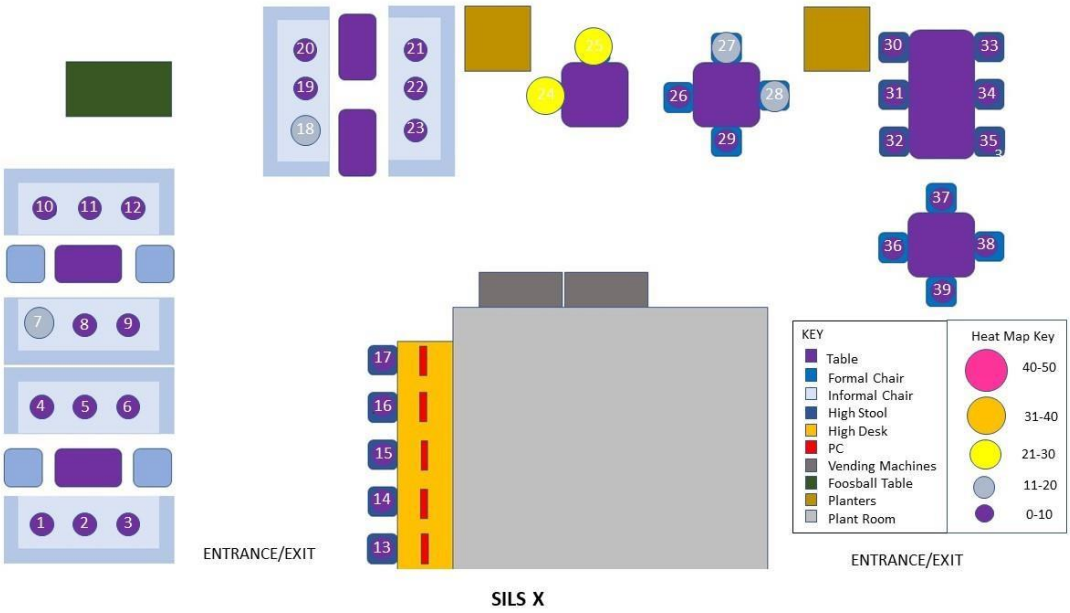
Plotting the mean daily occupancy per day suggests the most popular day to use Social Informal Learning Space X is Wednesday, followed by Thursday and Monday, and least popular days to use Social Informal Learning Spaces X are Tuesday and Friday respectively (Fig. 8):



(Fig. 8) Social Informal Learning Space X Mean Occupancy Per Day

The data suggests the peak day and time for Social Informal Learning Space X occupancy are Wednesdays between 12:00 and 14:00, and as the peak occupancy was 9 people, between 13:00 and 14:00 on a Wednesday afternoon, this suggests Social Informal Learning Space X, with a total capacity of 39, is more than adequate for its intended purpose and, if anything, is rather under-utilised, which may be due to its location within a building used by a single Faculty, which is situated on the periphery of the HEI campus.

The observations were used to create a heat map, showing the most popular locations in Social Informal Learning Space X throughout the observation studied (Fig. 9):



(Fig. 9) Social Informal Learning Space X Heat Map

The heat map suggests that the most popular locations for students to study are locations 24 and 25, with 21-30 occupants within the observation period, which have formal chairs positioned at a formal table. The space offers a degree of privacy and security , as it is located against a glass wall, and is partially screened by a planter containing green foliage.

The second most popular locations within the room are 27 and 28, with 11-20 occupants within the observation period, which also have formal chairs positioned at a formal table. This furniture is also located against the same glass wall as 24 and 25, and is next to another planter containing green foliage, again offering a degree of privacy and security.

The third most popular locations are 18 and 7, also with 11-20 occupants, both of which are located on informal sofas with low tables, and the rest of the locations within Social Informal Learning Space X had 0-10 occupants during the observation period.

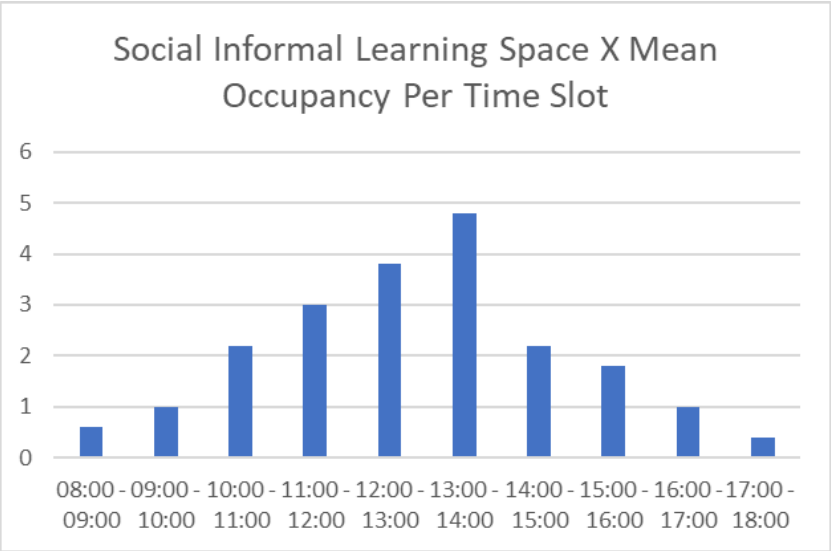
4.1.1.3 Pedagogy: Social Informal Learning Space Y - Patterns of use

Observations of Social Informal Learning Space Y were conducted at hourly intervals from Monday to Friday across a period of several weeks, and the room occupancy data for Social Informal Learning Space Y is presented in the table below (Table. 17):

SILS Y	MON	TUE	WED	THU	FRI	TOTAL	MEAN
08:00 - 09:00	0	2	3	3	4	12	2.4
09:00 - 10:00	4	3	5	7	5	24	4.8
10:00 - 11:00	5	6	8	12	7	38	7.6
11:00 - 12:00	7	9	10	15	8	49	9.8
12:00 - 13:00	8	10	11	9	5	43	8.6
13:00 - 14:00	7	12	9	11	0	39	7.8
14:00 - 15:00	6	4	23	6	4	43	8.6
15:00 - 16:00	2	5	4	3	4	18	3.6
16:00 - 17:00	4	3	6	5	2	20	4
17:00 - 18:00	0	0	3	1	0	4	0.8
TOTAL	43	54	82	72	39		
MEAN	4.3	5.4	8.2	7.2	3.9		

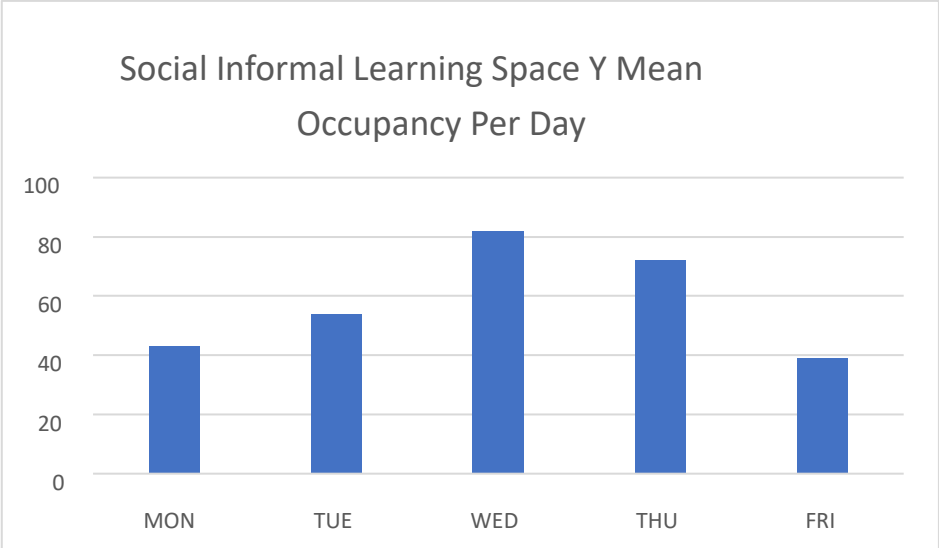
(Table. 17) Social Informal Learning Space Y Occupancy Data

Plotting the mean time slot data across all five days shows the pattern of usage of Social Informal Learning Space Y, which starts low at 08:00 to 09:00, peaks between 11:00 and 12:00, falls slightly between 12:00 and 13:00, falls again between 13:00 and 14:00, then rises again between 14:00 and 15: 00, and tails off between 17:00 and 18:00. (Fig. 10):



(Fig. 10) Social Informal Learning Space Y Mean Occupancy Per Time Slot

As with Social Informal Learning Space X, the data suggests the peak day for Social Informal Learning Space Y occupancy is Wednesday. However, the next most popular days are Thursday and Tuesday, followed by Monday and Friday respectively (Fig. 11):

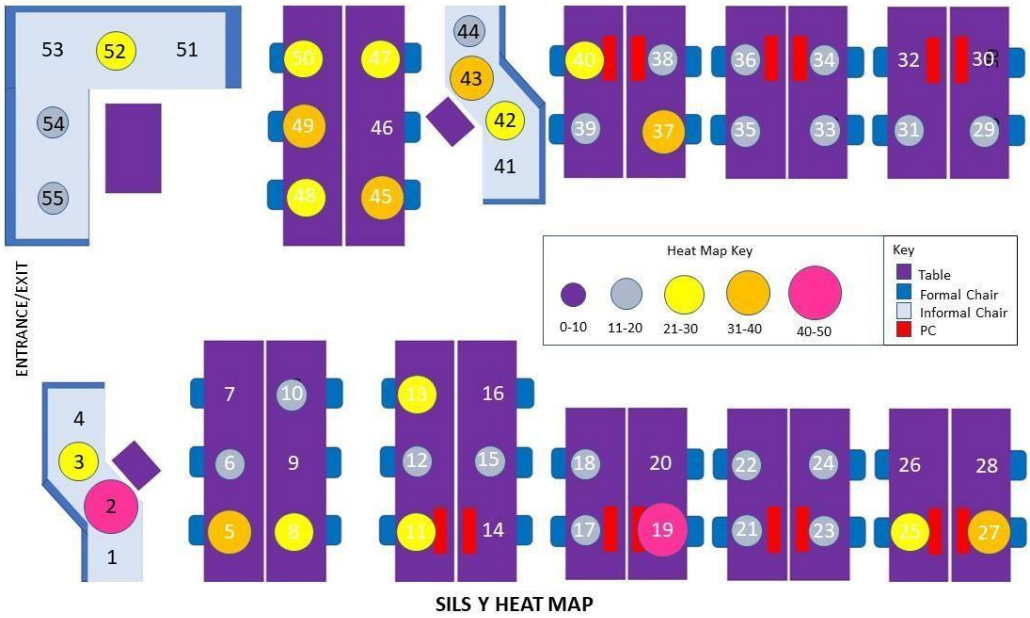


(Fig. 11) Social Informal Learning Space Y Mean Occupancy Per Day

Social Informal Learning Space Y appears to be used much more consistently throughout the day compared to Social Informal Learning Space X, and by many more people, with a mean daily occupancy of 58 (Social Informal Learning Space X) compared to 21 (Social Informal Learning Space Y), but even at its peak occupancy of 23, on a Wednesday.

Between 14:00 and 15:00, Social Informal Learning Space Y still has plenty of capacity, with 55 available seats, which once again suggests it is more than fit for purpose, but still a little underutilised, perhaps because it is tucked away at the top of a building used by a single Faculty.

The Social Informal Learning Space Y heat map shows two particular locations, 2 and 19 as being the most popular, with 40-50 occupants during the observation period. Location 2 is situated just inside the main entrance, and is informal seating, with a small, moveable formal table in front of it. Location 19 is about halfway down the room with a formal desk with formal seating and a desktop PC. Both locations are to the right hand side of the room in relation to the entrance (Fig. 12):



(Fig. 12) Social Informal Learning Space Y Heat Map

Locations 3, 8, 11, 13, 25, 40, 42, 47, 48, 50 and 52 all had 21-30 occupants during the observation period, and they are distributed evenly across Social Informal Learning Space Y, with a mixture of informal seating (3, 42, 52), formal seating (8, 11, 13, 25, 40, 47, 48, 50). All of these locations have fixed formal desks in front of them with the exception of locations 42 and 52, each of which has a formal, moveable table in front of them.

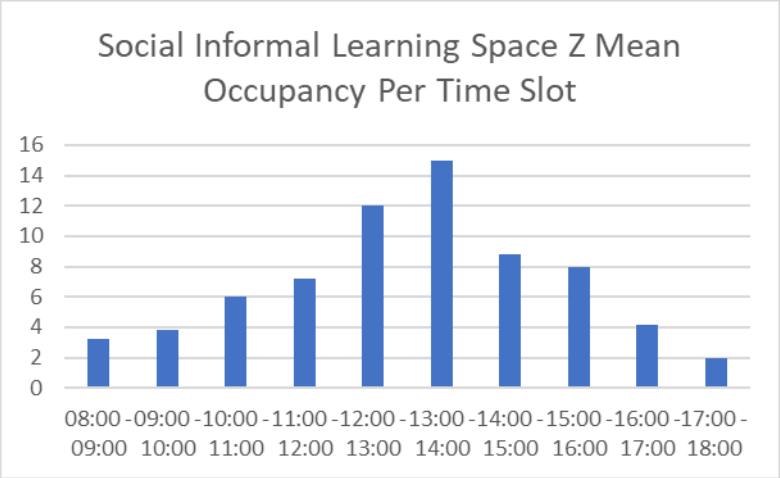
4.1.1.4 Pedagogy: Social Informal Learning Space Z - Patterns of Use

Observations of Social Informal Learning Space Z were conducted at hourly intervals from Monday to Friday across a period of several weeks, and the room occupancy data for Social Informal Learning Space Y is presented in the table below (Table 18):

WHB	MON	TUE	WED	THU	FRI	TOTAL	MEAN
08:00 - 09:00	3	2	2	4	5	16	3.2
09:00 - 10:00	3	3	4	5	4	19	3.8
10:00 - 11:00	5	4	7	9	5	30	6
11:00 - 12:00	6	7	5	7	11	36	7.2
12:00 - 13:00	12	12	13	14	9	60	12
13:00 - 14:00	6	11	36	15	7	75	15
14:00 - 15:00	9	7	11	8	9	44	8.8
15:00 - 16:00	5	8	14	7	6	40	8
16:00 - 17:00	7	3	6	4	1	21	4.2
17:00 - 18:00	3	3	0	3	1	10	2
TOTAL	59	60	98	76	58		
MEAN	5.9	6	9.8	7.6	5.8		

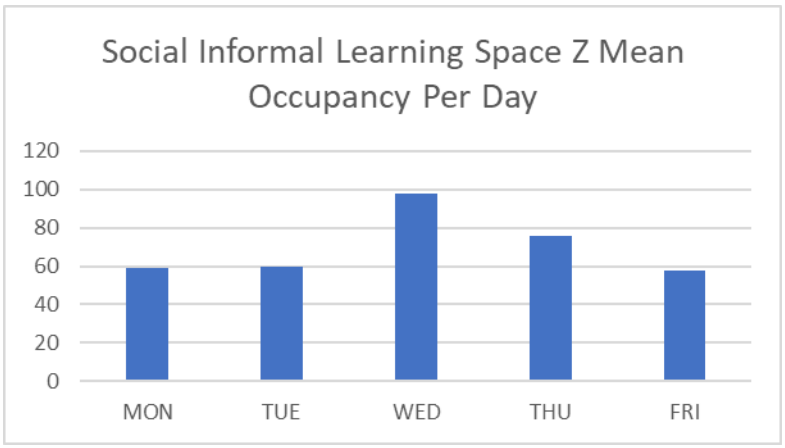
(Table. 18) Social Informal Learning Space Z Occupancy Data

Plotting the mean time slot data across all five days shows the pattern of usage of Social Informal Learning Space Z, which starts low at 08:00 to 09:00, peaks between 12:00 and 14:00, and tails off between 17:00 and 18:00. (Fig. 15), which is a similar patter to the occupancy of Social Informal Learning Space X (Fig. 13):



(Fig. 13) Social Informal Learning Space Z Mean Occupancy Per Time Slot

As with Social Informal Learning Space X and Y, the data suggests the peak day for Social Informal Learning Space Z occupancy is Wednesday, with the next most popular day being Thursday, followed by Monday, Tuesday, and Friday respectively (Fig. 14):

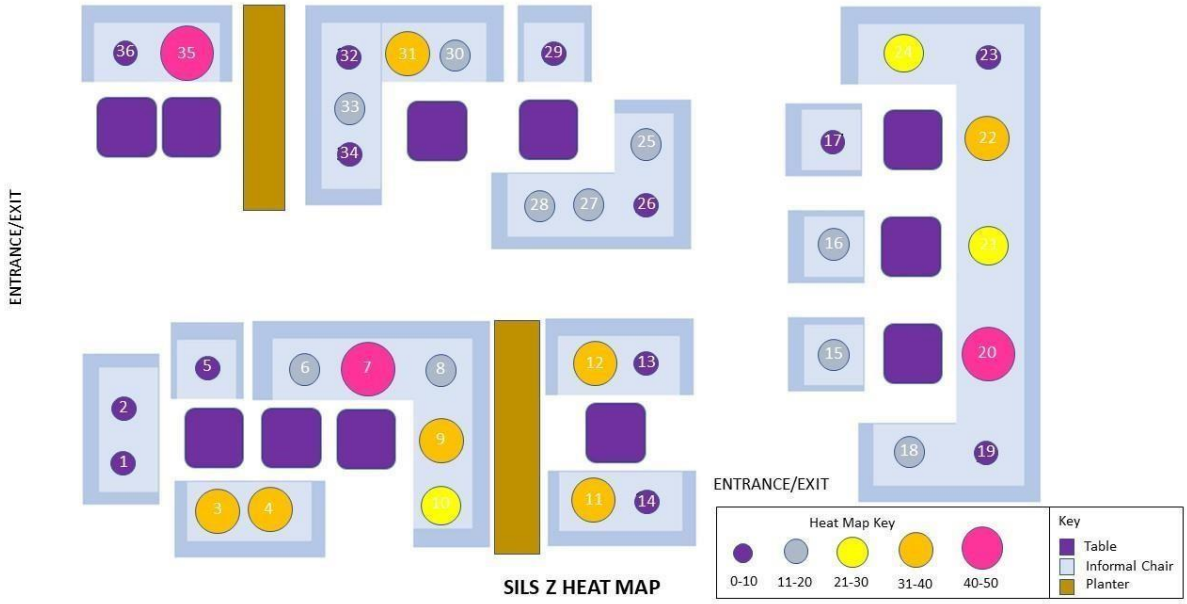


(Fig. 14) Social Informal Learning Space X Mean Occupancy Per Day

Social Informal Learning Space Z, like Social Informal Learning Space Y, appears to be used much more consistently throughout the day when compared to Social Informal Learning Space X, and is the most used of the three Social Informal Learning Spaces studied, with a mean daily occupancy of 70 (Social Informal Learning Space Z) compared to 28 (Social Informal Learning Space X) and 21 (Social Informal Learning Space Y), and it is the only one of the Social Informal Learning Spaces which reached a peak occupancy of 36/36, which was on a single Wednesday between 13:00 and 14:00, but is should be noted that at this

particular time, Social Informal Learning Space Z was being used as a holding area for a Faculty open day, and not only were the 36 seats filled, there was also a further 17 people standing around waiting for the event to begin.

With the exception of this single anomalous result, with the next peak occupancy being 15, and a mean occupancy of 7 people per time slot, Social Informal Learning Space Z never became more than half full during the periods observed, which once again suggests it is more than fit for purpose, if perhaps a little underutilised (Fig. 15):



(Fig. 15) Social Informal Learning Space Z Heat Map

The Social Informal Learning Space Z heat map shows three particular locations, 7, 20 and 35 as being the most popular, with 40-50 occupants during the observation period. Location 7 is situated on the right of Social Informal Learning Space Z, and is informal seating, with a small, moveable formal table in front of it, location 20 is at the far end of Social Informal Learning Space Z, and is informal seating, with a small, moveable formal table in front of it, and location 35 is just inside the main entrance, with informal seating and a formal table.

Locations 3, 4, 9, 11, 12, 22 and 31 are the next most popular Social Informal Learning Space Z locations, with 31-40 occupants, and all have informal seating and formal moveable desks in front of them, followed by locations 10, 21, and 24 which had 21-30 occupants during the observation period, all of which also have informal seating and formal moveable desks in front of them.

The remaining locations had between 0 and 20 occupants during the observation period, and all of them have informal seating and formal moveable desks in front of them, with the exceptions of 15, 16, 17 and 29 all of which have formal seating.

4.1.1.5 Pedagogy: Social Informal Learning Spaces X, Y and Z - Patterns of Use

In Social Informal Learning Space X, the most used positions were 24 and 25, with formal seating and a formal table, however, the some of the least used positions were 26, 27, 28 and 29, which is situated right next to it, with exactly the same formal seating and formal table, the only notable difference between the two sets of positions being the number of seats.

Social Informal Learning Space X was the least used of the three Social Informal Learning Spaces, and it is difficult to draw any firm conclusions about student preferences, although users do seem to have a slight preference for formal seating and formal tables over informal seating with informal tables, the networked PCs provided in locations 13, 14, 15, 16, and 17, appear to be underutilised, as does Social Informal Learning Space X, with a maximum occupancy of 9/39 (23%), and an overall mean occupancy of 2/38 (5%) per time slot, despite attempts to make the space more user-friendly with the provision of foliage planters, snack machines, and a Foosball table.

In Social Informal Learning Space Y, both of the most utilised positions, 2 and 19, seem to have little in common, apart from the fact that they are both located on the right hand side of the room, with position 2 having informal seating and a formal moveable table, and position 19 having a formal seat, a fixed formal table, and a networked PC.

The next most utilised positions appear to be spread evenly across Social Informal Learning Space Y, with positions 5, 37, 45 and 49 having formal seating and formal fixed desks, 27 having formal seating and formal fixed tables with a networked PC, and 43 having informal seating and a moveable formal table.

As with Social Informal Learning Space X, despite the higher occupancy rates, it is difficult to draw meaningful conclusions about the student preferences in Social Informal Learning Space Y, with most of the positions being utilised at some point during the observations, although at a peak occupancy of 23/55 (42%) suggest that, like Social Informal Learning Space X, Social Informal Learning Space Y is underutilised.

In Social Informal Learning Space Z, all of the most utilised positions, 7, 20, and 35 have a combination of informal seating and a formal, moveable table, as do the next most used positions, 3,4,9,11,12,22 and 31. These most used position are spread evenly across the space, just as in Social Informal Learning Space Y,

with no obvious meaningful pattern of distribution, nor is there any apparent pattern regarding the leased utilised positions.

Social Informal Learning Space Z has a peak occupancy of 36/36 (100%) during the observation period, although as previously discussed, this was an anomalous result. The next highest peak occupancy of 15/36 (42%) suggests that Social Informal Learning Space Z is adequate for purpose in terms of space provision, although once again it is somewhat underutilised, particularly outside of the peak times between 12:00 and 14:00.

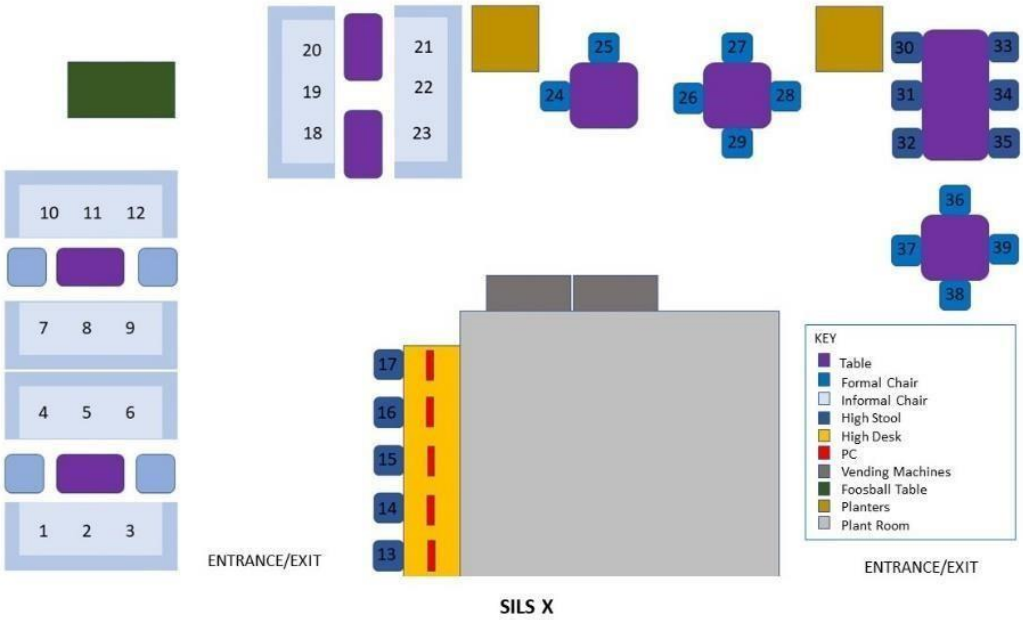
However, it should be noted that an occupancy rate of less than 50% may, in fact, be desirable for students who wish to have personal space and study alone, surrounded by other likeminded students, and so any reduction of the number of seats and tables available in Social Informal Learning Space Y and Social Informal Learning Space Z, and a subsequent potential rise in the number of people using the reduced number of seats and tables might actually have a negative effect on the numbers of students who wish to use the space.

4.2. Space: Introduction

Space is defined in Radcliffe's PST Framework (Radcliffe, 2009) as the elements of the design which encourage the desired types of learning behaviour, and is concerned with the aspects of the design which make the space work for its intended purpose. Social Informal Learning Spaces are designed to foster social informal learning, where students can study surrounded by like-minded people focussed on their own or group tasks, with the potential to interact with one another informally should the desire to do so arise.

4.2.1 Space: Social Informal Learning Space X - Room Information

Social Informal Learning Space X is located on the ground floor, just off the atrium, of one of the newest buildings on campus, and whilst it is located in a building occupied by one Faculty, it is available for use by students of all disciplines from 8am to 6pm Monday to Friday (Fig. 16):



(Fig. 16) Room Layout - Social Informal Learning Space X

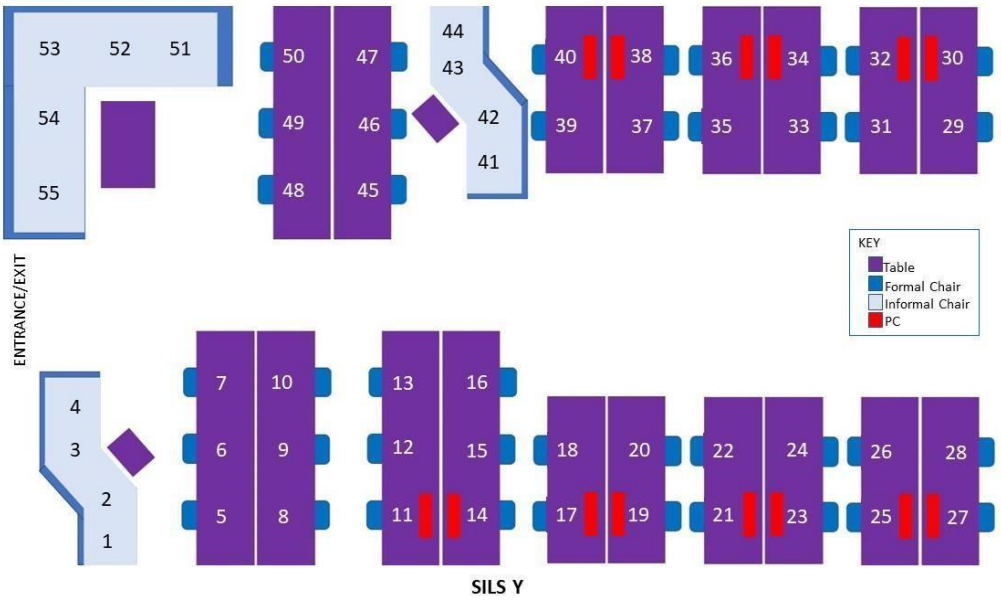
A u-shaped room containing a variety of formal and informal and moveable furniture with seating for 39 students, five of those seats are at high level desks with open access PCs, and there is also a drinks machine, a snack machine, a foosball table, and two large planters filled with green plants.

The room is surrounded on three sides by glass windows, allowing plenty of natural light, but with no curtains to control that light, and which is supplemented by artificial lights set into the ceiling which can be turned on or off by the students.

Conversation, socializing, and consuming food and drink are permitted within Social Informal Learning Space X, which is unsupervised, and toilet facilities are located across the atrium.

4.2.2 Space: Social Informal Learning Space Y - Room Information

Social Informal Learning Space Y Is located in another relatively new building, and was created in the formerly underutilised roof space of the building, and is perhaps less likely than Social Informal Learning Space X to be used by students from other Faculties, who may not even know of its existence, but it is available for use by students of all disciplines from 8am to 6pm Monday to Friday (Fig. 17):



(Fig. 17) Room Layout - Social Informal Learning Space Y

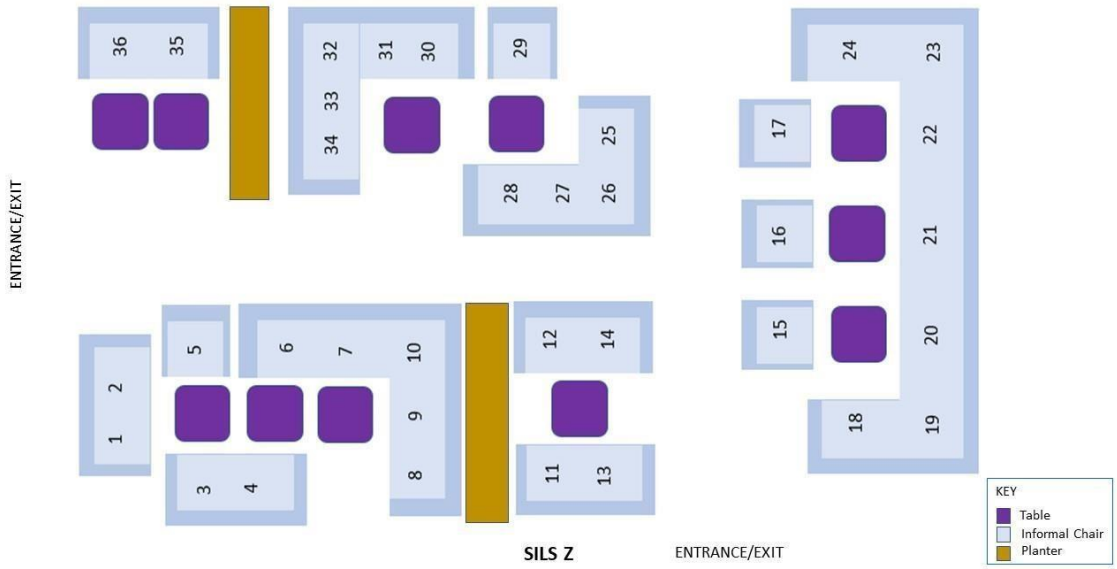
A wide rectangular room, it contains a variety of formal and informal furniture with seating for 55 students, and 14 of the fixed formal desks have open access PCs.

The windows are set high in the walls, offering views of the sky, but nothing more, and they are partially covered by the mezzanine floor above which contains more study spaces, and so the room's main illumination is provided large fluorescent lighting panels set into the ceiling which can be set by the students to be on or off.

Conversation, socializing, and consuming food and drink are permitted within Social Informal Learning Space Y, although there are no facilities for purchasing them, the room is unsupervised, and toilet facilities are located a few steps away along the corridor outside the room.

4.2.3 Space: Social Informal Learning Space Z – Room Information

Social Informal Learning Space Z is located in the atrium of one of oldest buildings which has recently been refurbished, and whilst it is on the ground floor of a particular Faculty, it available for use by students of all disciplines from 8am to 6pm from Monday to Friday (Fig. 18):



(Fig. 18) Room Layout - Social Informal Learning Space Z

A large, rectangular, high-ceilinged space, it contains a variety of formal and informal furniture, most of which is fixed in position, and it has informal seating for 36 students, mainly consisting of upholstered banquettes with tables next to them.

Large high windows are located at one end of the space, but continue to the top of the building letting a in a lot of natural light, and whilst there is no way to control natural light levels, they are supplemented by arcs of suspended neon lights over which the students have no control.

Conversation, socializing, and consuming food and drink are permitted within Social Informal Learning Space X, which is unsupervised, and a café serving a range of food and drinks is located off to one side, as are the toilet facilities.

4.3 Technology: Introduction

Technology is defined in Radcliffe's PST Framework as the technologies which are most effective at enhancing learning within learning spaces, which in this context means the technologies the students bring with them to enhance their learning experience whilst they are using those spaces, such as laptops, phones, and headphones (Radcliffe, 2009).

4.3.1 Technology: Social Informal Learning Space X

In Social Informal Learning Space X, 139 pieces of technology were observed in use by 104 students, with a mean value of 1.3 devices each, with 83% (86/104) using laptop computers, 4% (4/104) using desktop

computers, 0% (0/104) using Tablet computers, 13% (14/104) using phones, 17% (18/104) using headphones, and 17% (14/104) using nothing.

The fact that 139 pieces of technology were observed to be in use between 86 students (10418) suggests that some students used multiple pieces of technology whilst studying e.g. working on a laptop whilst using their mobile phones to search the web, or to stream audio via Bluetooth headphones.

4.3.2 Technology: Social Informal Learning Space Y

In Social Informal Learning Space Y, 438 pieces of technology were observed to be in use by 290 students, with a slightly higher mean value than Social Informal Learning Space X of 1.5 devices each, with 84% (244/290) using laptop computers, 18% (42/290) using desktop computers, 2% (6/104) using Tablet computers, 18% (52/290) using phones, 29% (84/290) using headphones, and 0% (0/290) using nothing.

Once again, the fact that 438 pieces of technology were observed to be in use between 290 students (290-0) denotes that some students were using multiple pieces of technology.

4.3.3 Technology: Social Informal Learning Space Z

In Social Informal Learning Space Z, 387 pieces of technology were observed in use by 351 students, with a mean value of 1.1 devices each, with 88% (309/351) using laptop computers, 0% (0/745) using desktop computers, 2% (7/351) using Tablet computers, 12% (42/351) using phones, 17% (11/351) using headphones, and 5% (18/351) using no technology at all. **4.3.4**

4.3.4 Technology: Social Informal Learning Spaces X, Y and Z Comparisons

When the percentage technology use results are tabulated, we are able to compare the three Social Informal Learning Spaces, X, Y and Z to get a clearer picture of which technologies are used in which space (Table. 19):

	Laptop	Desktop	Tablet	Phone	Headphones	Nothing	Total (Tech)	Total (People)
SILS X	86	4	0	14	18	18	139	**104**
SILS Y	244	52	6	52	84	0	438	**290**
SILS Z	309	0	7	42	11	18	387	**351**
TOTAL	**639**	**56**	**13**	**108**	**113**	**36**	**964**	**745**

(Table. 19) Technology Observed In Use In Social Informal Learning Spaces X, Y & Z

The use of laptops across all three Social Informal Learning Spaces is reasonably consistent, and suggests that the vast majority of users who wish to work bring their own laptops with them when studying in Social Informal Learning Spaces, which is reflected once again in the relatively low use of desktop computers in Social Informal Learning Spaces X and Y, which provide 5 and 14 networked PC computers for student use

respectively. There are no desktop computers in Social Informal Learning Space Z, which may account for the slightly higher percentage of students bringing their own laptop to that space.

Only two tablet computers were observed in use throughout the period of observation, and they were both being used by students who were also using laptops, suggesting perhaps whilst they are not their main tool for study, but perhaps are used when taking a break from study to consume content, or to search for additional educational content whilst creating a piece of work on their laptop.

Phones were in evidence on some students' desks, in most case alongside their laptops, but once again this suggests that this is not their primary learning tool.

However, it is interesting to note that whilst headphone use in both Social Informal Learning Space X (13%) and Social Informal Learning Space Y (18%) seems to be reasonably widespread, and is particularly popular in Social Informal Learning Space Y, the headphone use in Social Informal Learning Space Z is very low in comparison which, when coupled with the group sizes data (Table X) suggests students use the space for a more social and sociable learning experience, and choose to communicate with each other, rather than use headphones which isolate them from potential conversations, and act as a potential signifier that they do not want to be disturbed.

This may be explained by the fact that Social Informal Learning Space Z is the only one of the three Social Informal Learning Spaces which is adjacent to a café, and therefore students can meet to consume food and beverages, as well as work together, and this idea is also reflected in the data shown in the Social Informal Learning Space Z mean occupancy per time slot (Fig.X) which shows peak use of Social Informal Learning Space Z to be between 12:00 and 14:00, when lunchtime takes place in the UK.

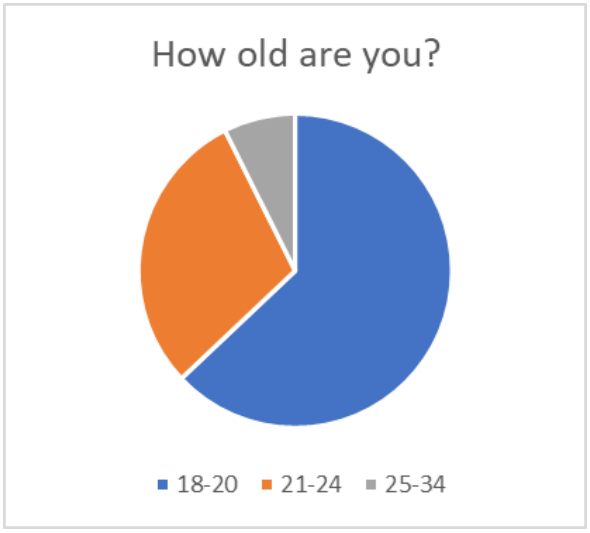
4.4 Social Informal Learning Spaces Questionnaire: Introduction

27 Students from across all disciplines at the HEI were given the questionnaire, and given one hour to fill it in. The data were collated and analysed, and the results are presented and discussed below in the following section.

4.4.1 Demographics

4.4.1.1 Demographics: How old are you?

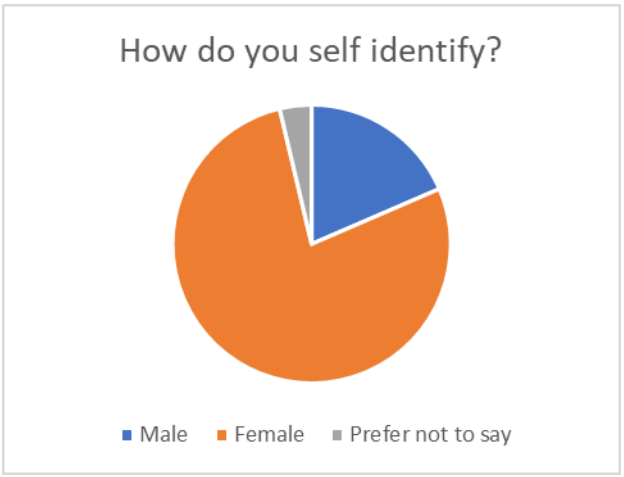
63% (17/27) of the respondents were aged 18-20, 30 % (8/27) were aged 21-24, and 7% (2/27) were aged 25-34 (Fig.X), which is the range of ages we would expect to find in a group of undergraduate students in a UK HEI according to the HESA (21/22) data (Fig. 19):



(Fig. 19) Demographics: How old are you?

4.4.1.2 Demographics: How do you self-identify?

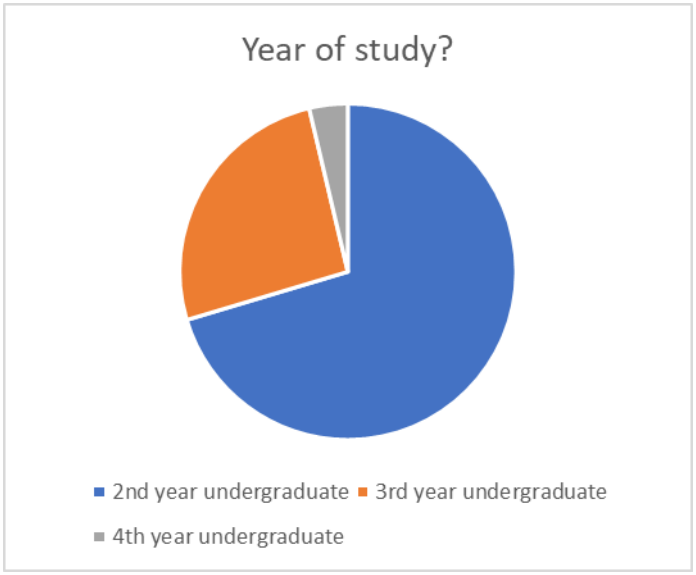
78% (21/27) of respondents were female, 19% (5/27) male, 4% (1/27) preferred not to say. (Fig. 1). These results are somewhat surprising, as the HEI has 60% female undergraduates, and 40% male undergraduates, and suggests the makeup of the targeted group of Laidlaw Scholars is skewed towards females, which may affect the results of the subsequent questions asked (Fig. 20):



(Fig. 20) Demographics: How do you self-identify?

4.4.1.3 Demographics: Year of study

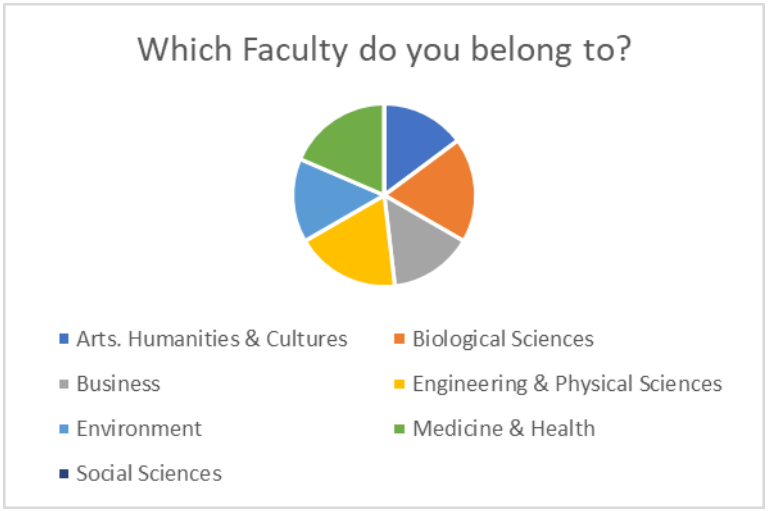
70 % (19/27) respondents were 2nd year undergraduates, 26% (7/27) were 3rd year undergraduates, and 4% (1/27) were 4th year undergraduates. (Fig. 21).



(Fig. 21) Demographics: Year Of Study?

4.4.1.4 Demographics: Which Faculty do you belong to?

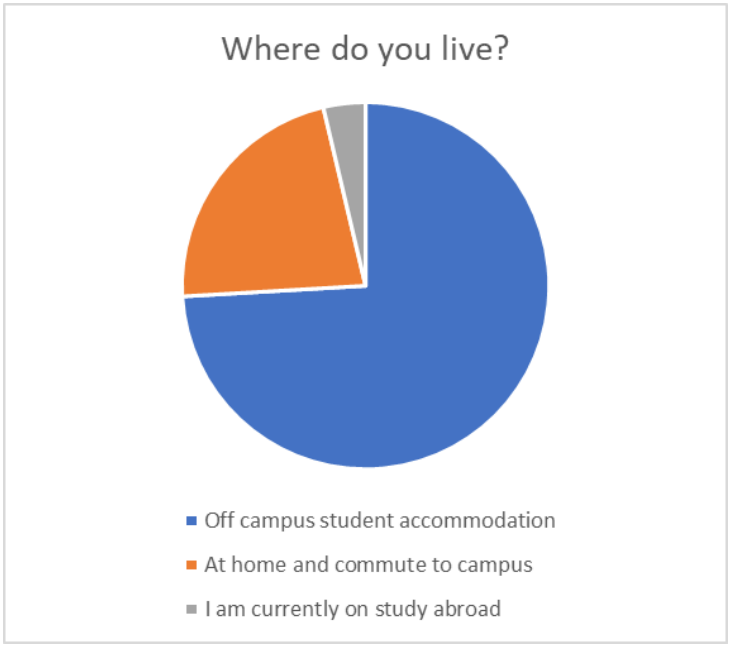
15% (4/27) of respondents were from the Faculty of Arts, Humanities & Cultures, 19% (5/27) from the Faculty of Biological Sciences, 15% (4/27) from the Faculty of Business, 15%
(5/27) from the Faculty of Engineering & Physical Sciences, 15 % (4/27) from the Faculty of Environment, 19% (5/27) from the Faculty of Medicine and Health, suggesting we have a good mix of students from all disciplines. (Fig. 22):



(Fig. 22) Demographics: Which Faculty do you belong to?

.1.5 Demographics: Where do you live?

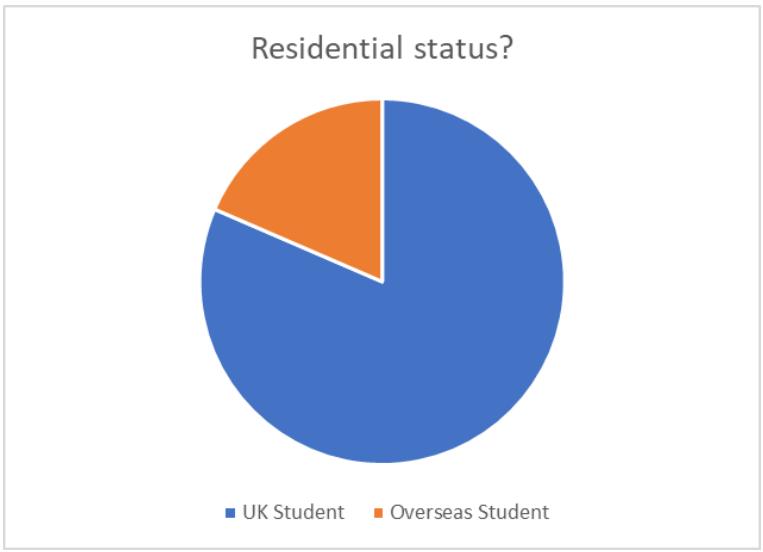
74 % (20/56) of respondents live in off campus student accommodation, 22% (6/27) live at home and commute to campus, and 4% (1/27) live abroad. (Fig. 1), which is broadly reflective of the HEI population studied according to the HESA (21/22) data (Fig. 23):



(Fig. 23) Demographics: Where do you live?

4.4.1.6 Demographics: Residential status?

81% (22/27) respondents are UK residents, and 19% (5/27) are overseas students, which is again in alignment with the overall undergraduate population at the HEI studied (Fig. 24).



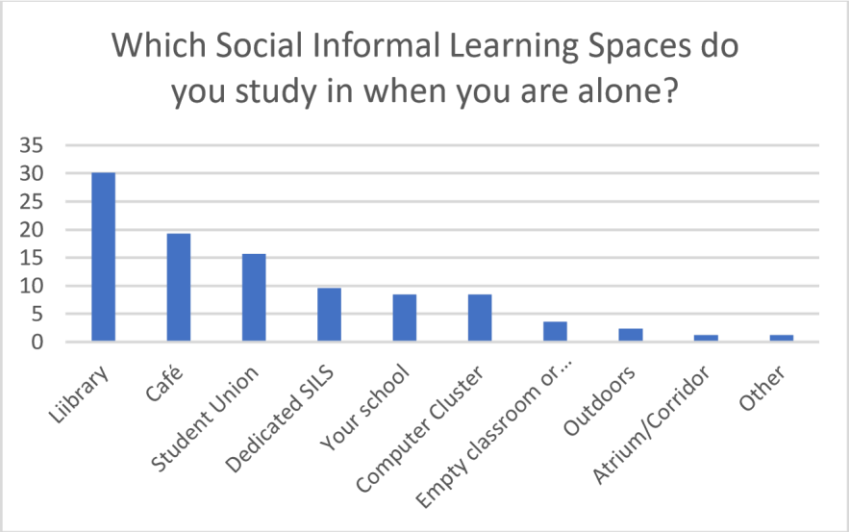
(Fig. 24) Demographics: Residential status?

4.4.2 Pedagogy

4.4.2.1 Pedagogy: In which kinds of Social Informal Learning Spaces do you usually study on campus when learning on your own? (Select all that apply)

Respondents were asked to tick as many boxes as applied to them, and there were 81 responses from 27 respondents, suggesting many use more than one space during the week when studying alone, or that they have selected multiple answers to denote the same space e.g. Dedicated Social Informal Learning Spaces located in Schools.

30 % (25/83) of students indicated they study in the library when working on their own, 19% (16/83) study in cafés, 16% (13/85) study in the Student Union, 9% study in designated Social Informal Learning Spaces, with 8% (7/81) studying in their Schools and 8% (7/81) computer clusters. 4% (3/81) use empty classrooms or lecture theatres in which to study, 2% (2/81) study outdoors, and 1% (1/81) study in either atria/corridors or other. Nobody selected either shared office or that they did not study on campus. (Fig. 25):



(Fig. 25) Which Social Informal Learning Spaces do you study in when you are alone?

Students have a strong affinity for working in the library (30%), when studying alone, and whilst two out of the three libraries on campus incorporate areas for social learning, with a range of fixed and moveable formal and informal spaces available to them, where they are free to talk and work together, they also incorporate silent study spaces where students can focus on solo work.

The next most popular venue for solo study is cafes (19%), which are located all across the campus, where food and drink are available to buy and consume, and where conversation and social informal learning is encouraged.

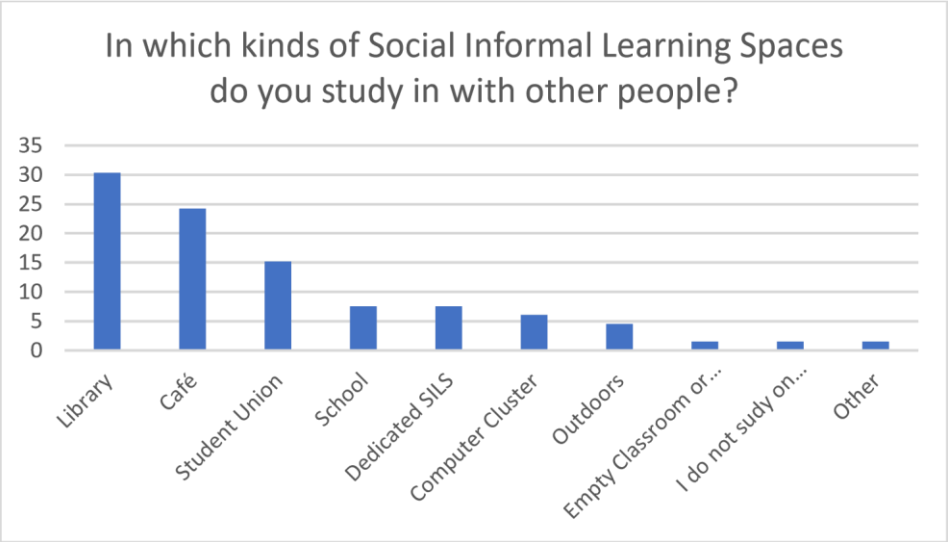
The Student Union (16%) also incorporates several cafes and food and beverage outlets, along with a large range of informal seating in the atrium where students are free to meet, work and engage in socialising, social informal learning, or solo study.

The fourth most popular response for solo study is in dedicated Social Informal Learning Spaces (10%) located outside the libraries and cafes, such as the Social Informal Learning Spaces selected for the observations in this study, and the 10% response rate suggests even though they are not as popular as some of the other available spaces, they are a necessary and valuable part of our campus infrastructure.

4.4.2.2 Pedagogy: In which kinds of Social Informal Learning Spaces do you study on campus when learning with other people? (Select all that apply)

Respondents were asked to tick as many boxes as applied to them, and there were 66 responses from 27 respondents, suggesting that many of them use more than one space when studying with other people.

30% (20/66) of responses indicate that when students study with other people they use the library, 24% (16/66) study in a cafe, and 15% (10/66) study in the Student Union. 8% (5/66) use their School, 8% (5/66) study in dedicated Social Informal Learning Spaces, 6% (4/66) utilise computer clusters and 5% (3/66) study outdoors. 2% (1/66) study in an empty classroom of lecture theatre, 2% (1/66) Said they do not study with others on campus, and 2% (1/66) selected other (Fig. 26):



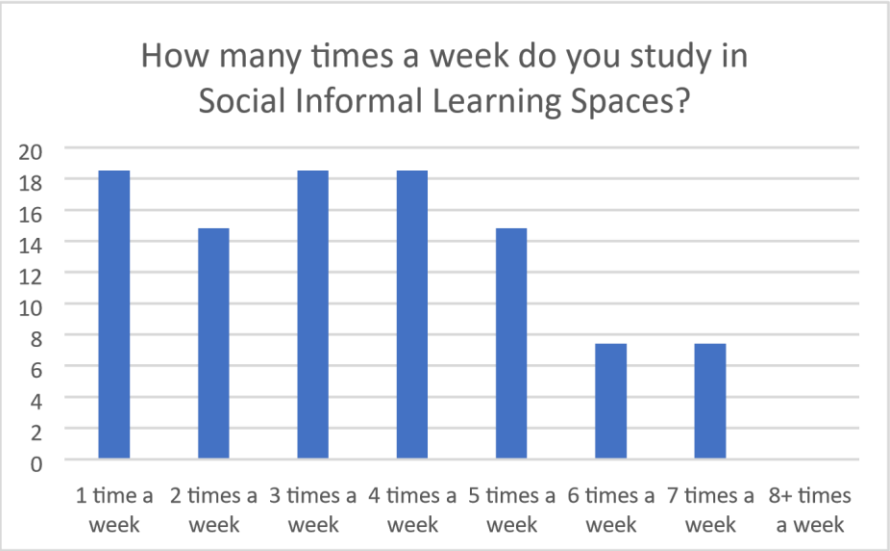
(Fig. 26) Which Social Informal Learning Spaces do you study in when with other people?

Students indicated that when they study with others, they also have a strong preference for libraries (30% / 20/66), cafes (24% / 16/66), and the Student Union (15% / 10/66), with Social Informal Learning Spaces (8% / 5/66) and School (8% / 5/66) placed on an equal footing, all of which is very similar to the results indicated for when studying alone.

However, it would appear that students are slightly more likely to use computer clusters, which are located across the campus, when studying alone (8% / 7/81) as opposed to when they want to work with others (6% / 4/66), but slightly more likely to study outdoors when working with others (5% / 3/66) than when alone (2% / 2/81), but it is difficult to draw any firm conclusions from these last two findings, as the numbers of students indicating those preferences is so small. Is should al be noted that the research took place in January to March, and that more students may have selected to study outdoors at a different time of the year.

4.4.2.3 Pedagogy: How many times a week do you study in Social Informal Learning Spaces?

19% (5/27) of respondents study in Social Informal Learning Spaces once a week, 15% (4/27) study in Social Informal Learning Spaces twice a week, 19% (5/27) study in Social Informal Learning Spaces three times a week, 19% (5/27) study in Social Informal Learning Spaces four times a week, and 15% (4/27) study in Social Informal Learning Spaces five times a week. 7% (2/27) of respondents use Social Informal Learning Spaces six times a week, 7% (2/27) use them seven times a week, and none use Social Informal Learning Spaces 8 or more times a week. (Fig. 27).



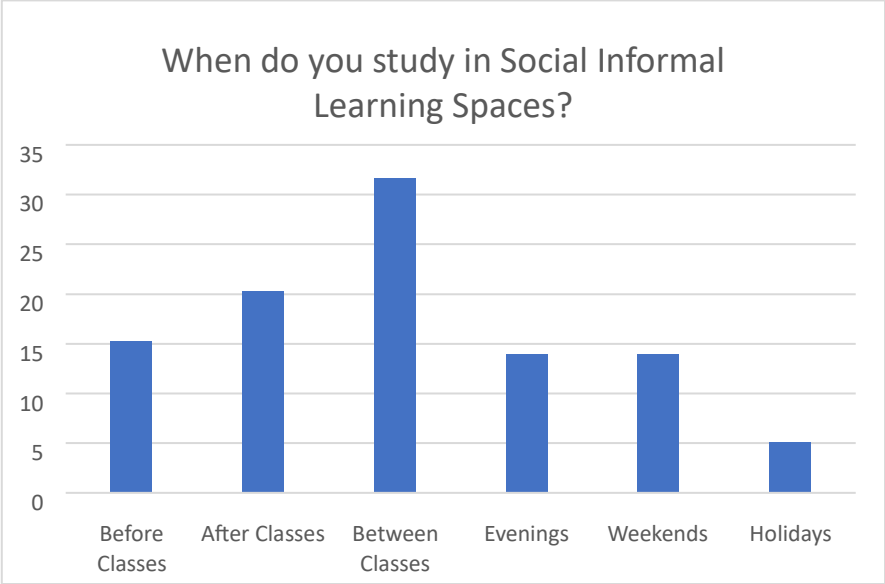
(Fig. 27) How many times a week do you study in Social Informal Learning Spaces?

100% (27/27) of the students use Social Informal Learning Spaces at least once a week, and the same numbers of students use Social Informal Learning Spaces one (19% / 5/27), three (19% / 5/27), or four (19% / 5/27) times a week. 15% (4/27) of the students use Social Informal Learning Spaces two or five times a week, and 7% (2/27) use Social Informal Learning Spaces six or seven times a week. Once again, this demonstrates that Social Informal Learning Spaces are an important part of students' educational infrastructure, with all of them using Social Informal Learning Spaces at least once a week.

4.4.2.4 Pedagogy: When do you Study in Social Informal Learning Spaces? (Tick all that apply)

Respondents were asked to tick as many boxes as applied to them, and there were 79 responses from 27 respondents, suggesting that many of them use Social Informal Learning Spaces at various different times during the week, both inside and outside the regular teaching semesters when there are no scheduled classes.

15% (12/79) of responses indicate they use Social Informal Learning Spaces before classes, 20 % (16/29) said they use Social Informal Learning Spaces after classes, and 32% (25/79) study in Social Informal Learning Spaces between classes. 14% (11/79) use Social Informal Learning Spaces on evenings, 14% (11/79) study in Social Informal Learning Spaces on weekends, and 5% (4/79) use them during the holidays (Fig. 28):



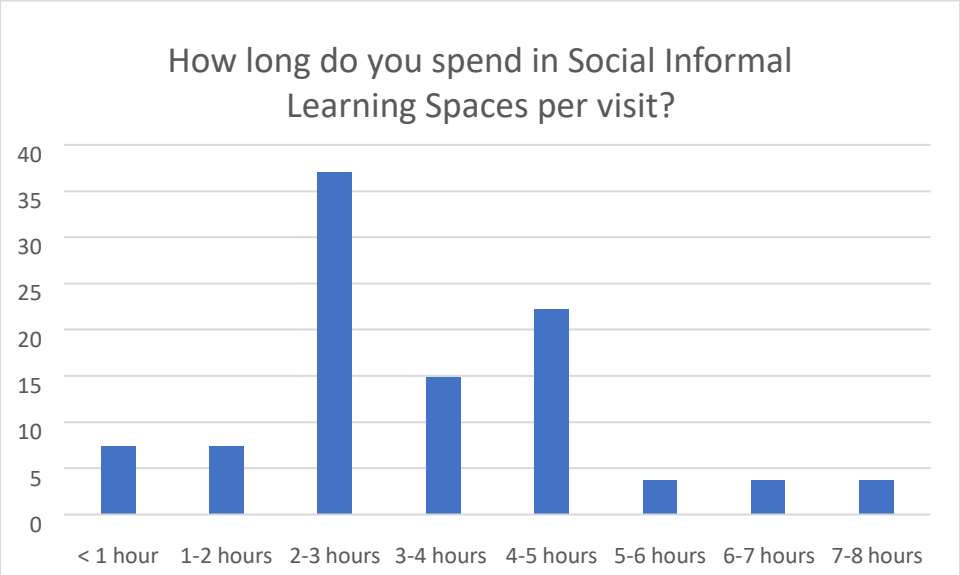
(Fig. 28) When do you study in Social Informal Learning Spaces?

79 responses from 27 students means that students use Social Informal Learning Spaces at multiple times throughout the year, including evenings (14% / 11/79), weekends (14% / 11/79) and during the holidays 5% (4/79), which indicates the importance of Social Informal Learning Spaces being accessible for students throughout the year, even outside normal working hours, and teaching semesters.

With almost one third (32% / 25/79) of students choosing to use Social Informal Learning Spaces between classes, 15% (12/79) using Social Informal Learning Spaces before classes, and 20 % (16/29) using Social Informal Learning Spaces after classes, a total of 67% (53/79), it is clear that the majority of students value the availability of Social Informal Learning Spaces during teaching semesters, as somewhere to study on campus outside of their timetabled sessions, and are an integral part of their study routines.

4.4.2.5 Pedagogy: How long do you spend in Social Informal Learning Spaces per visit?

7 % (2/27) of respondents said they spent less than 1 hour per Social Informal Learning Spaces visit, 7 % (2/27) of respondents said they spent 1-2 hours, 37% (10/27) spent 2-3 hours, 15% (4/27) 3-4 hours, and 22% (6/27) 4-5 hours. 4% (1/27) spend 5-6 hours, 4% (1/27) spend 6-7 hours, and 4% (1/27) spend 7-8 hours per Social Informal Learning Spaces visit. (Fig. 29).



(Fig. 29) How long do you spend in Social Informal Learning Spaces per visit?

Almost three quarters (74% / 20/27) of students surveyed spend between two and five hours in Social Informal Learning Spaces, with 37% (10/27) spending 2-3 hours, 15% (4/27) 3-4 hours and 22% (6/27) 4-5 hours, which suggests that it is important that the furniture provided is ergonomically sound, and the Social Informal Learning Spaces environments are welcoming and a pleasure to spend long durations of time working in, as well as underlining the importance of Social Informal Learning Spaces being as useful on campus spaces in which students can spend their time when not in their scheduled classes.

4.4.2.6 Pedagogy: When studying in Social Informal Learning Spaces, how important is the ability to talk to others?

The ability to talk to others does not seem to be particularly important to students studying in Social Informal Learning Spaces, with 7% (2/27) selected Unimportant, 44% (12/27) selected Slightly Important, 22% (6/27) selected Moderately Important, 22% (6/27) selected Very Important, and 4% (1/27) of respondents selected Extremely Important (Fig. 28):

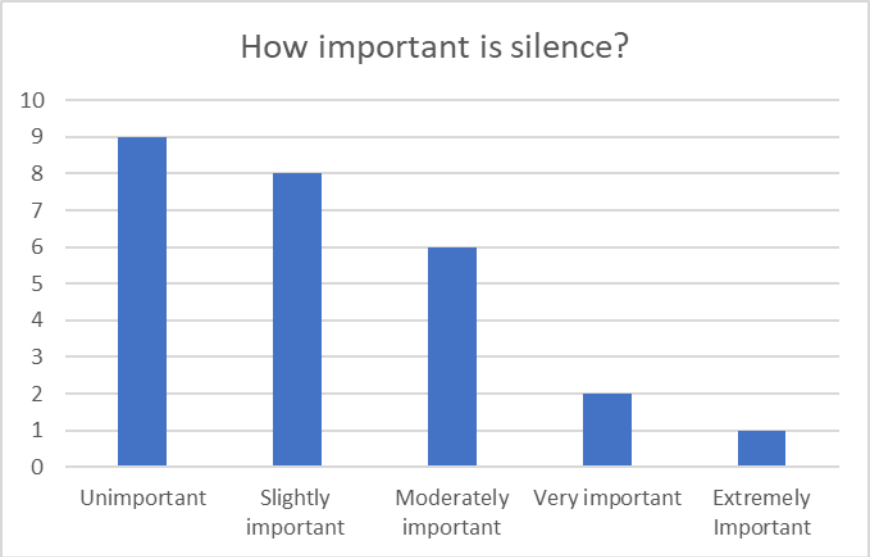
(Fig. 30) How important is the ability to talk to others?

The mode value is Slightly Important (44% 12/27), with a mean value of 2.7, placing it between Slightly Important and Moderately Important, which is interesting, as one might expect the ability to talk to others to have higher level of importance in Social Informal Learning Spaces, which are designed to encourage and enable students to interact.

This also seems inconsistent with the data discussed in section 4.4.2.10 which suggests 78% (21/27) students use Social Informal Learning Spaces for socialising, and which causes one to wonder how the might students socialize or interact without talking, or perhaps how they have chosen to define the concept of socialising when answering the subsequent question.

4.4.2.8 Pedagogy: When studying in Social Informal Learning Spaces, how important is silence?

As one might expect, silence is not particularly important to students studying in Social Informal Learning Spaces, and 33% (9/27) selected Unimportant, 30% (8/27) selected Slightly Important, , 22% (6/27) selected Moderately Important, 11% (3/27) selected Very Important, and 4% (1/27) of respondents selected Extremely Important (Fig. 31):

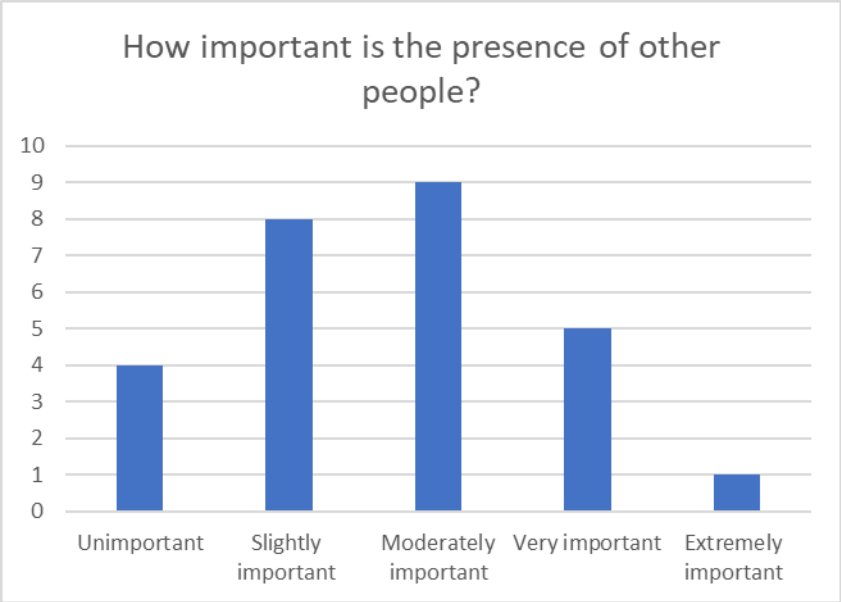


(Fig. 31) How important is silence?

The mode value is Unimportant (33% 9/27), with a mean value of 2.2, placing it between Slightly Important and Moderately Important, which means it has a lower value than that of the importance of the ability to talk to others, suggesting that students are happy with conversations happening around them whilst they study in Social Informal Learning Spaces, even if they are not participating in them, and that they prefer some conversation happening around them to absolute silence.

4.4.2.8 Pedagogy: When studying in Social Informal Learning Spaces, how important is the presence of other people?

15% (4/27) selected Unimportant, 30% (8/27) selected Slightly Important, 33% (9/27) selected Moderately Important, 19% (5/27) selected Very Important, and 4% of respondents (1/27) selected Extremely Important (Fig. 32):

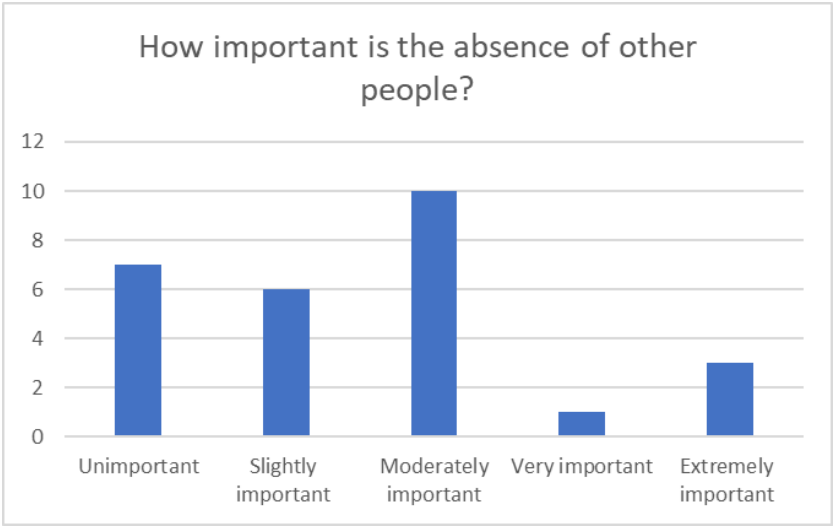


(Fig. 32) How important is the presence of other people?

The mode response is Moderately Important, and the mean value is 2.7, which means the presence of other people lies between Slightly Important and Moderately Important to students studying in Social Informal Learning Spaces, which suggests that most students do like to study in Social Informal Learning Spaces surrounded by others engaged in learning.

4.4.2.9 Pedagogy: When studying in Social Informal Learning Spaces, how important is the absence of other people?

26% (7/27) selected Unimportant, 22 % (6/27) selected Slightly Important, 37% (10/27) selected Moderately Important, 4% (1/27) selected Very Important 11%, and (3/27) of respondents selected Extremely Important (Fig. 33):



(Fig. 33) How important is the absence of other people?

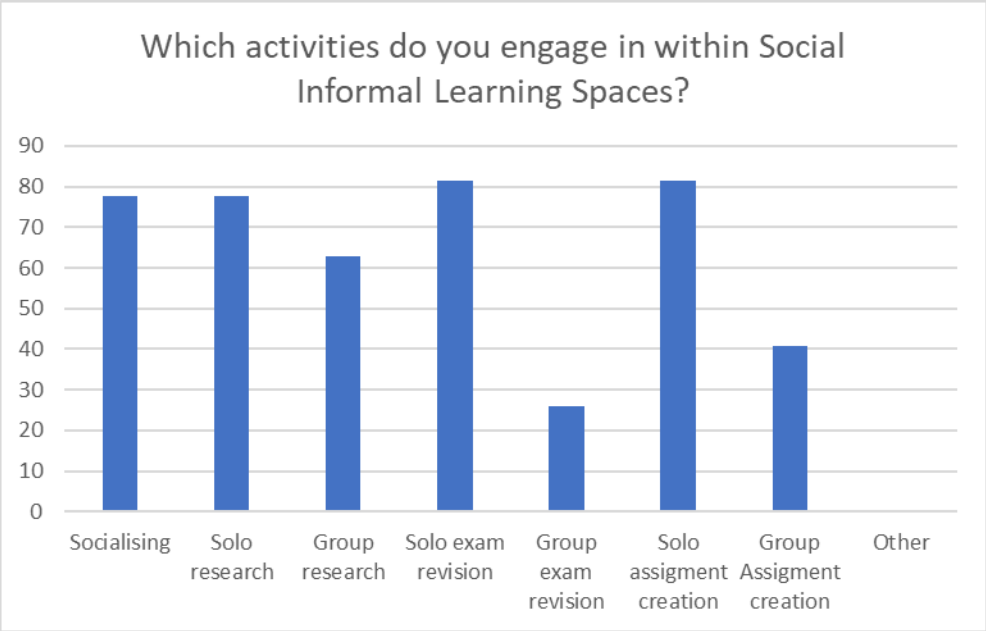
Once again, the mode response is Moderately Important (37% 10/27), but the mean value is 2.52, which puts the absence of other people approximately mid-way between Slightly Important and Moderately Important when studying in Social Informal Learning Spaces.

When this data considered in conjunction with the data from the previous question, it suggests students are ambivalent when it comes to the presence of others in Social Informal Learning Spaces when they are studying, which may be explained by the context in which they are using these spaces i.e. sometimes they may prefer places which are quiet when they wish to study alone, and sometimes they may seek out spaces where they are surrounded by people.

4.4.2.10 Pedagogy: When studying in Social Informal Learning Spaces, which of the following activities do you engage in?

Respondents were asked to tick as many boxes as applied to them, and there were 121 responses from 27 respondents, suggesting many of them use Social Informal Learning Spaces for multiple purposes across the academic year.

78% (21/27) of respondents said they used Social Informal Learning Spaces for socialising, 78% (21/27) said they used Social Informal Learning Spaces for solo research, and 63% (17/27) said they used Social Informal Learning Spaces for group research. 81% (22/27) said they used Social Informal Learning Spaces for solo exam revision, and 26% (7/27) said they used Social Informal Learning Spaces for group exam revision. 81% (22/27) said they used Social Informal Learning Spaces for solo exam revision, and 26% (7/27) said they used Social Informal Learning Spaces for group exam revision. 81% (22/27) said they used Social Informal Learning Spaces for solo assignment creation, and 41% (11/27) said they used Social Informal Learning Spaces for group assignment creation (Fig. 34):



(Fig. 34) Which of the following activities do you engage in?

The data clearly illustrates the wide variety of activities undertaken throughout the year by the surveyed students, and the fact that they use Social Informal Learning Spaces for so many parts of their working lives suggest they are a highly valued resource to have on campus.

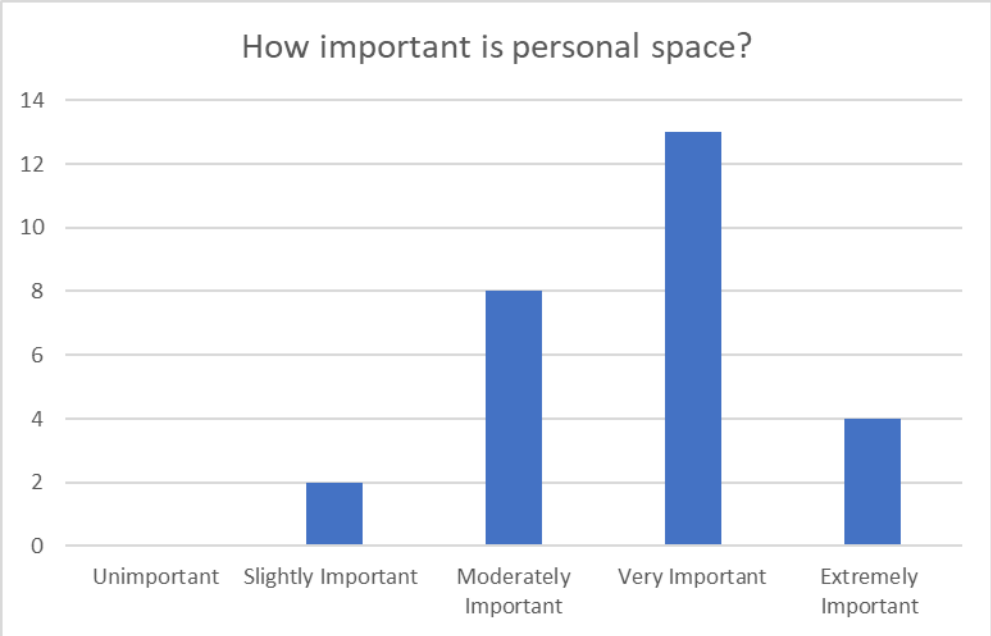
The usage patterns of students vary throughout the year depending on course requirements, and which activities they are required to be working on, but it is pleasing to see such a high percentage of students using Social Informal Learning Spaces for Socialising as well as for specific tasks, suggesting that they do encourage the kinds of social informal learning for which they were designed.

4.4.3 Space

Space is defined in Radcliffe's PST Framework (Radcliffe, 2009) as "the elements of the design which encourage the desired types of learning behaviour".

4.4.3.1 Space: When you are studying in Social Informal Learning Spaces, how important is personal space?

When it comes to Personal Space, 0% of respondents (0/27) selected Unimportant, 7% (2/27) selected Slightly Important, 30% (8/27) selected Moderately Important, 48% (13/27) selected Very important, and 15% (4/27) of respondents selected Extremely Important (Fig. 35):



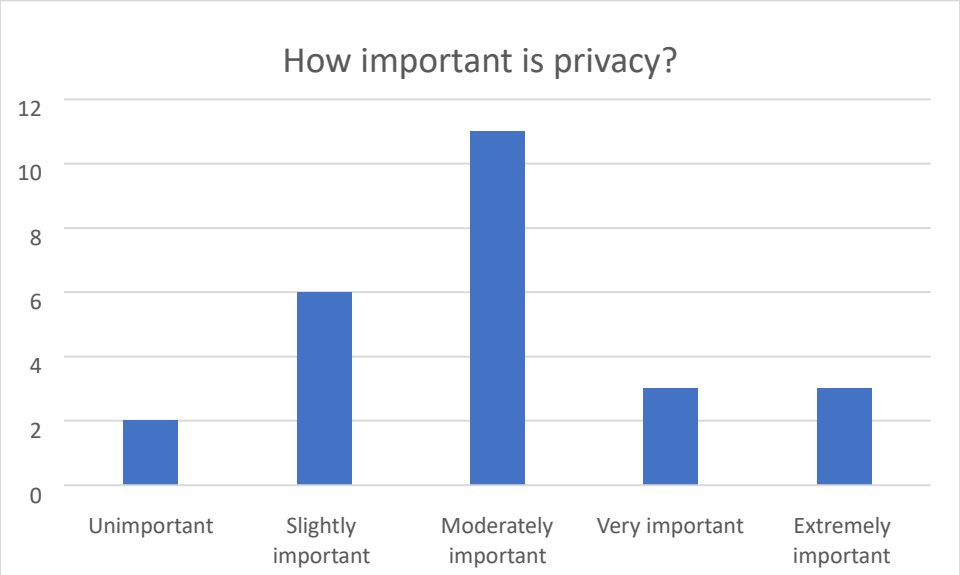
(Fig. 35) How important is personal space?

The mode response is Very Important (48% 13/27), and the mean value is 3.7, which lies between Moderately Important and Very Important, suggesting personal space is important to students are studying in Social Informal Learning Spaces.

4.4.3.2 Space: When you are studying in Social Informal Learning Spaces, how important is Privacy?

Out of 27 potential respondents, only 93% (25/27) responded to this question, and 7% (2/27) did not respond, but we have no indication as to why that was the case.

Of those 25 respondents, 8% (2/25) selected Unimportant, 24% (6/25) selected Slightly Important, 44% (11/25) selected Moderately Important, 12% (3/25) selected Very Important, and 12% (3/25) of respondents selected Extremely Important (Fig. 36):

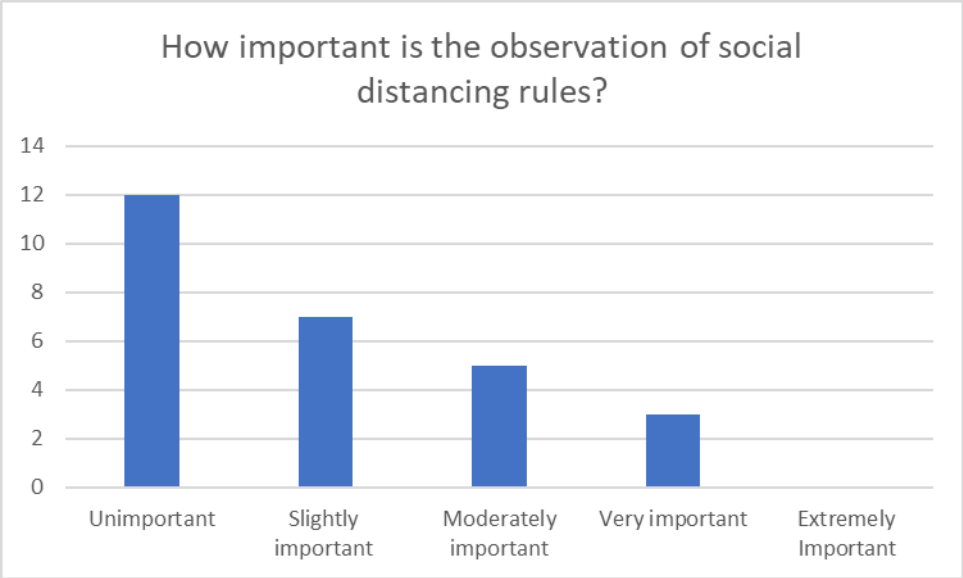


(Fig. 36) How important is privacy?

The mode response is Moderately Important (44% 11/25), and the mean value is 2.94, which lies between Slightly Important and Moderately Important, suggesting privacy is still important to students when they are studying in Social Informal Learning Spaces, but less important than personal space i.e. they are happy to be in shared space, where privacy may be at a premium, but they still require a level of personal space in order to study.

4.4.3.3 Space: When you are studying in Social Informal Learning Spaces, how important is the observation of social distancing rules?

When it comes to the observation of social distancing rules, 44% of respondents (12/27) selected Unimportant, 26% (7/27) selected Slightly Important, 19% (5/27) selected Moderately Important, 11% (3/27) selected Very Important, sand 0% (0/27) of respondents selected Extremely Important (Fig. 37):

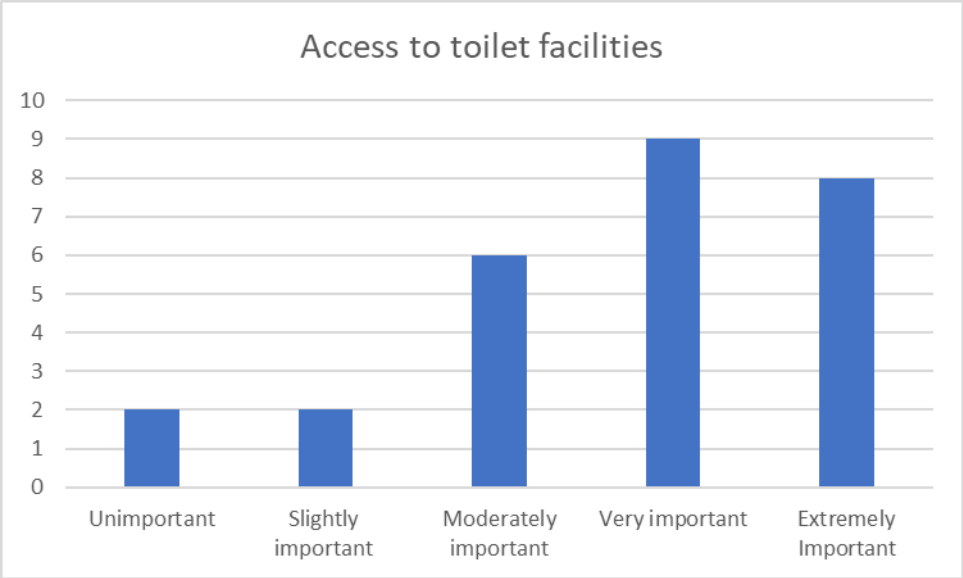


(Fig. 37) How important are the observation of social distancing rule?

The mode response is Unimportant (44% 12/27), and the mean value is 1.96, which lies between Unimportant and Slightly Important, and is somewhat surprising, as the survey was conducted in February 2022, not long after the students had returned to campus for the first time after the Covid 19 pandemic, suggesting that they had few concerns about being in close proximity to other students in Social Informal Learning Spaces even if social distancing rules were no longer being observed or enforced upon their return.

4.4.3.4 Space: When you are studying in Social Informal Learning Spaces, how important is access to toilet facilities?

Access to toilet facilities seems to be important to students studying in Social Informal Learning Spaces, with 7% (2/27) selecting Unimportant, 7% (2/27) selecting Slightly Important, 22% (6/27) selecting Moderately Important 33% (9/27) selecting Very Important, and 30% (8/27) of respondents selecting Extremely Important (Fig. 38):

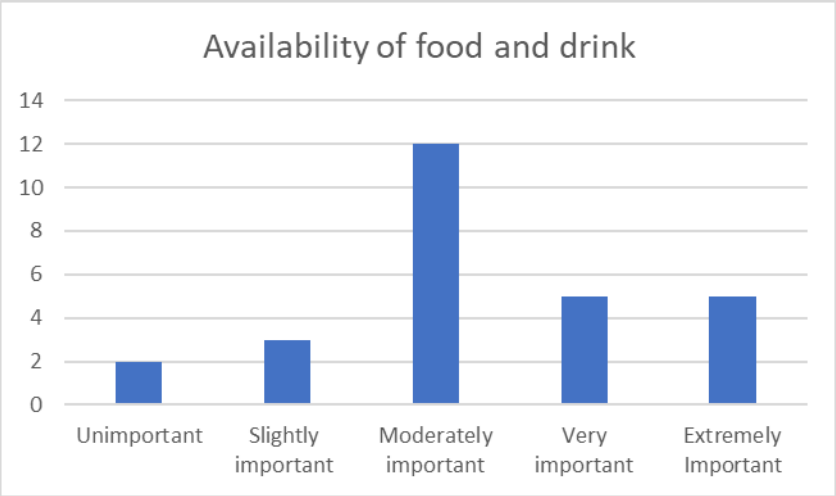


(Fig. 38) How important is access to toilet facilities?

The mode response is Very Important (33% 9/27), and the mean value is 3.7, which lies between Moderately Important and Very Important, suggesting a strong desire by students to have toilet facilities in close proximity to Social Informal Learning Spaces

4.4.3.5 Space: When you are studying in Social Informal Learning Spaces, how important is availability of food and drink?

Food and drink availability appears to be reasonably important to Social Informal Learning Spaces users, with 7% (2/27) selecting Unimportant, 11% (3/27) selecting Slightly Important, 44% (12/27) selecting Moderately Important, 19% (5/27) selecting Very Important, and 19% (5/27) of respondents selecting Extremely Important (Fig. 39):

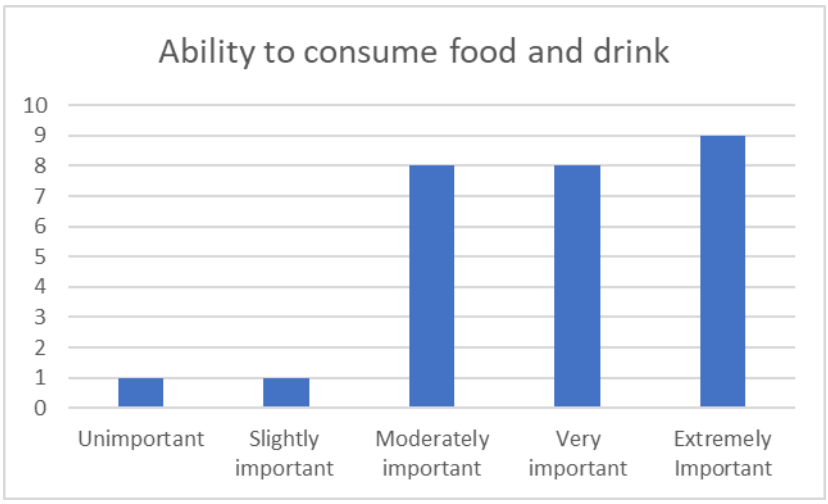


(Fig. 39) How important is the availability of food and drink?

The mode response is Moderately Important (44% 12/27), and the mean value is 3.3, which again lies between Moderately Important and Very Important, and suggests students prefer to have food and drink facilities in close proximity to Social Informal Learning Spaces.

4.4.3.6 Space: When you are studying in Social Informal Learning Spaces, how important is being able to consume food and drink?

The students seem to like being able to consume food and drink in Social Informal Learning Spaces, with 4% (1/27) selecting Unimportant, 11% (1/27) selecting Slightly Important, 30% (8/27) selecting Moderately Important, 30% (8/27) selecting Very Important, and 33% (9/27) of respondents selecting Extremely Important (Fig. 40):



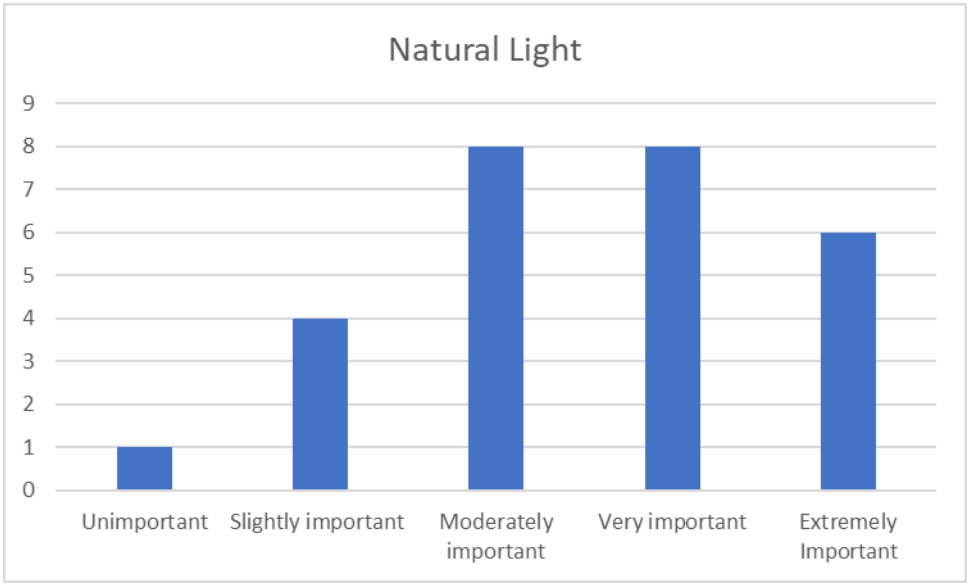
(Fig. 40) How important is the ability to consume food and drink?

The ability to be able to consume food and drink, which is traditionally prohibited in both libraries and computer clusters, seems to be important to students, with the mode value being Extremely Important (33% 9/27), and the mean value being 3.85, which lies between Moderately Important and Very Important, suggesting that may be a major contributing factor when selecting to study in Social Informal Learning Spaces as proposed to libraries or computer clusters, and ties in with the data regarding the popularity of the use of Social Informal Learning Spaces during lunch breaks.

4.4.3.7 Space: When you are studying in Social Informal Learning Spaces, how important is natural light?

Natural light also seems to be important to students studying in Social Informal Learning Spaces, and 4% (1/27) selected Unimportant, 15% (4/27) selected Slightly Important, 30%

(8/27) selected Moderately Important, 30% (8/27) selected Very Important, and 22% (6/27) of respondents selected Extremely Important (Fig. 41):

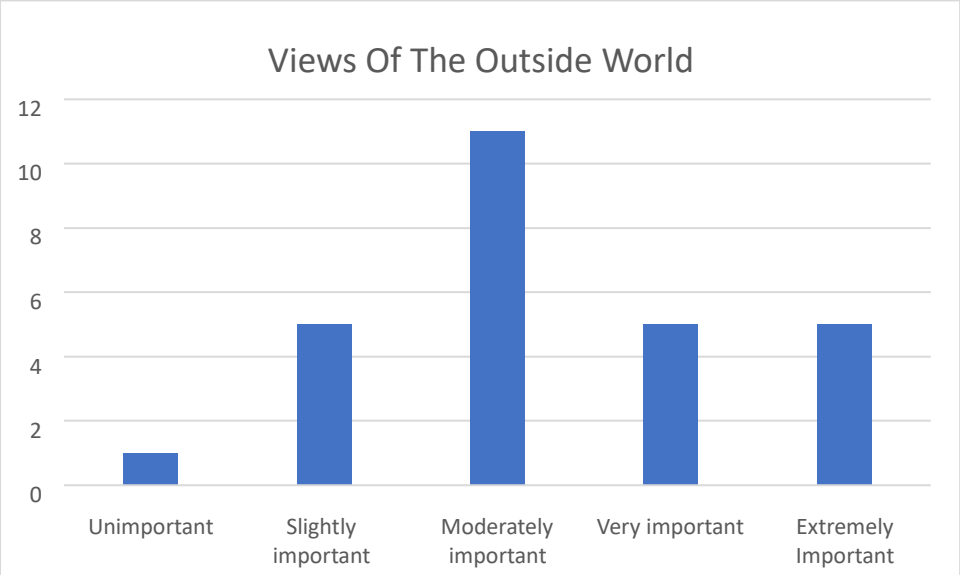


(Fig. 41) How important is natural light?

The mode values of this response were Moderately Important (30% 8/27) and Very Important (30% 8/27), with a mean value of 3.5, placing it mid-way between the two selections, suggesting that natural light is preferred when electing to use Social Informal Learning Spaces.

4.4.3.8 Space: When you are studying in Social Informal Learning Spaces, how important are views of the outside world?

Views of the outside world are also deemed to be important, and 4% (1/27) selected Unimportant, 19% (5/27) selected Slightly Important, 41% (11/27) selected Moderately Important, 19% (5/27) selected Very Important, and 19% (5/27) of respondents selected Extremely Important (Fig. 42):

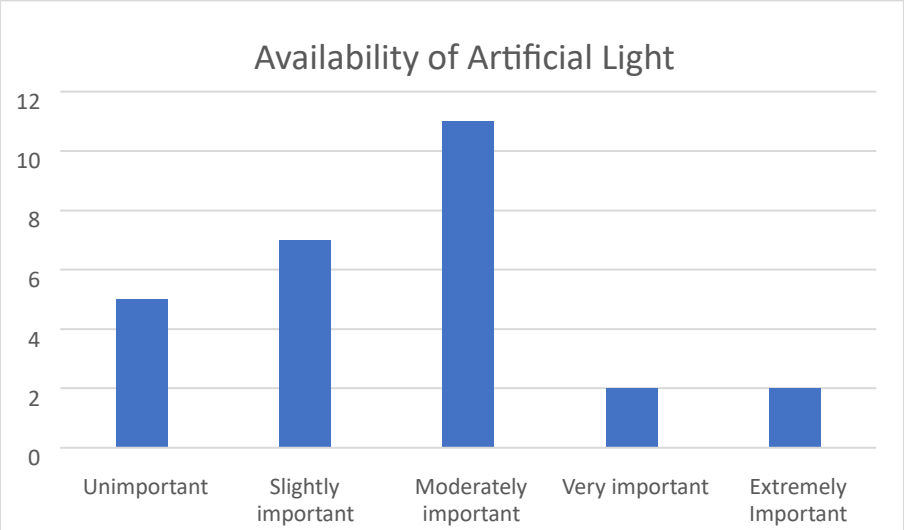


(Fig. 42) How important are views of the outside world?

The mode value is Moderately Important, with a mean value of 3.3, placing it between Moderately Important and Very Important, which suggest that whilst not quite as important to students as natural daylight, views of the outside world from Social Informal Learning Spaces are still important to students, although it is worthy of note that the responses are more evenly spread across the categories than those for natural daylight.

4.4.3.9 Space: When you are studying in Social Informal Learning Spaces, how important is artificial light?

Artificial light is another factor which may affect students choice of Social Informal Learning Spaces, and 19% (5/27) selected Unimportant, 26% (7/27) selected Slightly Important , 41% (11/27) selected Moderately Important, 7% (2/27) selected Very Important, with 7% (2/27) of respondents selecting Extremely Important (Fig. 43):

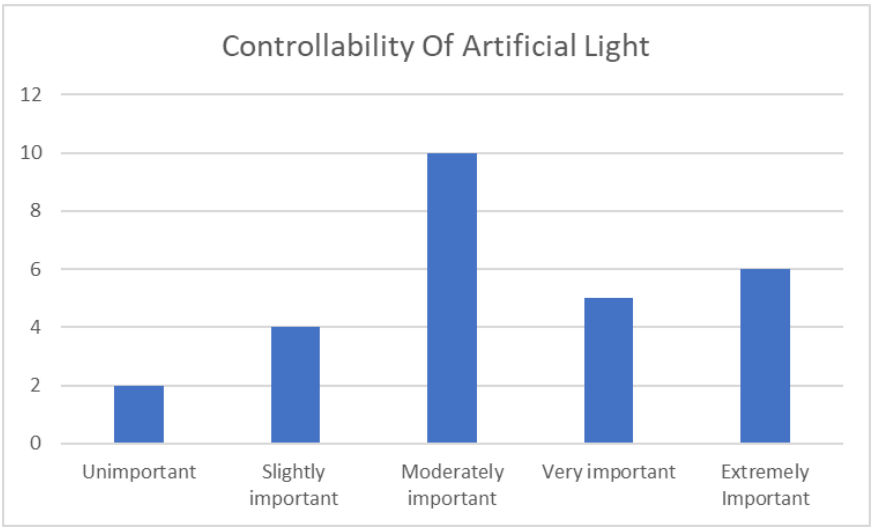


(Fig. 43) How important is the availability of artificial light?

The mode value is Moderately Important (41% 11/27), with a mean value of 2.6, placing it between Slightly Important and Moderately Important, which suggest that whilst not quite as important to students as natural daylight, artificial light in Social Informal Learning Spaces is still somewhat important to students studying in Social Informal Learning Spaces.

4.4.3.10 Space: When you are studying in Social Informal Learning Spaces, how important is controllable artificial light?

The controllability of artificial light is another factor which may be considered by students studying in Social Informal Learning Spaces, and 22% (6/27) selected Unimportant, 19% (5/27) selected Slightly Important, 37% (10/27) selected Moderately Important, 15% (4/27) selected Very Important, and 7% (2/27) selected Extremely Important. (Fig. 44):

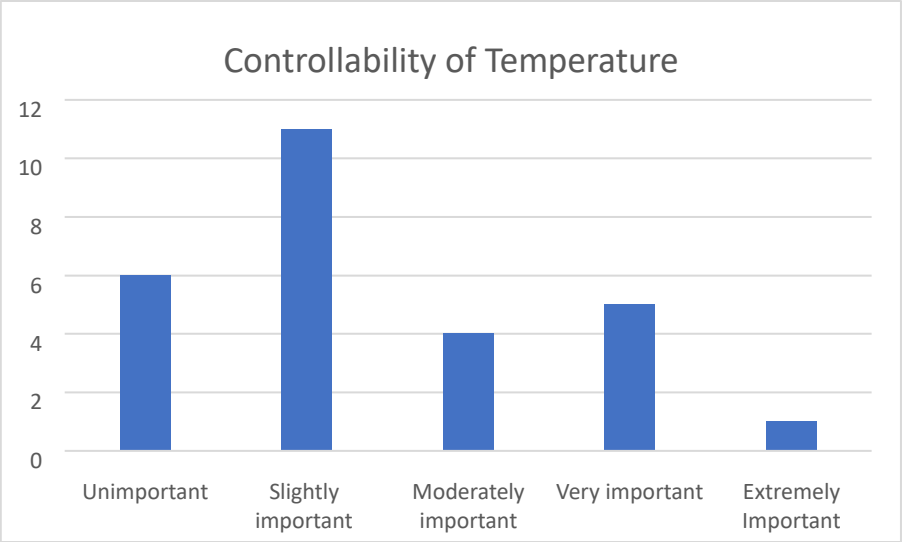


(Fig. 44) How important is the controllability of artificial light?

The mode value is once again Moderately Important (37% 10/27), with a mean value of 3.3, placing it between Moderately Important and Very Important, which is interesting when compared to the availability of light, as it suggests that the availability of artificial light is slightly less important to students than the controllability of artificial light, which is slightly less important than the availability of natural light.

4.4.3.11 Space: When you are studying in Social Informal Learning Spaces, how important is controllable temperature?

The controllability of temperature does not seem to be important to students studying in Social Informal Learning Spaces, and 22% (6/27) selected Unimportant, 41% (11/27) selected Slightly Important, 15% (4/27) selected Moderately Important, 19% (5/27) selected Very Important, and 4% (1/27) of respondents selected Extremely Important (Fig. 45):

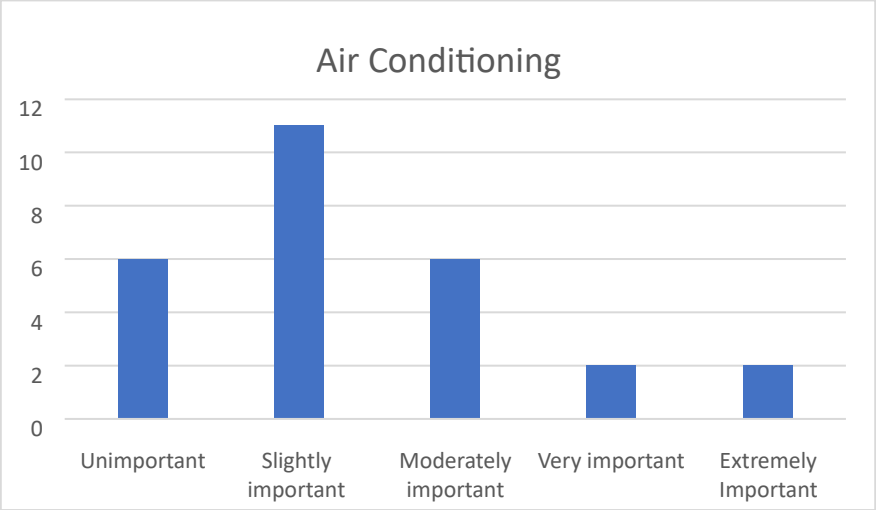


(Fig. 45) How important is the controllability of temperature?

The mode value is Slightly Important (41% 11/27), with a mean value of 2.4, placing it between Slightly Important and Moderately Important, suggesting that the controllability of temperature is not particularly important to them.

4.4.3.12 Space: When you are studying in Social Informal Learning Spaces, how important is air conditioning?

22% (6/27) selected Unimportant, 41% (11/27) selected Slightly Important, 22% (6/27) selected Moderately Important, 7% (2/27) selected Very Important, and 7% (2/27) of respondents selected Extremely Important (Fig. 46):

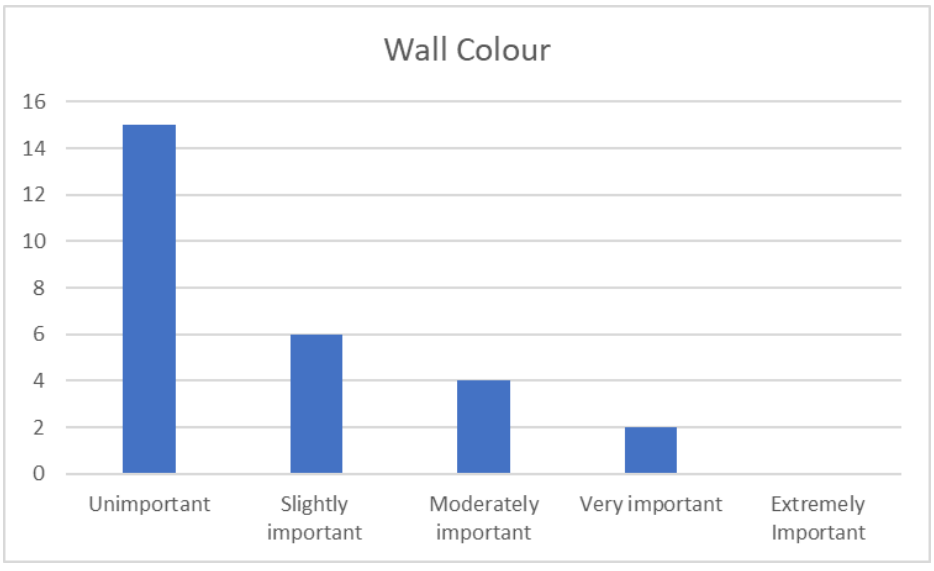


(Fig. 46) How important is air conditioning?

Once again, the mode value is Slightly Important (41% 11/27), with a mean value of 2.4, placing it between Slightly Important and Moderately Important, suggesting that the air conditioning is not particularly important to students studying in Social Informal Learning Spaces, and is on a par with controllability of temperature.

4.4.3.13 Space: When you are studying in Social Informal Learning Spaces, how important is the colour of the walls?

Whilst studies have suggested Wall colour may have an effect on the ability of students to focus on tasks, 56% (15/27) selected Unimportant, 22% (6/27) selected Slightly Important, 15% (4/27) selected Moderately Important, 7% (2/27) selected Very Important, and 0% (0/27) of respondents selected Extremely Important (Fig. 47):

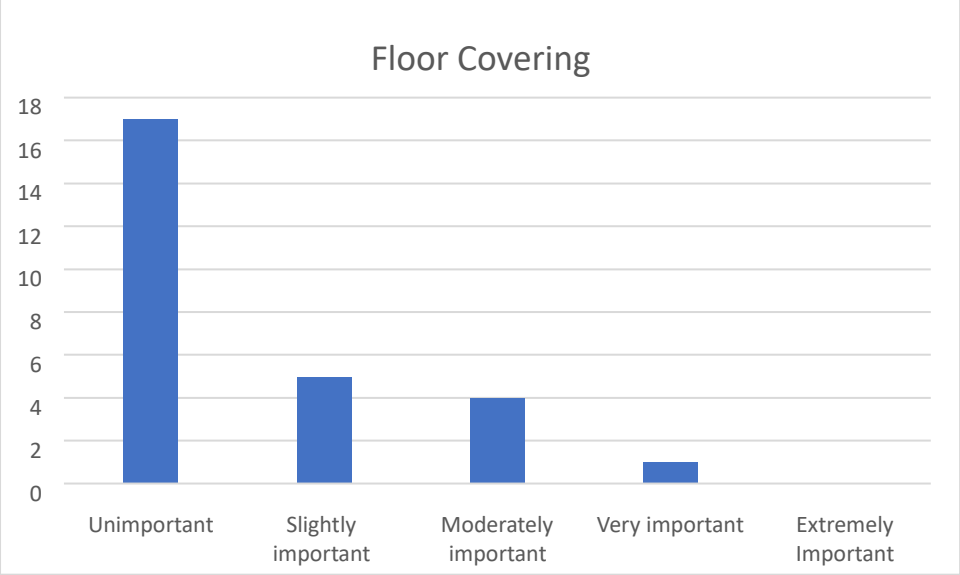


(Fig. 47) How important is wall colour?

The mode value for wall colour is Unimportant (56% 15/27), with a mean value of 1.7, placing it between Unimportant and Slightly Important, suggesting that wall colour is not particularly important to students studying in Social Informal Learning Spaces. This may be because they do not feel negatively impacted by the colours chosen, with this factor coming in at 33/35 on the importance ratings.

4.4.3.14 Space: When you are studying in Social Informal Learning Spaces, how important is the floor covering?

Floor covering may also be a factor to be considered when choosing Social Informal Learning Spaces in which to work, and 63% (17/27) selected Unimportant 0% (0/27), 19% (5/27) selected Slightly Important, 15% (4/27) selected Moderately Important, 4% (1/27) selected Very Important, and O% (0/27) selected Extremely Important (Fig.48):

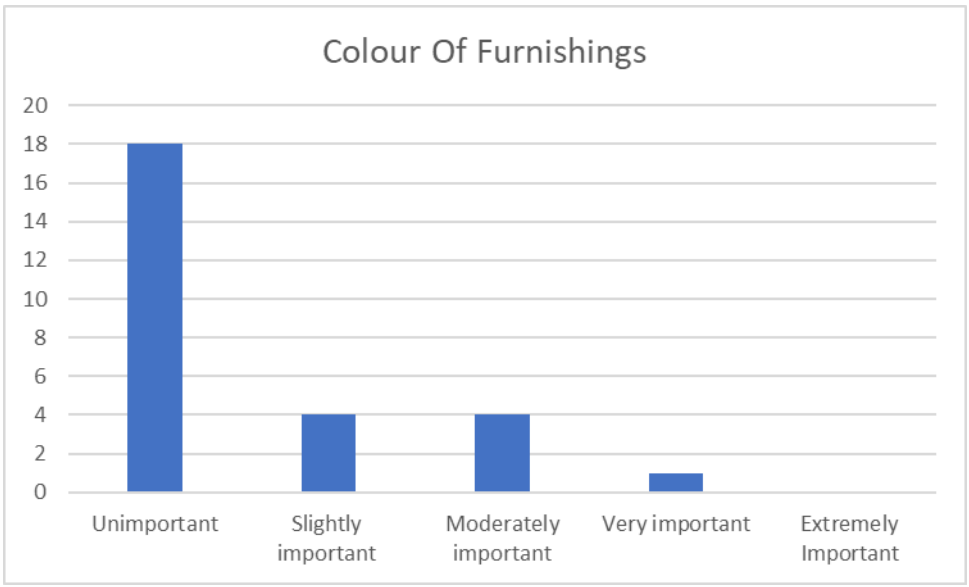


(Fig. 48) How important is the floor covering?

As with wall colour, the mode value for wall covering is Unimportant (63% 15/27), with a mean value of 1.6, placing it between Unimportant and Slightly Important, suggesting that wall colour is not particularly important to students studying in Social Informal Learning Spaces, and slightly less important than the color of the walls, and it is placed at the lowest position in the importance rankings along with the colour of the floors.

4.4.3.15 Space: When you are studying in Social Informal Learning Spaces, how important is the colour of the furnishings?

Furniture colour does not seem to be important to students, with 67% (18/27) selecting Unimportant, 15% (4/27) selecting Slightly Important, 15% (4/27) selecting Moderately Important, 4% (1/27) selecting Very Important, and 0% (0/27) of respondents selecting Extremely Important (Fig. 49):

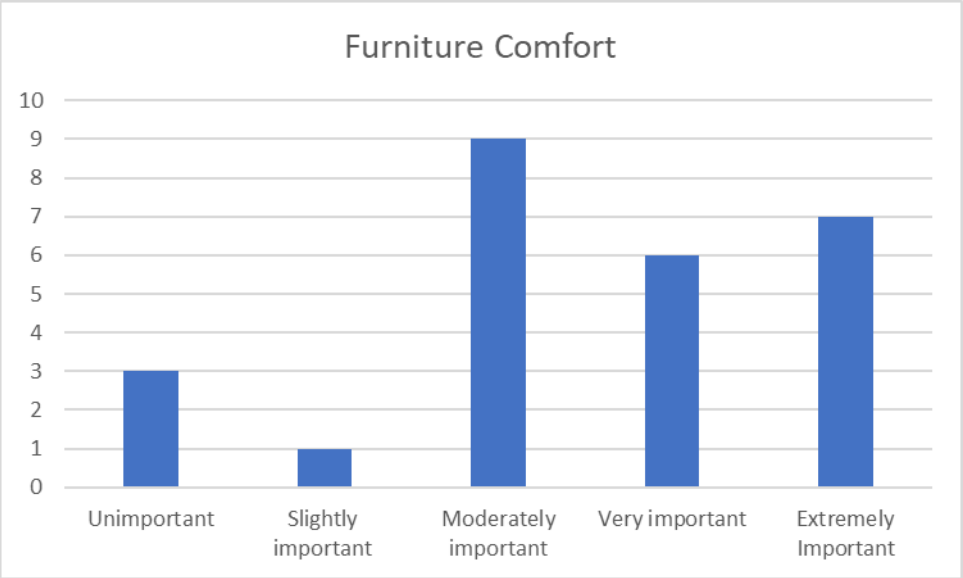


(Fig. 49) How important is the colour of the furnishings?

The mode value for colour of furnishings is Unimportant (67% (18/27), with a mean value of 1.6, placing it between Unimportant and Slightly Important, suggesting that furniture colour, like wall colour and floor colour, is not particularly important to students studying in Social Informal Learning Spaces, and is at position 35/35, right at the bottom of the importance rankings.

4.4.3.16 Space: When you are studying in Social Informal Learning Spaces, how important is the comfort of the furnishings?

Only 26/27 respondents answered this question, but the comfort of the furnishings in Social Informal Learning Spaces does seem to be relatively important to students, and (27% 7/26) of respondents selected Extremely Important, 22% (6/27) selected Very Important, 33% (9/27) selected Moderately Important, 4% (1/27) selected Slightly Important, 11% (3/27) selected Unimportant (Fig. 50):

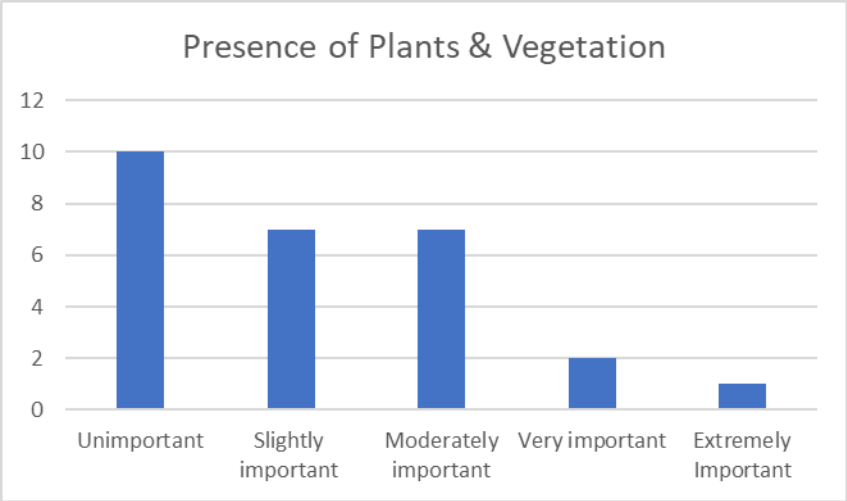


(Fig. 50) How important is the comfort of the furnishings?

With almost three quarters (74% / 20/27) of students surveyed spending between two and five hours in Social Informal Learning Spaces, the comfort of the furniture should be an important consideration, and whilst the mode value for the comfort of furnishings is Moderately Important (33% (9/26), the mean value of 3.5, between Moderately Important and very important places the comfort of furnishings quite high (10=) on the importance rankings when studying in Social Informal Learning Spaces.

4.4.3.17 Space: When studying in Social Informal Learning Spaces, how important is the presence of plants?

The presence of plants and vegetation may also be considered by designers to make Social Informal Learning Spaces more attractive and conducive to studying, but 37% of respondents (10/27) selected Unimportant, 26% (7/27) selected Slightly Important, 26% (7/27) selected Moderately Important, 7% (2/27) selected Very important, and 4% (1/27) of respondents selected Extremely Important (Fig. 51):

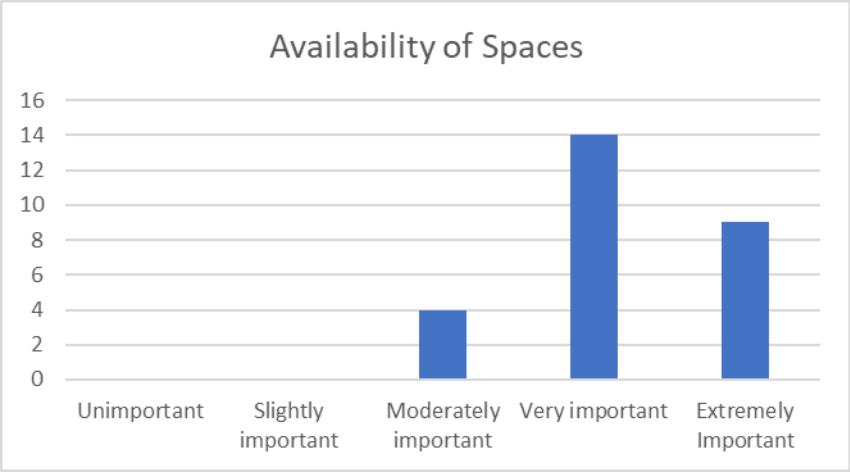


(Fig. 51) How important is the presence of plants and vegetation?

The results suggest that students do not consider the presents of plants and vegetation to be particularly important when they are studying in Social Informal Learning Spaces, with a mode value of Unimportant, and a mean value of 2.2 placing it between Slightly Important and Moderately Important, and at position of 31/35 in the importance rankings.

4.4.3.18 Space: When you are studying in Social Informal Learning Spaces, how important is the availability of spaces?

Availability of space is important to students, and 0% (0/27) selected Unimportant, 0% (0/27) selected Slightly Important, 15% (4/27) selected Moderately Important, 52% (14/27) selected Very Important, and 33% (9/27) selected Extremely Important (Fig. 52):

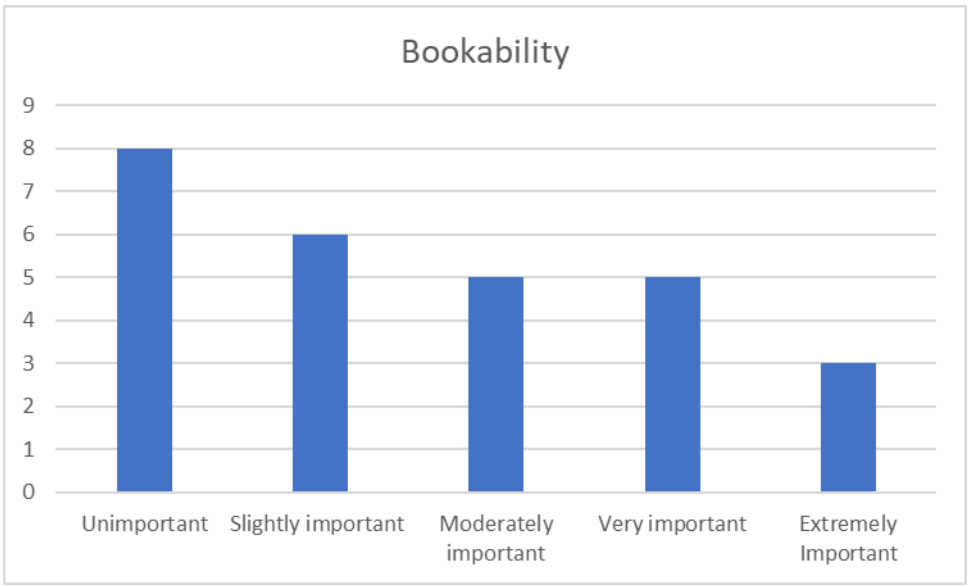


(Fig. 52) How important is the availability of spaces?

With a mode value of Very Important, and a mean value of 4.2 placing it between Very Important and Extremely Important, availability of spaces is clearly important to students, and the results place it at position 4/35 in the importance rankings.

4.4.3.19 Space: When you are studying in Social Informal Learning Spaces, how important is the bookability of spaces?

The bookability of Social Informal Learning Spaces seem to be important to some students, but not others, and 30% (8/27) selected Unimportant, 22% (6/27) selected Slightly Important, 19% (5/27) selected Moderately Important 19% (5/27) selected Very Important, and 11% (3/27), of respondents selected Extremely Important (Fig. 53):

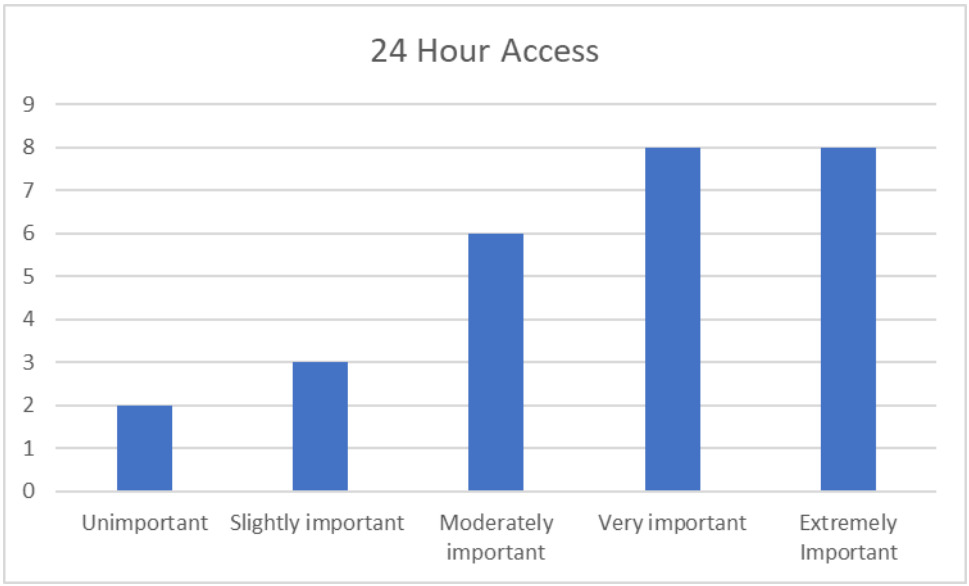


(Fig. 53) How important is the bookability of spaces?

The mode value is Unimportant, whilst the mean value of 2.6 is between Slightly Important and Moderately Important, and opinion seems to be much more widely spread than in most of the other questions, suggesting that the ability to book Social Informal Learning Spaces has a varying degree of importance depending on the respondents' needs, and that some Social Informal Learning Spaces should be made available with 24 hour access on campus for those that wish to use them outside the normal 9-5 working day.

4.4.3.20 Space: When you are studying in Social Informal Learning Spaces, how important is 24 hour access?

24 Hour Access to Social Informal Learning Spaces appears to be important to students, with 7% (2/27) selecting Unimportant, 11% (3/27) selecting Slightly Important, 22% (6/27) selecting Moderately Important, 30% (8/27) selecting Very Important, and 30% (8/27) of respondents selecting Extremely Important (Fig. 54):

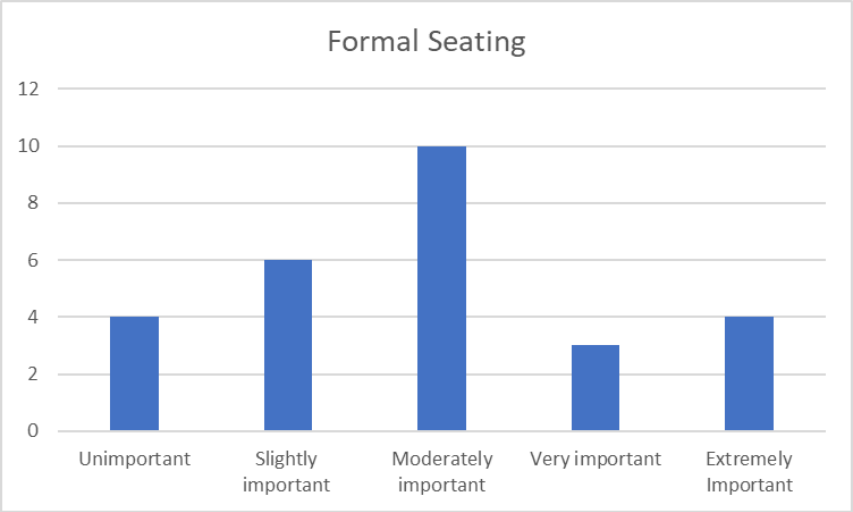


(Fig. 54) How important is 24 hour access?

The mode value is shared between Extremely Important and Very important, the mean value of 3.6 places 24 Hour Access between Moderately Important and Very Important, and at position 9/35 in the importance rankings, suggesting that for most of the students, the ability to access Social Informal Learning Spaces at any time of the day or night is important.

4.4.3.21 Space: When you are studying in Social Informal Learning Spaces, how important is it to have formal seating?

Formal seating seems to be moderately important to students studying in Social Informal Learning Spaces, with 15% (4/27) selecting Unimportant, 22% (6/27) selecting Slightly Important, 37% (10/27) selecting Moderately Important, 11% (3/27) selecting Very Important, and 15% (4/27) of respondents selecting Extremely Important (Fig. 55):

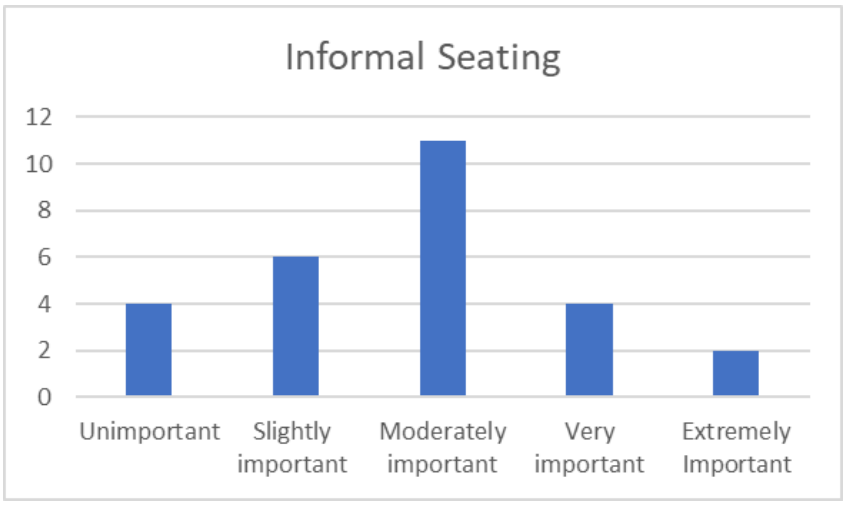


(Fig. 55) How important is formal seating?

With a mode value of Moderately Important, and a mean value of 2.9 placing it between Slightly Important and just below Moderately Important, formal seating seems to be quite important to most students, placing it at position 16/35 in the importance rankings. However, as with Bookability, the results are spread across the entire range suggesting the presence of formal seating is important to some respondents, but not to others.

4.4.3.22 Space: When you are studying in Social Informal Learning Spaces, how important is it to have informal seating?

The presence of informal seating has a similar range of responses to the presence of informal seating, and 15% (4/27) of respondents selected Unimportant, 22% (6/27) selected Slightly Important, 41% (11/27) selected Moderately Important, 15% (4/27) selected Very Important, and 7% (2/27) of selected Extremely Important (Fig. 56)

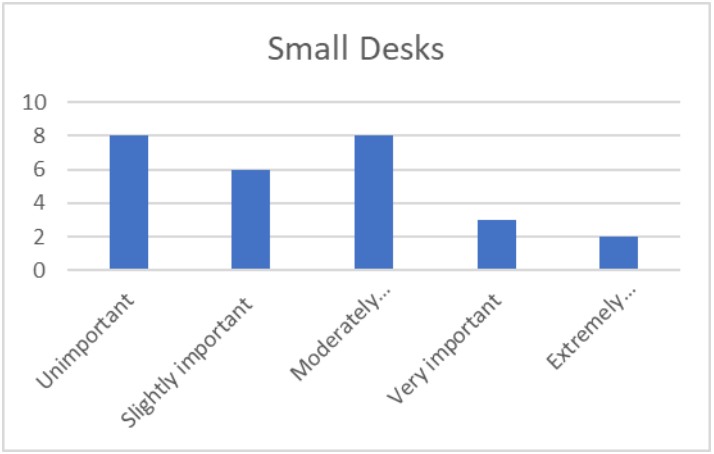


(Fig. 56) How important is informal seating?

Whilst the mode value is Moderately Important, and the mean value is 2.8, between Slightly Important and Moderately Important, once again, as with formal seating, the results are spread across the range suggesting some students find the presence of informal seating is more important to some students than others.

4.4.3.23 Space: When you are studying in Social Informal Learning Spaces, how important is it to have small desks?

The presence of small desks seems to divide the students once again, with 30% (8/27) selecting Unimportant, 22% (6/27) selecting Slightly Important, 30% (8/27) selecting Moderately Important, 11% (3/27) selecting Very Important, and 7% (2/27) selecting Extremely Important (Fig. 57):

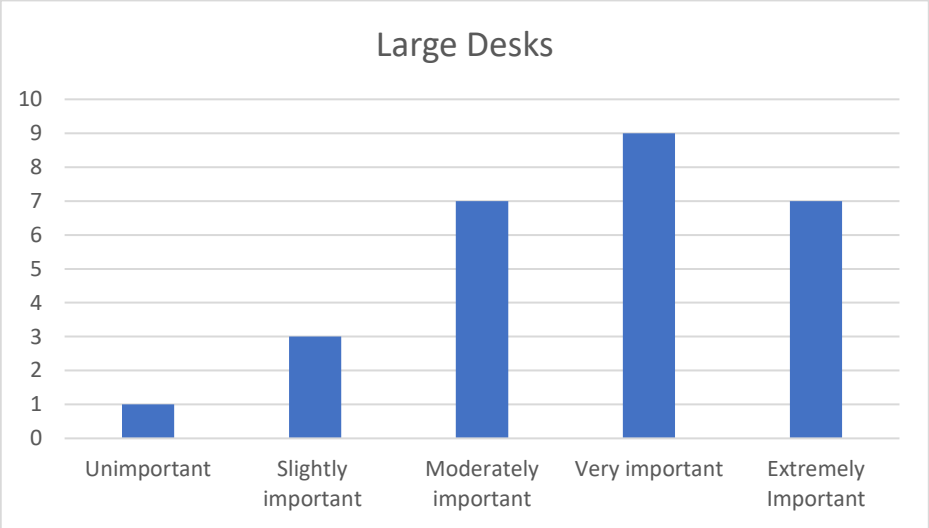


(Fig. 57) How important is it to have small desks?

The mode value is shared between Unimportant and Moderately Important, with a mean value of 2.4 placing it between Slightly Important and Moderately Important, and at position 28/35 in the rankings, suggesting that the provision of small desks is reasonably important, but depends on individual preferences and, presumably, on whether they are studying alone or in pairs or small groups, and what activities they are engaged in.

4.4.3.24 Space: When you are studying in Social Informal Learning Spaces, how important is it to have large desks?

The provision of large desks seems to be more important to students than the provision of small desks, and 4% (1/27) selected Unimportant, 11% (3/27) selected Slightly Important, 26% (7/27) selected Moderately Important, 33% (9/27) selected Very Important, and 26% (7/27) selected Extremely Important (Fig. 58):

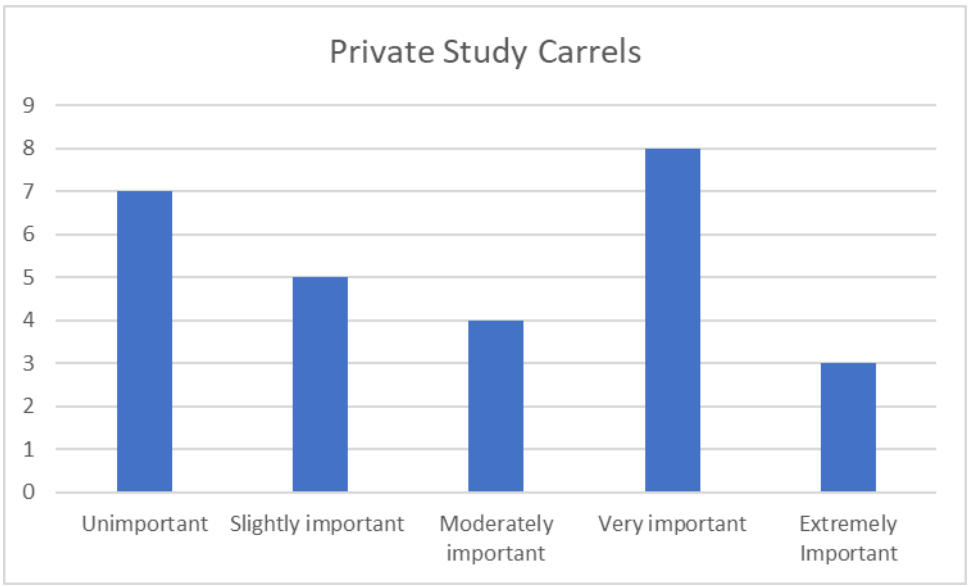


(Fig. 58) How important is it to have large desks?

With a mode value of Very Important, and a mean value of 3.7 placing it between Moderately Important and Very Important, the provision of large desks is clearly more important to students than the provision of small desks, and it ranks at number 8/35 in the rankings list.

4.4.3.25 Space: When you are studying in Social Informal Learning Spaces, how important is it to have private study carrels?

Private study carrels are provided in some Social Informal Learning Spaces, although not in any of the ones which were observed, and 26% (7/27) respondents selected Unimportant, 19% (5/27) selected Slightly Important, 15% (4/27) selected Moderately Important, 30% (8/27) selected Very Important, and 11% (3/27) selected Extremely Important (Fig. 58):



(Fig. 59) How important is it to have private study carrels?

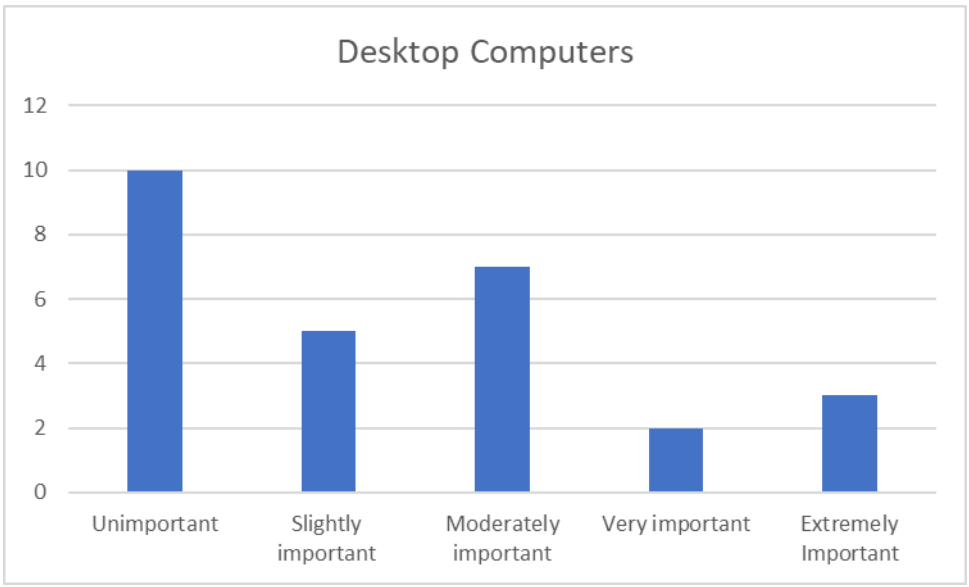
The results suggest that some students think the provision of carrels is important, whilst others do not, and whilst the mode value is Very Important, and the mean value of 2.8 places it between Slightly Important and Moderately Important, placing it at 18/35 in the rankings, it does suggest that the provision of some study carrels in Social Informal Learning Spaces might be useful for students who want to focus on solo work and have a greater degree of privacy whilst they study.

4.4.4 Technology

Technology is defined in Radcliffe's PST Framework as the technologies which are most effective at enhancing learning within learning spaces.

4.4.4.1 Technology: When you are studying in Social Informal Learning Spaces, how important is it to have desktop computers?

Desktop computers were only provided in 2/3 Social Informal Learning Spaces observed, and in response to this question 26% (7/27) of respondents selected Unimportant, 19% (5/27) selected Slightly Important, 15% (4/27) selected Moderately Important, 30% (8/27) selected Very Important, and 11% (3/27) selected Extremely Important (Fig. 60):

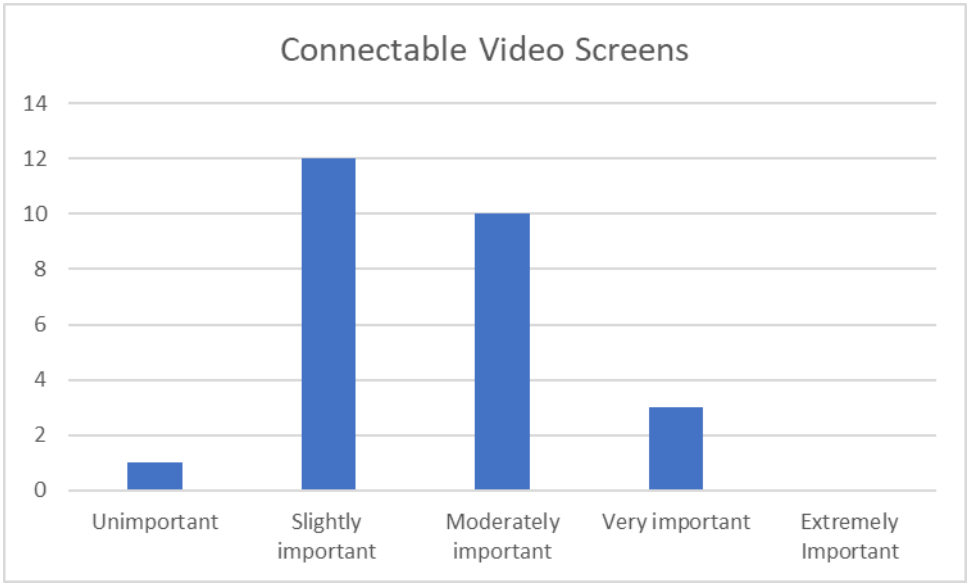


(Fig. 60) How important is it to have desktop computers?

4.4.4.2 Technology: When you are studying in Social Informal Learning Spaces, how important is it to have connectable video screens?

Connectable video screens for group work are provided in some Social Informal Learning Spaces in the Library, although not in any of the Social Informal Learning Spaces which were observed.

For some unknown reason, only 26/27 respondents answered this question, but 4% (1/26) selected Unimportant, 46% (12/26) selected Slightly Important, 39% (10/26) selected Moderately Important, 12% (3/26) selected Very Important, and 0% (0/26) selected Extremely Important (Fig. 61):



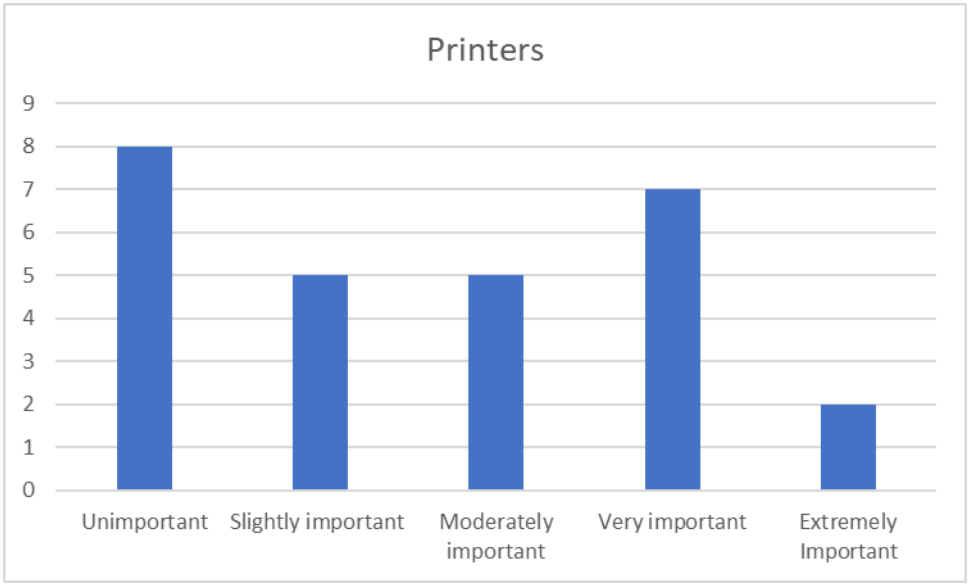
(Fig. 61) How important is it to have connectable video screens?

The mode is Slightly Important, and the mean value is 2.6, placing it between Slightly Important and Moderately Important, and at 23/35 in the rankings suggesting that the provision of connectable Video Screens is not very high on the list of priorities for students studying in Social Informal Learning Spaces.

4.4.4.3 Technology: When you are studying in Social Informal Learning Spaces, how important is it to have printers?

Printers were not provided in any of the Social Informal Learning Spaces which were observed, but 30% (8/27) of respondents selected Unimportant, 19% (5/27) selected Slightly

Important, 19% (5/27) selected Moderately Important, 7% (2/27) of respondents selected Extremely Important, and 26% (7/27) selected Very Important (Fig. 62):

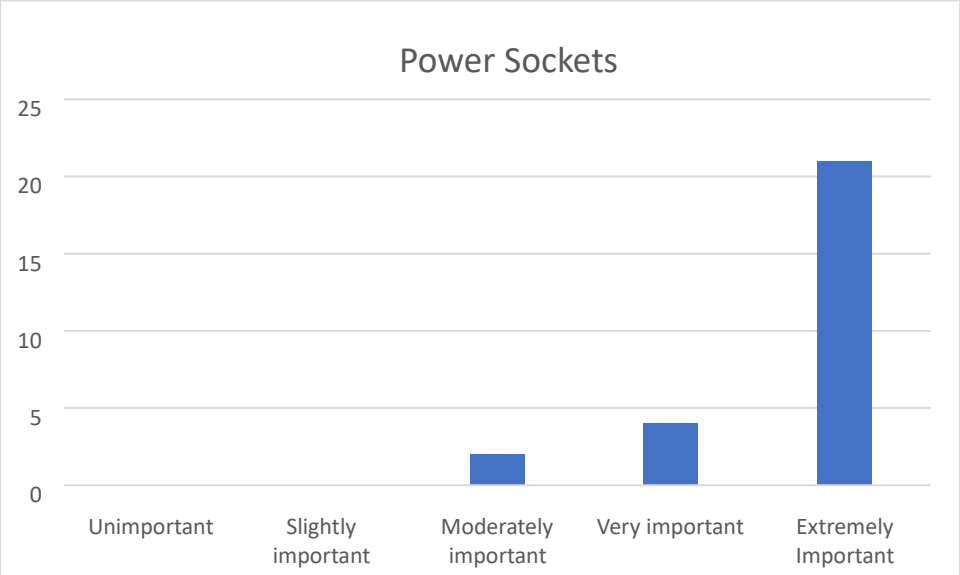


(Fig. 62) How important is it to have printers?

Whilst the mode value is Unimportant, and the mean value is 2.6, placing it between Slightly Important and Moderately Important and at 24 in the rankings, it is interesting to note that the second most popular selection was Very Important, suggesting that the provision of printers is very important to some students and un others, and that printers should probably be provided in at least some Social Informal Learning Spaces on campus.

4.4.4.4 Technology: When you are studying in Social Informal Learning Spaces, how important is it to have power sockets?

The provision of power sockets appears to be extremely important to students when studying in Social Informal Learning Spaces, and whilst 0% (0/27) of respondents selected Unimportant, 0% (0/27) selected Slightly Important, 7% (2/27) selected Moderately Important, 15% (4/27) selected Very Important, and 78% (21/27) selected Extremely Important (Fig. 63):

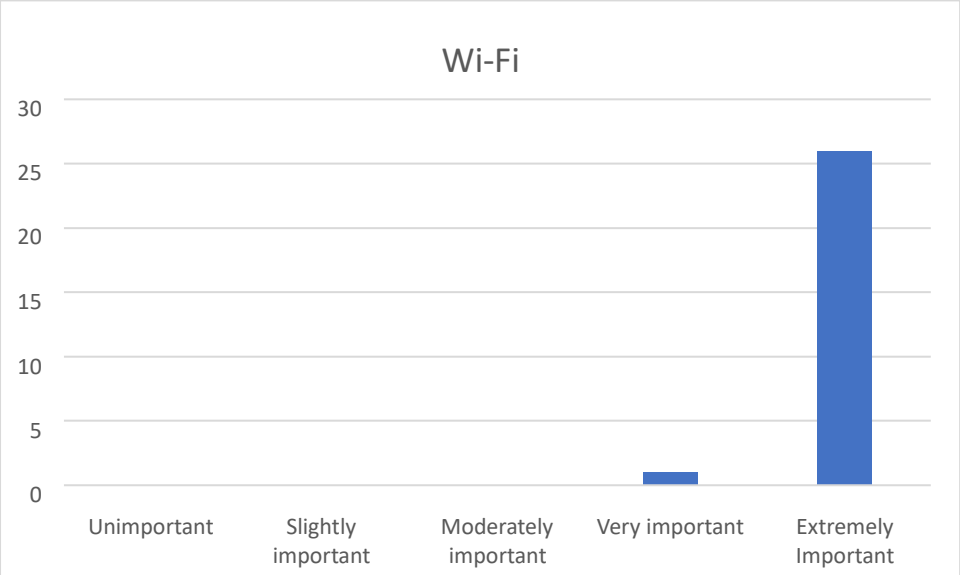


(Fig. 63) How important is it to have power sockets?

This is one of the most conclusive results from the survey, with the vast majority 78% (21/27) of respondents selecting the mode value Extremely Important, and the mean value being 4.7, placing it between Very Important and Extremely Important, and at position 2 in the rankings. Bearing in mind the fact that students used an average of 1.3 (Observed) and 1.8 (Surveyed) devices each whilst studying in Social Informal Learning Spaces, and the limited battery life of those devices, it is not particularly surprising that this is rated with such high importance.

4.4.4.5 Technology: When you are studying in Social Informal Learning Spaces, how important is it to have wi-fi?

Wi-fi, like power, is extremely important to students studying in Social Informal Learning Spaces, and 0% (0/27) of respondents selected Unimportant, 0% (0/27) selected Slightly Important, 0% (0/27) selected Moderately Important, 4% (1/27) selected Very Important, and 96% (26/27) of respondents selected Extremely Important (Fig. 64):



(Fig. 64) How important is it to have Wi-Fi?

The most decisive of all the results, the mode response was Extremely Important, and the mean value of 4.96 places it above Very Important and extremely close to Extremely Important, and right at the top of the rankings. Like power, this result is unsurprising, as many of the devices used by students are wi-fi enabled, and indeed rely on network connectivity for their functionality, but the results do suggest that both wi-fi and power are vital for Social Informal Learning Space users.

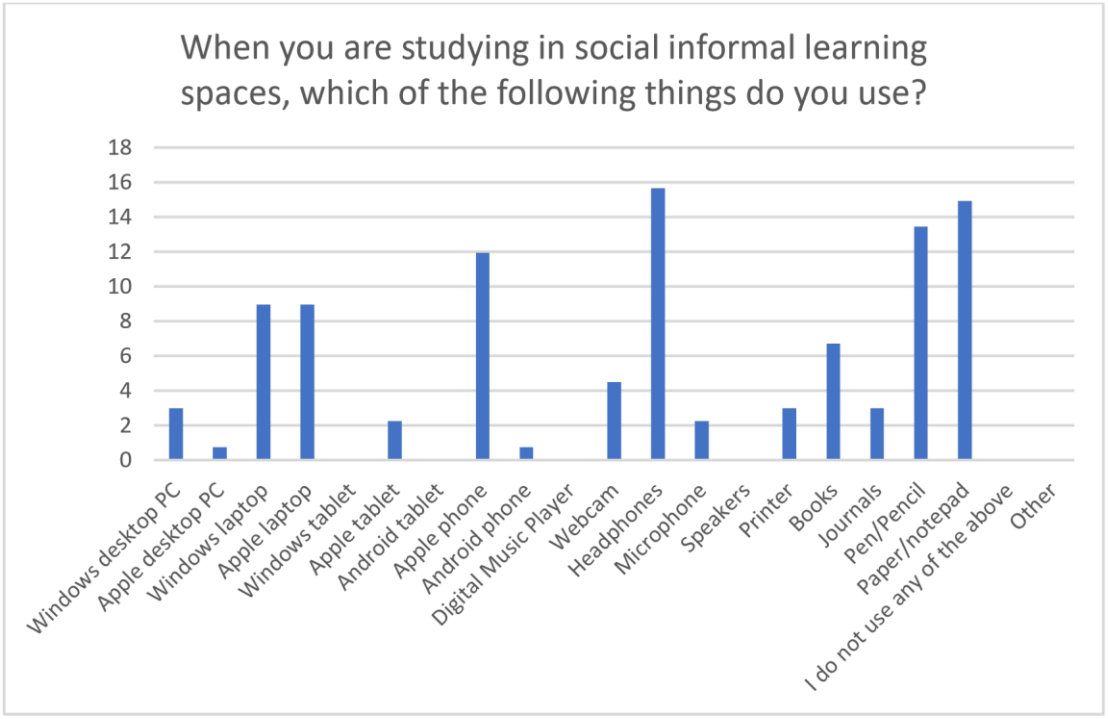
4.4.4.6 Technology: When you are studying in Social Informal Learning Spaces, which of the following things do you use?

Respondents were asked to tick as many boxes as applied to them, and there were 134 responses from 27 respondents, indicating that many of them use multiple devices in conjunction with other items when studying in Social Informal Learning Spaces.

The word “things” was used in this question, as opposed to “technologies”, to broaden the spectrum of potential responses to include a wider variety of items which may not be regarded by students as “technologies” e.g. books, pen/pencil, paper/notebook to get a fuller picture of the things which students utilise in Social Informal Learning Spaces.

However, it could be argued that all the “Things” listed are indeed pieces of technology, albeit some from a pre-digital age, which are still in use, despite the availability of “modern” technologies like the computer, smartphone, or tablet, which could have potentially made the

pre-digital technologies obsolete e.g. students could make notes on a smart device, rather than using a pen/pencil and paper (Fig. 65):



(Fig. 65) When you are studying in Social Informal Learning Spaces, which of the following things do you use?

Whilst the observations in section 4.2 were based on ethnographic sweeps of Social Informal Learning Spaces X, Y and Z, analysis of the questionnaire in 4.3 should allow us to delve deeper into the uses of technology by students when working in Social Informal Learning Spaces, and it will be useful to compare the data from the questionnaire with the data from the observations to gain additional insights.

4.4.4.7 Technology: Computer Use

15% (4/27) of respondents use Windows Desktop PCs, 4% (1/27) use an Apple PC, 44% (12/27) use a Windows Laptop, and 44% (12/27) use an Apple laptop. 11% (3/27) of respondents use an Apple Tablet (iPad), but 0% (0/27) used a Windows tablet, and 0% (0/27) use an Android tablet.

49 responses from 27 students, an average of 1.8 devices per student, suggests that each of them uses more than one device when studying in Social Informal Learning Spaces, which is considerably higher than the 1.1 (816/745) average devices per student observed in the

ethnographic sweeps. This may be explained by the observations being snapshots in time i.e. what the students were observed to be using, as opposed to this question, which was about general use of technology by students when in Social Informal Learning Spaces. Whilst students many utilise more than one device in both cases, it may be that when observed, many of the students were working on their primary devices i.e. a desktop, laptop, or tablet computer whilst supplemental devices were kept in pockets or bags for security reasons, or to avoid potential distractions such as social media updates whilst working on focussed tasks.

15% (4/27) of student respondents indicated that they use Windows or Apple desktop PCs in the questionnaire, as opposed to 7.5% (56/745) noted in the observations, which may be because, as research scholars, they need access to higher processing power or additional software, which is not available to them to use on their personal devices, perhaps because licenses are prohibitively expensive, but which may be available on networked desktop computers provided by the institution.

67% (18/27) of respondents said they used Windows or Apple laptops whilst in Social Informal Learning Spaces, compared to 85% (639/745) observed in Social Informal Learning Spaces X, Y and Z, but 7% (2/27) reported they used Apple or Android Tablets, and 7.5% (56/745) were observed to be using Apple or Android Tablets.
The lower percentage of laptop usage by the students who answered the questionnaire may be explained by their higher use of Desktop PCs, and indeed when the numbers for desktops, laptops and tablets are combined, 81% (22/27) from the questionnaire, and 85% (639/745), they are found to be very similar, indicating the majority of students 92% (710/772) use some kind of computing device whilst studying in Social Informal Learning Spaces.

4.4.4.8 Technology: Mobile Phone Use

48% (13/27) of respondents said they used mobile phones, 44% (12/27) of which were Apple devices, and 4% (1/27) of which were Android, whilst only 15% (108/745) were observed to be doing so during the observations, which is a very large difference, but which echoes the idea noted above that mobile phones may be tucked away for security reasons or the avoidance of distraction.

4.4.4.9 Technology: Headphone Use

78% (21/27) of respondents said they used headphones whilst studying in Social Informal Learning Spaces, compared to 15% (113/745) of students observed which is a huge difference, but this anomaly may be explained by the wording of the question in the questionnaire, which asks about which things they use, and does not consider how often, or for how long they are used whilst studying in Social Informal Learning Spaces.

It may also be that during the observational sweeps students were engaged in social learning with their peers, as opposed to working on solo tasks, and therefore their headphones were not needed, and were tucked away in pockets or bags, and therefore they could not be observed and recorded.

The following items were not recorded in the ethnographic room sweeps, so it is not possible to compare the two sets of data, but nevertheless, the results are still of interest in the context of this study:

4.4.4.10 Technology: Webcam, Microphone and Speaker Use

22% (6/27) use a webcam whilst studying in Social Informal Learning Spaces, and 11% (3/27) use a microphone, which is a little surprising, as Social Informal Learning Spaces are shared spaces, which one might imagine would preclude the use of such a technologies, and may account for the 0% (0/27) use of speakers.

However, the questionnaire data does suggest that 50% (3/27) of those who used headphones used them passively, to consume videos, podcasts, music, or other pre-recorded materials on their devices, whilst the other 50% (3/27) used their microphones, which may or may not be combined with their headphones, to actively engage, perhaps via audio or video calls, or whilst remotely attending live events such as lectures or seminars.

4.4.4.11 Technology: Printer Use

None of the Social Informal Learning Spaces observed contained printers, in line with Institutional policy regarding the limiting of photocopying and paper use, so it is interesting to note that 15% (3/27) of students used printers whilst studying in Social Informal Learning

Spaces, suggesting that whilst they may have multiple devices capable of displaying learning materials available to them, and the fact that most assessments, irrespective of discipline, are now submitted electronically, a small minority of students still prefer to print things out.

4.4.4.12 Technology: Book & Journal Use

33% (9/27) of respondents use books, and 15% (4/27) make use of journals whilst studying in Social Informal Learning Spaces, which is a little surprising, as most, if not all, resources and required reading materials are provided electronically by the Institution via the Virtual Learning Environment, but it does suggest that a significant number of students use traditional books along with their electronic devices, perhaps to free up their devices for content creation, rather than referencing information, or to access information inaccessible online.

4.4.4.13 Technology: Pen, Pencil, Paper & Notepad Use

Despite the apparent abundance of electronic devices capable of recording audio or capturing written notes amongst students, 67% (18/27) use pens or pencils, and 74% (20/27) use paper/notepads, although it does bode the question of what 7% (2/27) of the respondents use to make notes on their paper/notepad if they do not use a pens or pencils, but perhaps they are the same group of students who prefer print things out, as opposed to reading them online.

4.4.4.14 Technology: Nothing / Other

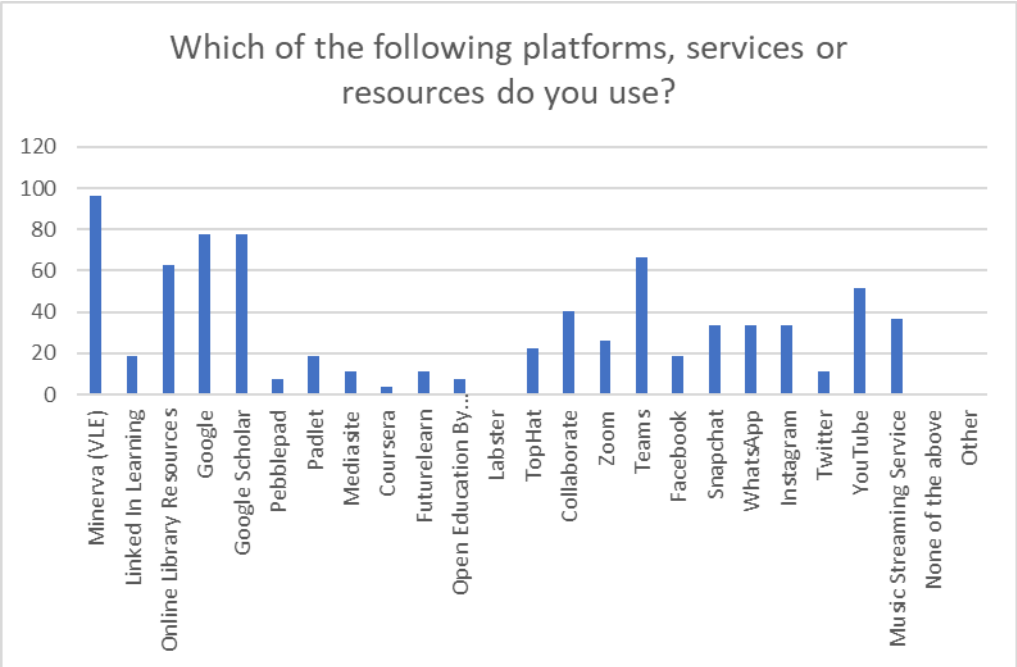
0% (0/27) of the surveyed students said they used nothing, and the same number, 0% (0/27), indicated they used anything other than the technologies listed whilst studying in Social Informal Learning Spaces.

However, 5% (36/745) of students observed during the ethnographic sweeps were recorded as having nothing on their tables or desks which could be used for learning, suggesting they were engaged in socialising, food, or beverage consumption, or both.

It is interesting to note that both food and drink are available to purchase in Social Informal Learning Spaces X and Z, where 17% (18/104) 5% (18/351) of students were observed to have nothing on their tables or desks , whilst in Social Informal Learning Space Y, no such refreshment facilities are available, and 100% (290/290) of students had at least one learning tool on display.

4.4.4.14 Technology: When you are studying in Social Informal Learning Spaces, which of the following platforms, services or resources do you use?

Respondents were asked to tick as many boxes as applied to them, and there were 207 responses from 27 respondents, indicating that many of them use multiple online platforms, services or resources when studying in Social Informal Learning Spaces (Fig. 66):



(Fig. 66) Which of the following platforms, services or resources do you use?

4.4.4.16 Technology: Learning Platforms, Services and Resources

When studying in Social Informal Learning Spaces, 96% (26/27) of respondents use Minerva, our Virtual Learning Environment, which is a repository for learning materials and lecture recordings, enables them to communicate with their peers and tutors, and also to take summative and formative assessments as well as submit their assignments.

7% (2/27) of survey respondents use Linked In Learning, which contains a wide variety of courses to which students have full access thanks to our site-wide license.

63% (17/27) said that they use Online Library Resources, which allows them to access databases, ejournals and ebooks without visiting the physical libraries.

78% (21/27) use Google, and 78% (21/27) use Google Scholar, both of which are owned by Alphabet Inc. Google is a general online search engine, Google Scholar narrows down the search field to only include scholarly links and journal articles.

7% (2/27) of respondents use Pebble Pad, which is utilised in some disciplines to enable students to curate online portfolios of their work.

19% (5/27) use the Padlet online collaboration tool, which enables users to create walls of virtual post-it notes, and 11% (3/27) use Mediasite, which is the system where our lecture recordings and ad-hoc recordings are hosted.

4% (1/27) use educational platform Coursera, and 11% (3/27) use the FutureLearn educational platform, and 7% (2/27) use the Open Education by Blackboard educational platform all of which, like Linked In Learning, offer a range of additional free online courses to students.

Whilst 0% (0/27) use Labster, the virtual laboratory experiment platform, 22% (6/27) do use our Institutional quiz tool TopHat, whilst they are studying in Social Informal Learning Spaces.

What is clear from these results is that students use a wide variety of learning resources whilst studying in Social Informal Learning Spaces, all of which can be accessed online via their computers or tablets, enabling them to do further study or reding without access to printed materials or traditional textbooks.

4.4.4.17 Technology: Communication Tools

When communicating online whilst studying in Social Informal Learning Spaces, 41% (11/27) of respondents use Collaborate, 26 % (7/27) use Zoom, and 41% (11/27) use Microsoft Teams, which is indicative of the various communication tools used across the Institution for running live seminars and lectures, and they may also be using them to communicate with fellow students who may not be in the same geographical space.

Respondents also use social media whilst studying in Social Informal Learning Spaces, with 19% (5/27) using Facebook, 33% (9/27) using Snapchat, 33% (9/27) using WhatsApp, 33% (9/27) using Instagram, and 11% (3/27) using Twitter, and whilst it is not clear if they are

using these tools for educational, as opposed to recreational, purposes, they are clearly an integral part of their range of communication platforms.

52% (14/27) of respondents indicated that they use YouTube whilst studying in Social Informal Learning Spaces, and 37%(10/27) use a Music Streaming Service, but once again it is unclear if they are using these whilst they study to access additional learning materials, during study breaks, or a combination of the two.

0% (0/27) of respondents selected either none of the above or other.

4.4.5 Pedagogy, Space and Technology: Additional Comments

The final question on the questionnaire was deliberately open ended, and the survey allowed free text responses rather than limiting the respondents by using tick boxes.

Only 41% (11/27) of respondents chose to answer this question, choosing to provide additional insights into their experience of using on campus Social Informal Learning Spaces.

Is there anything else you would like to say about Social Informal Learning Spaces on campus?

4.4.5.1 Pedagogy: Noise

One of the students (9% 1/11) also commented that the low background sounds of others working was conducive to study, especially for students like him with ADHD.

4.4.5.2 Space: Food and Drink

One respondent (9% 1/11) suggested the provision of hot water, a microwave, and somewhere to eat would be useful, and another (9% 1/11) suggested they would like to see more plants.

4.4.5.3 Space: Temperature

There was one complaint (9% 1/11) about the temperature in Social Informal Learning Spaces being either too hot or too cold.

4.4.5.4 Space: Availability

One student (9% 1/11) complained about the lack of available spaces at busy times, and the need to spend time searching for somewhere to study.

4.4.5.5 Space - Toilets

One student commented on the importance of (9% 1/11) of the availability of toilets.

4.4.5.6 Space: Cleanliness

(9% 1/11) of students said our Social Informal Learning Spaces were nice and clean.

4.4.5.7 Technology: Power Sockets

Two students (18% 2/11) commented on the lack of availability of working power sockets in some Social Informal Learning Spaces which they frequent.

4.5 Focus Group

All 27 of the students who answered the questionnaire were invited to attend the focus group. 11 students attended the one hour session, and the discussion was structured by asking three open-ended questions about studying in Social Informal Learning Spaces:

1. Which is your favourite Social Informal Learning Space?
2. What do you dislike about our Social Informal Learning Space?
3. What can we do wo improve our Social Informal Learning Spaces?

The structured focus group session was recorded, transcribed, and the data was manually encoded by the researcher to find the emerging themes.

Due to the open-ended nature of the questions and the discussion, some students made more than one comment.

4.5.1 Pedagogy: Emerging Themes

After encoding the focus group responses, three main pedagogical themes emerged:

- Studying
- People
- Noise

4.5.1.1 Pedagogy: People

20 comments were made during the focus group about the presence of other people in Social Informal Learning Spaces, 65% (13/20) of which were positive, and 35% (7/20) of which were negative.

Positive comments were made about being surrounded by other people such as “I can see people I know, which is good for my mental health”, and how it was good to have Social Informal Learning Spaces as spaces where they could “see friends for a break between classes”, and how the potential to interact with others in Social Informal Learning Spaces make them feel “less lonely”, and this suggests that students actively seek out Social Informal Learning Spaces between timetabled sessions to meet up with friends and colleagues and interact with them socially, and also that being surrounded by people has a positive effect on their wellbeing.

Respondents were also very positive about the “informal” and “chilled atmosphere” in Social Informal Learning Spaces, and the fact that they feel able to “have social interactions with other students”, “have conversations at breaks without irritating people”, and how Social Informal Learning Spaces are “relaxed spaces compared to libraries” where rules may prohibit such interactive activities.

Two of the defining factors for Social Informal Learning Spaces are that they are both social and informal spaces, and the students seem to recognise and embrace those elements, taking advantage of the lack of supervision and formal rules in place in order to be able to interact with their fellow students without worrying about disturbing others.

The majority of negative comments were about the fact that Social Informal Learning Spaces “Get crowded quickly” and that they are often “very busy”, suggesting that not only are Social Informal Learning Spaces on campus well used, but that they are often full, which in turn suggests that more on campus Social Informal Learning Spaces provision may be necessary to cope with student demands, particularly at peak times.

However, two of the respondents commented that there are “Not many people around” and that is “Normally nobody there”, which suggests that perhaps some Social Informal Learning

Spaces are more popular than others, and that it may be necessary to either improve the desirability of these under-utilised spaces, or publicise their locations more widely so they attract more students.

One final notable comment with regards to people in Social Informal Learning Spaces was made about the fact that sometimes Social Informal Learning Spaces are “too informal i.e. if people are there for a chat and socializing, you feel like you’re in a bar - with no alcohol” which suggest that on some occasions the lack of supervision or formal rules regarding behaviour and noise levels may make some Social Informal Learning Spaces less desirable, particularly when students are engaged in focussed tasks, and the behaviour of others negatively affects their ability to get their work done.

4.5.1.2 Pedagogy: Studying

20 comments were noted about studying in Social Informal Learning Spaces, 100% (20/20) of which were positive, giving us useful insights into why students enjoy studying in them.

Students said that when they work in Social Informal Learning Spaces they “tend to be more productive”, that they can “focus and concentrate”, that they provide a “good, studious environment”, they are “the best facilities to study in”. Students also said that they liked “having more students around who are also studying”.

Students also “like to work surrounded by other students” which suggests that studying in Social Informal Learning Spaces surrounded by other people has a positive effect on the ability of students to concentrate and focus on their studies, and that they value being able to use them.

Respondents also indicated that they found it “nice being surrounded by people in case they get stuck”, that “study groups with my friends take the pressure off the work itself”, and that they go to Social Informal Learning Spaces “with others who want to study too, so it’s a good, studious environment” which suggests their interactions with others in Social Informal Learning Spaces are nor simply social, but that social learning is actually taking place, which is exactly what Social Informal Learning Spaces are designed to facilitate.

4.5.1.3 Pedagogy: Noise

17 comments related directly to noise levels within Social Informal Learning Spaces, 65% (11/17) of which were positive, and 35% (6/17) of which were negative.

On the positive side, many of the students found Social Informal Learning Spaces to be "quiet" spaces where they can "work quietly without being interrupted" and that studying in Social Informal Learning Spaces "helps them to concentrate and complete tasks" in a "cheerful environment" suggesting that the Social Informal Learning Spaces they use are fit for purpose, and enhance the students' ability to study.

However, some of the students complained that Social Informal Learning Spaces are "sometimes too noisy", and that "sometimes people get to rowdy", with one suggesting that we should "set rules for whether it's allowed to speak in those spaces" which suggests that for those students, sometimes Social Informal Learning Spaces do not provide the ideal working environment for them.

The comments suggest that perhaps the unwritten rules about behaviour should be made clear, and posted within the spaces, which relates back to the comment in 4.4.1.1, where it was suggest that on some occasions the lack of supervision or formal rules regarding behaviour and noise levels may make studying in Social Informal Learning Spaces less desirable.

4.5.2 Space: Emerging Themes

After encoding the responses about Space, four main themes emerged:

- Convenience
- Availability
- Food & Drink
- Comfort

4.5.2.1 Space: Convenience

16 comments were made by the students regarding convenience, 94% (15/16) of which were positive, and 6% (1/16) negative.

The majority of the positive comments were about the close proximity of Social Informal Learning Spaces to spaces where the students' scheduled learning activities took place, as opposed to the proximity of their home study environments, with students saying Social Informal Learning Spaces make it "easy to make use of the time between classes, since I live too far away to get back home", that Social Informal Learning Spaces "make it easier to go back to lectures if you are already on campus", and that they "Make sense in terms of location and time" which suggests that students use Social Informal Learning Spaces throughout the day between classes, and that they value Social Informal Learning Spaces being located in close proximity to their lecture theatres and seminar rooms.

However, one students suggested that Social Informal Learning Spaces are "not easily accessible because of the distance", which suggests that this particular student is unhappy with how far they have to travel to get to one of the Social Informal Learning Spaces.

However, it is interesting to note that this particular student is located in one of the Schools where one of the Social Informal Learning Spaces observed in this study is located, further illustrating the need to inform students about the location of Social Informal Learning Spaces, particularly those located near their School, as noted in section 4.4.1.1, to ensure students know where they are, and how to get there, and how important it is to ensure Social Informal Learning Spaces are spread evenly across the University campus.

4.5.2.2 Space: Availability

11 comments were made about availability of Social Informal Learning Spaces on campus, 100% (11/11) of them negative.

Students complained about the "limited availability" of spaces within Social Informal Learning Spaces, the "lack of seating" and the fact that it "can be hard to find a place", which suggests that there is not enough Social Informal Learning Spaces provision on campus, particularly at peak times, or perhaps that we need to either create more spaces, or make more of an effort to direct students to underutilised existing spaces.

Potential solutions to the problem suggested by the students included the provision of "more seating", "building more social informal learning spaces", and "opening one building 24/7 throughout the year", some or all of which might mitigate the problems of overcrowding

within our Social Informal Learning Spaces, along with raising awareness of underutilised Social Informal Learning Spaces which already exist on campus.

4.5.2.3 Space: Food & Drink

12 comments were made about the availability of, and the ability to consume, food & drink in Social Informal Learning Spaces, 83% (10/12) of which were positive, and 17% (2/12) negative.

Positive comments were made about the ability to be able to "sit there and eat and drink" whilst in Social Informal Learning Spaces, that there was "no need to buy something" and said that "not having to pay for anything" was part of their attraction, as opposed to how they might feel compelled to do in cafes on campus, suggesting relaxed rules about consuming food and drink whist studying were seen as beneficial.

Others commented positively about the proximity of Social Informal Learning Spaces to food & drink outlets, saying that there are "convenient food and coffee options nearby", that you can "eat a packed lunch or buy well priced food" from shops on campus and consume it whilst working, and that they also like the fact that they can "help themselves to water" suggesting the ability to obtain and consume food and drink are important to students using Social Informal Learning Spaces.

However, negative comments suggested that some Social Informal Learning Spaces "don't have food/drink available or simply don't allow the consumption of food or drink", that there is "nowhere to go to consume your own food" suggesting that the proximity of such facilities and, and policies regarding food and drink consumption in Social Informal Learning Spaces are inconsistent across campus, and both of these things are of concern to at least some of the respondents.

4.5.2.4 Space: Comfort

12 comments were made about comfort in Social Informal Learning Spaces, 75% (9/12) of which were positive, and 25% (3/12) of which were negative.

The majority of the students said that Social Informal Learning Spaces on campus were "comfortable", that is was "not as comfortable off campus", and that Social Informal Learning Spaces are "somewhere everyone feels comfortable", with one student going on to say that "the sofa chairs are very comfortable to nap", which suggesting that the provided furniture is fit for purpose, even if that purpose is not necessarily what the furniture was presumably intended for when the Social Informal Learning Spaces were created. However, it should be noted one of the students cited the "uncomfortability of chairs" as being a problem in the Social Informal Learning Spaces they frequent, suggesting that the furniture in the Social Informal Learning Spaces they use do not suit all potential users, and that a wider variety of furniture might be useful in some spaces.

Light levels were mentioned by three of the students, one of whom found the Social Informal Learning Spaces they use to be "bright", and another commenting positively about "the daylight coming through the roof", but a third student suggested the "Lighting is sometimes a bit harsh", which suggest controllability of light may be useful to some students in these spaces.

Temperature was also mentioned by three of the students, one of whom said that Social Informal Learning Spaces are "cosy", one who said they get "quite warm", whilst another said that they were "cold", suggesting that the ability to regulate temperature in Social Informal Learning Spaces may also be a factor worth considering when Social Informal Learning Spaces are being created.

4.5.3 Technology: Emerging Themes

After encoding the responses about Technology, three main themes emerged:

- Power Sockets
- Wi-Fi
- PC Availability

4.5.3.1 Technology: Power Sockets

Whilst the provision of power sockets was ranked extremely highly by the surveyed students on the questionnaire, second only to the provision of Wi-Fi, there were only four recorded mentions in the focus group, 100% (4/4) of which were negative.

All the students who did mention power sockets talked about the fact that there were “not enough power sockets” and that there we “not enough places to charge laptops”, and both statements elicited affirmation from the others in the group.

The results from both the survey and the focus group suggest that the provision of working power points is one of the primary wants of students using Social Informal Learning Spaces.

4.5.3.2 Technology: Wi-Fi

Wi-fi in Social Informal Learning Spaces was rated as the top priority for students in the survey, but there were only three mentions of it in the focus group interview, and 100% (3/3) of those were positive about the provision of Wi-Fi in Social Informal Learning Spaces.

One student said that the “Wi-Fi is better than in my house”, and several other members of the group seemed to agree, but added no further comment, whilst two students said one of the main reasons that they use Social Informal Learning Spaces is to gain access to Wi-Fi.

4.5.3.3 PC Availability

During the focus group, only one of the students raised the concern that “some spaces don’t have university computers”.

Two out of the three Social Informal Learning Spaces observed did have networked PCs provided, and although the data from the observations in section 4.3.2 showed that only 1% (56/745) used university provided PCs, as compared to 86 % (639/745) who use laptops, it does suggest that at least some networked computers should be provided in Social Informal Learning Spaces to accommodate students who do have device of their own with them to work on.

4.6 Chapter Summary

This chapter presents, and then discusses, the data collected from the Social Learning Spaces observations, questionnaire, and focus groups as viewed through the lens of Radcliffe's Pedagogy-Space-Technology (PST) Framework (Radcliffe, 2009). The information is presented in a variety of ways, from graphs and tables to room maps and heat maps which show student Social Informal Learning Space usage patterns, to present a holistic picture of how students engage with a wide variety of learning and social activities whilst in those spaces. The researcher also considers which elements of those spaces make them attractive and conducive to completing the kinds of tasks students wish to engage with, and which will enable the creation of a hierarchy of wants, needs and preferences which will be presented in Chapter 5 (Discussion) and Chapter 6 (Conclusions).

Chapter 5: Discussion

5.0 Chapter Overview

This chapter discusses the results and findings from the observations (4.2), the questionnaire (4.3), and the focus group (4.4) in order to answer the research questions which were presented in Chapter 1.

The overarching research question, What are the wants, needs and preferences of students with regards to Social Informal Learning Spaces, and how do they engage with learning whilst studying within those spaces? has been answered by the researcher answering the following research questions:

5.1 Research Question 1 – Pedagogy: Who uses Social Informal Learning Spaces?

According to the questionnaire data, 100% of students surveyed, irrespective of which gender they identify as, choose to study in on campus Social Informal Learning Spaces at least once a week, with many of them using Social Informal Learning Spaces several times a week for various learning activities either on their own, or with others.

5.2 Research Question 2 – Pedagogy: Why do students choose to study within Social Informal Learning Spaces?

5.2.1 Pedagogy: Mental Health Benefits

The focus group data suggests that students choose to study in Social Informal Learning Spaces because they feel it is good for their mental health and wellbeing to study in places where they can see and interact with their friends in breaks before, after, and between classes, and that doing so makes them feel less lonely.

5.2.2 Pedagogy: Atmosphere & Ambience

Students enjoy the relaxed and informal atmosphere in Social Informal Learning Spaces where they are free to talk to other students without the worry of disturbing others which they might experience in spaces with more strict rules in place, such as silent study spaces in the libraries.

These assertions are also backed up from the questionnaire data, which places the ability to talk to others at a much higher priority than silence, actively seeking out busier spaces filled

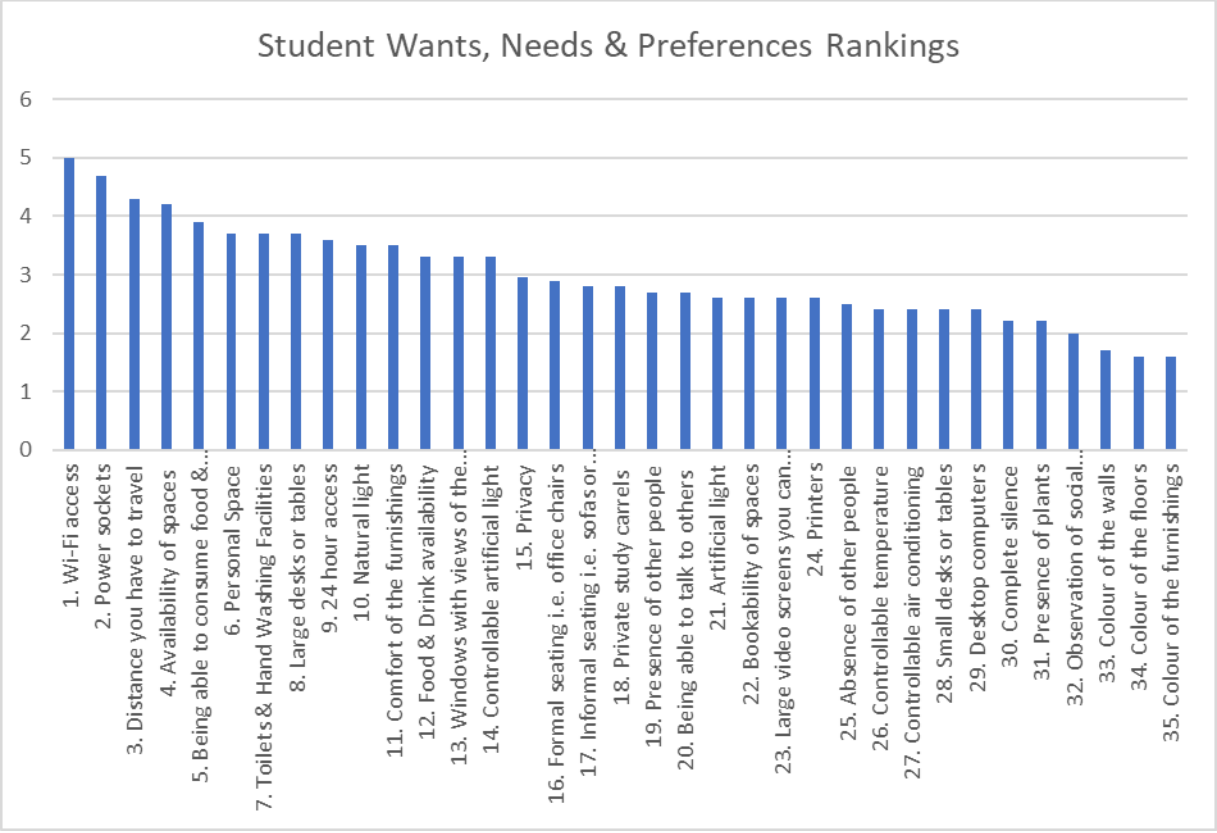
with other people also seems to be important, although when some spaces become overcrowded or too noisy, some students will choose to relocate to other spaces which are less busy in which to study, particularly if they have to focus on particularly arduous solo focussed tasks such as assignment creation, or examination revision.

5.2.3 Pedagogy: Increased Productivity

The focus group data also suggest Social Informal Learning Spaces enable students to be more productive, that studying in these spaces improves their ability to concentrate, and that visiting them is regarded as an important part of their daily on campus routines.

5.3 Research Question 3 - Space / Pedagogy / Technology: What are the wants, needs, and preferences of students when choosing Social Informal Learning Spaces?

From the questionnaire data, it is possible to rank the list of student priorities with regards to their wants, needs and preferences when it comes to choosing Social Informal Learning Spaces (Fig. 67):



(Fig. 67) Questionnaire data – Student Wants, Needs & Preference Rankings

These rankings, and the discussions below should provide future researchers and developers of Social Informal Learning Spaces with guidance as to what to prioritise when researching and creating new spaces, to ensure that they consider, include, and emphasise those elements which are ranked highly by student users of those spaces.

5.3.1 Technology: Wi-fi

Wi-Fi access (1) was the most highly ranked preference to emerge from the data, and should be considered a vital element to be included when creating Social Informal Learning Spaces. It should be noted that it is also important for us to ensure that students are able to access this service across the entire campus and in the Halls Of Residence, so that wherever students wish to study we can ensure they are always connected. We also need to ensure that internet access is available, reliable, and of sufficient bandwidth to accommodate high numbers of students, each of whom may be using multiple internet-connected devices either actively, such as the laptops on which they are currently working, or passively to listen to music or maintain their connection with learning or social media platforms whilst they are studying.

5.3.2 Space: Power Sockets

The data also suggests that each student requires Multiple power sockets (2), because whilst they may be using one main device on which to work such as a laptop or desktop PC, they may also need to charge multiple other devices whilst they work, such as mobile phones, tablets, or active headphones, and therefore even where desktop PCs are being provided and used, extra power sockets should also be provided.

5.3.3 Space: Distance To Travel

The next ranked priority was the distance students have to travel to get to Social Informal Learning Spaces (3), suggesting the need to create spaces spread across the entire campus in close proximity to where formal teaching sessions are taking place to minimise the time and effort it takes to get there, and therefore maximise the time which can be spent studying before, between, and after timetables learning activities.

5.3.4 Space: Availability of Spaces

The availability of spaces in Social Informal Learning Spaces (4), is also very highly ranked, suggesting that not only do we need to have many such spaces spread across the campus, but they must also be large enough to accommodate the ebb and flow of students throughout the day, to ensure that students do not have to roam the campus in search of somewhere to study, particularly at the peak times between 11:00 and 15:00 indicated by the observation data.

5.3.5 Space: Availability of Food and Drink

Being able to eat and drink whilst they are studying (5) is also a top priority for students, which is also logically linked to the availability of food and drink (12), and whilst many traditional spaces such as in libraries preclude eating and drinking whilst studying, it is clearly a reason why students choose to utilise Social Informal Learning Spaces, and the focus group data suggests it is also important for them not to feel any pressure to buy food and drink which they might feel when working in spaces such as cafes, and to feel free to consume things which they have bought outside, and brought in with them.

5.3.6 Pedagogy: Personal Space

Personal space is also a high priority (6), and may be linked to the desire to have large desks (8) which allow students to spread out their belongings or share the space with one or more other students when working collaboratively.

5.3.7 Space: Hand Washing and Toilet Facilities

Hand washing and toilet facilities are also highly ranked (7), and all three of the Social Informal Learning Spaces observed had these facilities in close proximity, which means students do not have to travel too far from their desks to make use of them. This can obviously also be linked to desire for the availability of food and drink (12), and ability to consume food and drink (5) whilst studying, and the desire for the close proximity of hand washing facilities may have increased due to the recent Covid-19 pandemic.

5.3.8 Space: Large Desks or Tables

Closely linked with Personal Space (6), the data suggest that students in Social Informal Learning Spaces prefer large desks where they can sit and work comfortably, spread out their

belongings, and create a relatively private zone around themselves so that their work cannot be overlooked by others.

5.3.9 Pedagogy: 24 Hour Access

24 hour access (9) is also seen as a priority, and whilst the observation data only extended to semester weekdays between 08:00 and 18:00, the focus group and questionnaire data suggest that students also use Social Informal Learning Spaces on evenings and weekends, and during breaks and holidays between semesters.

5.3.10 Space: Natural Light

Natural light (10) is also highly prioritised by students, and the data suggest it is very important to provide Social Informal Learning Spaces which incorporate windows, which also links to having preferences for having views of the world (13), and indicates how important it is to locate Social Informal Learning Spaces above ground in windowed rooms which are naturally lit during daylight hours.

5.3.11 Space: Comfort of the Furnishings

Students value the comfort of the furnishings (11) in Social Informal Learning Spaces, which is unsurprising when the observation and focus group data suggests that students spend between two and five hours studying in these spaces up to seven times a week, and so whatever furniture is provided needs to be ergonomically sound, so that it does not negatively impact on student wellbeing or their study sessions.

5.3.12 Space: Availability of Food and Drink

The availability of food and drink (12) is also important to students studying in Social Informal Learning Spaces, and two out of the three spaces observed had food and drink provision either within (Social Informal Learning Space X) or immediately adjacent to them (Social Informal Learning Space Z), and whilst Social Informal Learning Space Y has no provision of food and drink in close proximity, there is a café situated on the ground floor of where it is located.

5.3.13 Space: Windows with Views of the Outside World

The prioritisation of having views of the outside world (13), indicates how important it is to locate Social Informal Learning Spaces above ground in windowed rooms which students can see out of and is closely linked with their desire for Natural light (10), preferably provided via windows rather than skylights.

5.3.14 Space: Controllable Artificial Light

Along with natural daylight (10) and views of the outside word (13), it is considered relatively important by students to have supplemental controllable artificial lights (14), particularly during darker days and night-time study, which the focus group data suggests may be particularly important for those who require 24 hour access (9) and use Social Informal Learning Spaces in the evenings.

5.3.15 Pedagogy: Privacy

Whilst the focus group data suggest students seek out Social Informal Learning Spaces where they can be surrounded by others, they also feel the need for privacy (15), which can also be linked to their preference for large desks (8).

5.3.16 / 5.3.17 / 5.3.18 Space: Seating

Formal seating (16), Informal seating (17), and Study carrels (18) all have similar midranking positions and scores in the rankings, which suggest that a mixture of all three should be provided within Social Informal Learning Spaces, enabling students to choose the appropriate environment for the task which they are undertaking.

5.3.19 / 5.3.20 Pedagogy: Presence of Other People / Ability to Talk to Others

The presence of other people (19) and being able to talk to others (20) are mid-ranking attributes, suggesting that they are nice to have, rather than essential attributes, which is slightly at odds with the focus group data, which suggests being around, and being able to talk to, other people are two of the primary reasons for using Social Informal Learning Spaces, but this may be a consequence of the way the questions were designed to focus more on the pedagogical side of the model, rather than discussing considerations regarding the requirements of the space, and may also be dependent on the tasks in which the students are

engaged e.g. revision tends to be a solo pursuit, whilst group work by its very nature requires interaction with others.

5.3.21 Space: Controllable Artificial Light

Controllable artificial light (21) was considered above, in the context of light levels and window availability within Social Informal Learning Spaces, and it is important to ensure that natural light can be supplemented by artificial light for students whilst studying to reduce fatigue, and aid with intellectual focus.

5.3.22 Space: Bookability of Spaces

Bookability of spaces (22) is a relatively low priority for students, and none of the three Social Informal Learning Spaces observed were able to be booked, with students able to come and go as they please, but the questionnaire data does suggest that, on some occasions, students would like to be able to book desks in Social Informal Learning Spaces, which is related to their need for the availability of spaces (4), and perhaps indicates that in their experience they may have wished to use a particular space, but found that it was fully occupied when they arrived.

5.3.23 Technology: Large Video Screens

Large video screens (23) have been provided in some library spaces to enable students to work collaboratively, but none of the Social Informal Learning Spaces has such provision, and the data reflects that such provision is not highly ranked by students, and that they have much higher priorities when selecting a space in which to study, and as such they may be considered nice to have, but not essential.

5.3.24 Technology: Printers

Printers (24) also seem to be a relatively low priority in Social Informal Learning Spaces, and this may be a consequence of all students at the Higher Education Institution studied being provided with online resources, and submitting all assignment online via the Virtual Learning Environment, instead of being required to print them out and hand them in personally in as was previously the case, and none of the Social Informal Learning Spaces studied had printers available for students to use. On a side note, this reflects well on the Higher

Education Institution's ongoing mission to increase its sustainability by reducing carbon emissions and the unnecessary use of expensive finite resources such as paper.

5.3.25 Pedagogy: Absence of Other People

The low ranking with regards to the absence of other people (25) in Social Informal Learning Spaces is closely related to the mid-ranking presence of other people (19) and being able to talk to one another (20), both of which are slightly higher priorities, but their close proximity suggest that whilst students may prefer to work in Social Informal Learning Spaces where they are surrounded by others, they are also reasonably happy to work in those spaces without others being present, possibly dependent on the task in which they are engaged.

5.3.26 / 5.3.27 Space: Controllable Temperature / Controllable Air Conditioning

Controllable temperature (26) and controllable air conditioning (27) are low on the list of priorities, despite the focus group data suggesting that sometimes Social Informal Learning Spaces may be too hot or too cold, depending on the time of day and the seasonal weather conditions. None of the three Social Informal Learning Spaces observed provided student controls for temperature or air conditioning, but it will have been a consideration when building the rooms, and the likelihood is that the students rank these factors as low priorities because the temperatures and condition of the air is automatically controlled in those spaces, and is almost always conducive to study, and therefore they often do not really notice them consciously, so they do not feel a need to be able to control or change them.

5.3.28 Space: Small Desks or Tables

Small desks or tables (28) is related to the provision of large tables (8) and study carrels (18), and as discussed previously, it is important to ensure there is a selection of all of the above to ensure that students have an ability to choose at which kind of desk they sit to study, but the rankings do suggest that ergonomically appropriate large desks or tables (8) are by far the most important kind of tables to provide in Social Informal Learning Spaces, followed by study carrels (18), and lastly small desks or tables (28).

5.3.29 Technology: Desktop Computers

Desktop computers (29) are not a high priority of students studying in Social Informal Learning Spaces according to the questionnaire data, and this is also reflected in the observation data, which suggest that most students use their own laptops. However, the focus group data suggests it may still be important to provide a few networked desktop computers for students who need to access higher processing power or resources or software unavailable on personal devices, or who are unable, for whatever reason, to use their personal devices on a particular visit.

5.3.30 Pedagogy: Complete Silence

Unsurprisingly given the nature of Social Informal Learning Spaces, complete silence (30) is another low ranking priority, and this factor is closely related to the presence of other people (19) and being able to talk to others (20), which are mid-raking priorities, and seen as relatively desirable attributes, as compared to the relatively low rankings for the absence of other people (25) and complete silence (30). However, his does suggest that silent working spaces on campuses such as in libraries, may be more suitable for some students for certain tasks, and therefore they too should be included in campus infrastructure.

5.3.31 Space: Presence of Plants and Vegetation

Despite the literature review suggesting that the presence of plants and vegetation (31) in Social Informal Learning Spaces has a positive effect on both air quality and feelings of wellbeing, the low ranking suggest they are not a high priority for students, although it should be noted that both Social Informal Learning Space X and Social Informal Learning Space Z do have plants and vegetation present, and may be making a positive but subconscious contribution to the ambience and desirability of studying in those spaces for some students.

5.3.32 Pedagogy: Observation of Social Distancing

Perhaps somewhat surprisingly, bearing in mind that the data collection took place immediately after the Covid restrictions were lifted in the UK, the observation of social distancing (32), was very low in the priority rankings. This suggests that when the students returned to campus, they returned to their pre-Covid routines and ways of working, and

placed a high degree of faith in the assertion that it was now safe to return to normality, despite the adjacent student residential area being considered one of the country's Covid hot spots during the pandemic.

5.3.33 / 5.3.34 / 5.3.35 Colour of The Walls / Floors / Furnishings

The lowest priorities when it comes to choosing Social Informal Learning Spaces were the colours of the walls (33), the colour of the floors (34) and the colour of the furnishings (35), and whilst the literature review suggest these are all important factors when designing such spaces, the results suggest that students are not particularly worried about any or all of the above, presumably because the people responsible for purchasing the furniture and creating the Social Informal Learning Spaces have already considered the relevant research when designing the spaces.

5.4 Research Question 4: Where do students choose to study? (Pedagogy)

When studying in their own, the research suggest that 30 % of our Higher Education Institution students choose to study within campus libraries when not engaged in formal learning and teaching activities, with a further 19% choosing cafes, 16% the Student Union, and 10% choosing one of our designated Social Informal Learning Spaces.

9% of students study in spaces located within in their particular Schools, and 9% choose to use the computer clusters, with the remaining 7% of students using empty rooms, outdoor spaces, atria, or corridors or other.

The results are very similar for when student are studying with other people, with 30% making use of our libraries, 24% utilising cafes, and 15% choosing the Student Union, with the only significant difference being that students are slightly more likely to study in cafes on campus than when they study alone, perhaps due to the informal social nature of those spaces, and the ready availability of food and drink.

8% of students choose to study in designated Social Informal Learning Spaces, 8% study in spaces located within in their particular Schools, and 6% choose to use the computer clusters, with the remaining students using empty rooms, outdoor spaces, atria, or corridors or other.

What is interesting to note is that the rankings of designated Social Informal Learning Spaces (8%) and spaces within Schools (8%) are equal, suggesting that students choose to work within their own Schools and in designated Social Informal Learning Spaces slightly less often when working with others, which is surprising given that is one of the things which Social Informal Learning Spaces in particular are theoretically designed to accommodate.

It is interesting to note that students seem to make a distinction between Social Informal Learning Spaces which are located within libraries and in the Student Union, and designated Social Informal Learning Spaces located in other buildings, suggesting that perhaps they seek out the spaces which are most conveniently located in relation to the places where their formal learning and teaching sessions take place, rather than designated Social Informal Learning Spaces which have specifically been set up to accommodate the kinds of activity in which they wish to engage.

5.5 Research Question 5: Where should Social Informal Learning Spaces be located on campus? (Space)

Space: Distance To Travel

One of the highest priorities for students to emerge from the questionnaire data when it comes to features important to them when choosing Social Informal Learning Spaces, ranking 3/26 just behind Wi-Fi access and power sockets, was the distance students had to travel to get to the Social Informal Learning Spaces from their scheduled teaching sessions.

This need was also echoed by the interview data, where students emphasised the need to be able to get to their favourite Social Informal Learning Spaces without having to travel too far across campus, particularly when they lived off campus, meaning it would not be time efficient to return home, and then return to campus, between scheduled learning sessions.

Both sets of data lead to the conclusion that Social Informal Learning Spaces on Higher Education Institution campuses need to be spread across the campus in close proximity to where the students' scheduled learning activities take place to minimise travel time, maximise study time, and help them make efficient use of their working days.

5.6 Research Question 6 - When do students use Social Informal Learning Spaces? (Pedagogy)

All of the students surveyed said that they studied in Social Informal Learning Spaces on campus at least once a week, with the majority using them multiple times a week during the semester, and almost three quarters of them staying between 2 and 5 hours per visit.

The observation data from all three of the Social Informal Learning Spaces daily use statistics suggests that the most popular day during the semester on which students choose to utilise Social Informal Learning Spaces is Wednesday.

It is interesting to note that at the UK Higher Education Institution which is the subject of the study Wednesday afternoons are traditionally timetabled without formal teaching sessions to enable students to engage in activities associated with clubs, societies, and sporting teams, but the data suggests that at least some of those students not wishing to engage in any of the above activities choose to stay on campus, and study in Social Informal Spaces.

The observation data from all three of the Social Informal Learning Spaces hourly use statistics suggests that the most popular times during the semester during which students choose to utilise Social Informal Learning Spaces are between 13:00 - 14:00 followed by 12:00 - 13:00, 11:00 to 12:00 and 14:00 - 15:00.

However, it should be noted that quite lot of students also choose to use Social Informal Learning Spaces throughout the day, which is reflected in the interview data, which suggests students often use them before, after, and between classes.

It is also interesting to note that whilst observation data were collected on Social Informal Learning Space use between 08:00 and 18:00 on Mondays to Friday during semester time, one third of students (33%) interviewed also said they use Social Informal Learning Spaces on evenings, at weekends, and during the holidays, leading to the conclusion that, wherever possible, 24/7 access is desirable to at least some Social Informal Learning Spaces.

5.7 Research Question 7 - How do students engage with learning within Social Informal Learning Spaces? (Pedagogy)

5.7.1 Pedagogy: Group Sizes

The observation data indicates that 47% of students studying in Social Informal Learning Spaces X, Y and Z appeared to be working on their own, and 49% were working in groups of two, with just 5% working in groups of three, and 0% working in groups of four or more.

The data suggests that bigger groups do not choose to study in Social Informal Learning Spaces, or that bigger groups of students working on shared tasks and objectives choose to use other spaces on campus, such as bookable private rooms which can accommodate up to 8 students, and which are located within our campus libraries.

5.7.2 Pedagogy: Learning Activities

The questionnaire data suggests that students use multiple Social Informal Learning Spaces at various times and locations for multiple learning activities, from solo exam revision, solo assignment creation and solo research through to socialising, group research, group assignment creation and group exam revision, so it is important that Social Informal Learning Spaces are designed with the flexibility to accommodate this wide variety of activities, each of which might vary in importance to the students throughout the academic year.

5.7.3 Technology: Learning Tools

The questionnaire data indicates that 88% of the students surveyed use either a Windows or Apple laptop to engage with learning whilst studying in Social Informal Learning Spaces, with 15% using desktop computers, 11% using Apple iPads and 4% using an Apple Desktop, which suggests that the majority of students have at least one personal devise to use, and some use multiple devices simultaneously.

However, whilst providing desktop computers may not be a priority in Social Informal Learning Spaces, they are still used by some students some of the time, and therefore a limited number should still be provided, which was backed up by one of the focus group complaining that in some Social Informal Learning Spaces, they are currently not provided.

It is also interesting to note from the questionnaire data that 48% of students indicated they use mobile phones when studying, which is a much higher figure than the 15% observational data suggested, underlining the need for multiple ways of collecting data to get a holistic picture of student technology use in Social Informal Learning Spaces, but also suggesting that students may keep their mobile devices on their person or in their bags, taking them out only when they are going to use them, possibly to avoid potential distraction whilst working.

The uses of technology by students studying in Social Informal Learning Spaces reinforces the assertion that multiple power points must be provided for students to use, along with robust wi-fi with sufficient bandwidth to facilitate their use (See 5.7.4. below).

5.7.4 Technology: Learning Platforms, Services and Resources

The questionnaire data suggests that whilst studying in Social Informal Learning Spaces 96% of students access our Virtual Learning Environment, 78% of students use Google and 78% use Google Scholar, with 63% using online library resources, all of which emphasises the need for providing robust wi-fi in these spaces, as access to online information is an integral part of the way students study.

5.7.5 Technology: Communication Platforms

A significant proportion of students studying in Social Informal Learning Spaces also use communication platforms such as Collaborate (41%), Microsoft Teams (41%) and Zoom (26%), indicating that the provision of robust and reliable wi-fi with enough bandwidth to accommodate multiple data streams from multiple devices for multiple users is vital.

5.8 Contribution to Existing Literature

Viewing the discussions and conclusions through the lens of the Pedagogy - Space - Technology (PST) model (Radcliffe, 2009), and addressing each of the areas in turn, makes it possible to summarise the contributions to the existing literature made by this piece of research:

5.8.1 Pedagogy

All of the students observed, and those participating in the questionnaire and the focus group, are users of Social Informal Learning Spaces, and it is possible to conclude from the collected data that for at least 10% of the students Social Informal Learning Spaces are an important part of their study patterns, and that many students who use Social Informal Learning Spaces make use of them multiple times in a typical week.

The data also suggests that working in Social Informal Learning Spaces has benefits for student metal health and wellbeing, that being in those spaces makes them feel less lonely as well as increasing their productivity, and that they enjoy studying in spaces with a relaxed and informal ambience. where they can see and interact with their friends and fellow students before, between, and after formal teaching sessions, most often between 11:00 and 15:00, and that those spaces should preferably offer 24 hour access throughout the year and not have to be booked in advance.

Students engage in a variety of tasks within Social Informal Learning Spaces, from solo study to working with one or two other students on group activities, as well as socialising and exam revision, and the spaces need to accommodate a wide variety of activities which vary throughout the day, and indeed, throughout the year inside and outside semester time..

It is interesting to note that whilst very few students were observed on Mondays to Fridays between 08:00 and 18:00 engaged in what one might consider to be socialising, the survey data suggests that socialising within Social Informal Learning Spaces does indeed happen, leading the researcher to conclude that this probably takes place in the evenings and weekends.

5.8.2.Space

As outlined in Fig. 65, Students have a wide range of wants, needs and preferences when it comes to the things which Social Informal Learning Spaces should provide, from robust wi-fi access, power sockets, natural light, views of the outside world and controllable artificial light, to the ability to bring purchase and consume their own food and drink, along with the provision of nearby toilet and hand washing facilities.

The research also suggests Social Informal Learning Spaces should be placed evenly across campuses in close proximity to where formal teaching session take place, and they must be of sufficient size and quantity to provide enough spaces for students in which to study whenever they choose to do so without having to travel too far to get there, to maximise study time.

Students value personal space, and enjoy ability to spread out their belongings on large tables where they study, which they may also share with one or two others when engaged in collaborative tasks when they wish to be able to communicate freely, but also value privacy and quieter spaces when engaged in solo, more focussed tasks.

Furniture should be comfortable, and made up of a range informal and informal tables and seating, and whilst it may be theoretically useful to ensure the furniture is moveable, it is worthy of note that in the Social Informal Learning Spaces studied, none of the students took the opportunity to move furniture around to reconfigure the spaces, seemingly preferring to use the space as laid out by the original designers of the spaces.

Air conditioning and controllability of temperature seems to be a relatively low priority for students, as do the colours of the walls, floors, and furniture, and the presence of plants and vegetation, and it was interesting to note that, despite the study taking place after the return to campus after the Covid-19 pandemic, the observation of social distancing was not considered to be a high priority..

5.8.3 Technology

The observation, questionnaire and focus group data suggests that, as outlined in 5.8.2, wi-fi and power sockets are the highest priorities for students, which makes perfect sense given that the majority of those students are using wi-fi enabled, rechargeable battery powered, personal devices to engage with learning whilst studying in Social Informal Learning Spaces.

Students engage in a wide variety of learning activities, usually with their main device of choice being their own laptop computers, but it is notable that 11% of students use tablet computers, and 48% of students said they use their mobile phones whilst studying, and the data suggests that the majority of students use two or more devices simultaneously whilst studying.

These multiple devices are used by students to access a wide variety of connected platforms and services from our Virtual Learning Environment and search engines such as Google and Google Scholar to online library resources and audio and video streaming services as well as online lectures and communication platforms such a s Collaborate, Microsoft Teams and Zoom, the latter of which may require the use of headphones to avoid disturbing others.

Desktop PCs, printers and connected video screens seem to be very low priorities for students in Social Informal Learning Spaces, and space managers and future space designers may wish to consider that they may no longer be needed by the majority of students.

5.9 Chapter Summary

Returning to the research questions and answering them using results and findings drawn from the data collected in this chapter has been most enlightening, as it has provided answers to many of the questions which may be asked by those engaging in future Social Informal Learning Spaces research and design, which was the intended purpose of this research from the outset.

All of the students surveyed and in the focus groups used Social Informal Learning Spaces on our campus at least once a week, some many more times than that, and they feel that studying in Social Informal Learning Spaces has a positive effect on their productivity and their mental health, and consequently their feelings of wellbeing.

Students seek out and enjoy working in Social Informal Learning Spaces which are unsupervised, and which have an informal atmosphere where they can interact with others like-minded students if they wish to do so without the worry of disturbing others, and where there are no restrictions on their ability to consume food and drink.

When it comes to choosing Social Informal Learning Spaces, students have a range of wants, needs and preferences, with wi-fi, power sockets, the distance they have to travel, the availability of spaces, and the ability to consume food and drink ranking highest in the questionnaire data, and with Personal space, toilets and hand washing facilities, large desks, and tables, 24 hour access and natural light rounding out the top ten.

Students also prioritise the comfort of the furnishings, the availability of food and drink, windows with views of the outside world, controllable artificial light, privacy, and the provision of both formal and informal seating including study carrels.

The lowest priorities for students when choosing which Social Informal Learning Spaces in which to study are the colour of the furnishings, the colour of the walls, the observation of social distancing, and the presence of plants and vegetation.

Many students use Social Informal Learning Spaces multiple times a day, and multiple times a week before, between, and after classes, spending between 2 and 5 hours per visit not just during semesters, but also on evenings, weekends, and during vacations.

The peak times for using Social Informal Learning Spaces are between 11:00 and 15:00, and the peak day for using Social Informal Learning Spaces is Wednesday.

Whilst studying in Social Informal Learning Spaces, students use multiple wi-fi connected devices such as laptops and mobile phones, connect to multiple platforms such as our Virtual Learning Environment, Google, and Google Scholar to access information and resources, and use various communication platforms such as Collaborate or Microsoft Teams to access lectures and lecture recordings.

Chapter 6: Conclusions

6.0 Conclusions: Chapter Overview

This chapter presents the conclusions drawn by the researcher from information and data collected from the Literature review (Chapter 2) Social Informal Learning Space observations (4.2), the questionnaire (4.3), the focus group (4.4), and the discussion chapter (5.0).

6.1 Conclusions

The data collection for this thesis was delayed by the Covid-19 pandemic, extending the time it took to bring the completed project to fruition, but what that does mean is that the data collected, and the conclusions drawn from it, have been created based on not what the Higher Education Institution campus landscape was before lockdown, but what the Higher Education Institution campus landscape has become since lockdown, and the researcher believes that this thesis is all the better for it, as the intention from the outset was to produce something up to date and of real value for researchers, designers, and creators of Social Informal Learning Spaces in the future.

The researcher used mixed methods case study methodologies combining Social Informal Learning Space observations with student questionnaires and focus group interviews to collect quantitative and qualitative data to build up a holistic picture of Social Informal Learning Space use by students as viewed through the lens of Radcliffe's (2009) Pedagogy – Space – Technology (PST) framework to answer the following overarching research question (ORQ) by answering the subsequent research questions (RQ1. - RQ7):

ORQ. What are the wants, needs and preferences of students with regards to Social Informal Learning Spaces, and how do they engage with learning whilst studying within those spaces?

RQ1. Who uses Social Informal Learning Spaces?

RQ2. Why do students choose to study within Social Informal Learning Spaces?

RQ3. What are the wants, needs, and preferences of students when choosing Social Informal Learning Spaces?

RQ4. Where do students choose to study when not engaged in formal teaching activities?

RQ5. Where should Social Informal Learning Spaces be located on campus?

RQ6. When do students use Social Informal Learning Spaces?

RQ7. How do students engage with learning within Social Informal Learning Spaces?

The original intention of the researcher was to find out as much as possible about Social Informal Learning Spaces, and whilst this lead to a great many research questions, and a huge quantity of data to be analysed, it also lead to a great many research answers, and whilst there are still questions which remain to be asked, the researcher has gained a great deal of insight into the subject throughout the duration of this piece of research by asking, and answering, such a large number, and wide range, of pertinent research questions.

The research suggests that campus based Higher Education Institution students seek out Social Informal Learning Spaces where they can study either on their own or with one or two friends surrounded by like-minded individuals engaged in similar tasks, where they are relatively free from rules and supervision, and where they are free to both study and engage in interactions with other students when they feel they wish to do so, echoing the thoughts and ideas which previous researchers in this field have posited.

Some of the most useful information to have come out of the study is that Wi-fi and electric sockets are deemed by students to be an absolute necessity in Social Informal Learning Spaces, due to their use of multiple internet enabled devices which also may need to be plugged in and charged at some point during study sessions, and the provision of both of the above should be of the highest priority when thinking about Social Informal Learning Space design and development.

The distance students need to travel to access Social Informal Learning Spaces is another top priority, and the research suggests that, wherever possible, rather than creating a small number of large central spaces on Higher Education Institution campuses, as had been done at several other Higher Education Institutions, our student population might be better served by the creation of a larger number and greater variety of smaller Social Informal Learning Spaces which are located close to the venues where they experience their formal learning and teaching sessions, such as lecture theatres and laboratories, so that the students can maximise study time, and minimise travel time to get there.

Another reason supported by this research for creating a large number of smaller Social Informal Learning Spaces is that students can become frustrated when they visit their favourite study space only to find that there is nowhere to sit, therefore the availability of spaces when they get there must also be made another top priority.

The research also suggests that students also value the ability to be able to consume food and drink in Social Informal Learning Spaces, and therefore they should be designed accordingly to accommodate those activities, preferably with easy access to places where food and drink can be purchased, along with toilet facilities, as students don't like to pack up all of their belongings to travel to and from where they are studying.

Personal space when studying is also important to students studying in Social Informal Learning Space, and by providing large desks and tables, upon which they can spread out their belongings, along with comfortable, ergonomically appropriate seating is highly desirable, but students also value a range of other furniture such as study carrels when engaged in solo study activities which need a greater amount of focus, and low level comfortable sofas and tables where they can relax wand interact with friends when taking a break between study sessions.

24 hour access to Social Informal Learning Spaces both during, and between semesters is another highly prioritised desire amongst the students surveyed and in the focus groups, particularly by those who live off campus, those who may not have appropriate places to study in their place of residence, or students who come from overseas, and may not return to their home countries when the semester ends, but still feel the need to have somewhere on campus where they can be around others, and in which to continue their studies outside semester time.

Whenever possible, natural light should be incorporated into the design of Social informal Learning Spaces, preferably with views of the outside world which help students feel connected to the outdoors, and help to increase their feelings of wellbeing. Natural light should be augmented with suitable task-appropriate controllable lighting should be used to help augment what natural daylight there is, especially during the night times and the winter months.

The use of the Pedagogy - Space - Technology framework (Radcliffe, 2009) has proved to be an invaluable lens through which to conduct this research, as it has provided much needed

purpose and structure to this thesis, and the researcher believes this thesis, in turn, has shown what how valuable the framework can be when researching Social Informal Learning Spaces.

6.2 Hierarchy of Student Preferences for Social Informal Learning Spaces

This research has made it possible to create a league table ranking student preferences for particular features of Social Informal Learning Spaces which should prove to be useful for future researchers, designers, and creators of those spaces:

Social Informal Learning Space Features Student Importance Rankings
1. Wi-Fi access
2. Power sockets
3. Distance you have to travel
4. Availability of spaces
5. Being able to consume food & drink
6. Personal Space
7. Toilets & Hand Washing Facilities
8. Large desks or tables
9. 24 hour access
10. Natural light
11. Comfort of the furnishings
12. Food & Drink availability
13. Windows with views of the outside world
14. Controllable artificial light
15. Privacy
16. Formal seating i.e. office chairs
17. Informal seating i.e. sofas or easy chairs
18. Private study carrels
19. Presence of other people
20. Being able to talk to others
21. Artificial light
22. Bookability of spaces
23. Large video screens you can connect to
24. Printers
25. Absence of other people
26. Controllable temperature
27. Controllable air conditioning
28. Small desks or tables
29. Desktop computers
30. Complete silence
31. Presence of plants
32. Observation of social distancing rules
33. Colour of the walls
34. Colour of the floors
35. Colour of the furnishings

(Table. 20) Social Informal Learning Space Features Importance Rankings (McDonald, 2023)

Whilst these rankings cannot be considered to definitive due to the relatively low sample sizes, they do give a useful indication as to which priorities the students studied placed upon each individual element, and suggest a clear hierarchy of things which should be considered when creating or developing future Social Informal Learning Spaces (Table. 20):

The hierarchy of priorities is a useful starting point, but it should be noted that Social Informal Learning Space design should always be an iterative process, not least because the needs of the people using those spaces change over time, as do the pedagogies and available technologies, and certainly with Social Informal Learning Spaces, and it has become clear throughout the process of this research that a one size fits all, fit it out and forget about it strategy, which seems to be employed by some Higher Education Institutions is not really fit for purpose, and can lead to Social Informal Learning Spaces which are underutilised.

When Social Informal Learning Spaces are underutilised, they can quickly become unloved, and the fewer students that use them, the fewer other students will want to use them in the future, and they will instead seek out other spaces which have a more social and sociable atmosphere in which to study, therefore when such spaces have been identified as no longer being fit for purpose, and they are not attracting sufficient students to make them viable, time, effort and money should be invested in assessing and redesigning the space to improve its perceived value to the students so that it can become a more vibrant location in which they will choose to spend their time.

6.3 Reflections on the Challenges and Opportunities Presented by This Study

As previously stated, the data collection and subsequent analysis of that data took place after the Covid-19 lockdown, meaning that an extended period of time elapsed between the conception and the completion of the study.

Whilst this time delay was beneficial in that it meant the data is as up to date as possible, and reflects post-Covid lockdown student behaviours, it did mean that a lot of the initial impetus was lost, which proved somewhat difficult to regain after a period which including a necessary 12 month intercalation.

However, the extended time frame did give the researcher the opportunity to read a great deal of relevant research, and also gave the researcher a renewed appreciation of the campus, the

spaces which were studied, and the people who inhabit those spaces, when he was finally allowed to return to campus in the Spring of 2022.

Whilst the physical campus landscape had remained pretty much unchanged since before lockdown, the financial situation of the Higher Education Institution had changed, and whilst before the Covid-19 pandemic the creation of new Social Informal Learning Spaces had been a high priority, during the pandemic the funding for those spaces was re-distributed to enable the continuation of learning and teaching activities online, which meant that the initial impetus for creating more Social Informal Learning Spaces on our campus, and the funding to bring them into existence, has also been lost, but will hopefully build up again in time so that the researcher's work can be put to practical use on our own campus to help to improve the learning experiences of our students in the future.

Gaining permissions to collect data from students on the campus where I work, and at other Higher Education Institution campuses, also proved to be challenging, before, during and particularly after the Covid-19 pandemic, and whilst the researcher had originally hoped to be able to collect data from a much larger set of students across several campuses, it was not to be, and therefore compromises had to be made with the research design so as to move the project forwards.

As far as opportunities are concerned, this research project allowed the researcher to research an area in which he was interested in much greater depth then had previously been possible, and learn along the way about how Social Informal Learning Spaces are created, how they are used, and why they are such an important part of campus infrastructure, and the researcher believes that the research will make a useful contribution to the ongoing conversations about this particular field of study, and will have a positive and practical applications in the future.

6.4 Contribution to Scholarship, Practice and Policy

This thesis makes a valuable and useful contribution to the knowledge and scholarship in the field of Social Informal Learning Spaces by not only reviewing and building upon existing research in this area, but also bringing it up to date with regards to what is actually happening with regards to the use of Social Informal Learning Spaces on Higher Education Institution campuses by students.

We now live and work in what can hopefully be considered now in a post-Covid world, where things have returned to a semblance of normality after the lockdown restrictions, and this research will provide an invaluable resource to anyone engaged in the scholarship or practice in this area, as it provides a firm foundation upon which they can build their own research, and go on to create their own Social Informal Learning Spaces on their own Higher Education Institution campuses.

This research will also be of use to Higher Education Institution policy-makers when they are called upon to make decisions about what kinds of facilities students need in order to create first class on campus educational experiences, and it illustrates not only that Social Informal Learning Spaces are a vital part of campus infrastructure, but also that they are highly valued and utilised by our students, and so therefore their provision should not just be an afterthought, but should be at the forefronts of their conversations when deciding how to construct the campuses of the future..

6.5 Limitations of this study

This was not a particularly easy piece of research to conduct, and the observations in particular took a lot of time to do, and created a huge amount of data to be analysed. Whilst observing three different locations spread across the campus was fine in theory, in practice it took many weeks and a great deal of organisation to visit all of the spaces during all of the time slots, not to mention the time it took to travel from space to space during the data collection period.

Whilst the researcher could have concentrated on just one space, he felt that looking at three spaces was necessary to increase the validity of the data, and whilst he still believes this to be true, the researcher did not fully appreciate the scale of his ambition at the outset, and with the benefit of hindsight, it might have been more manageable to collect the data from one space instead of three, potentially over a much shorter period of time.

By focussing on one particular Social Informal Learning Space, it might also have been possible to create a bespoke list of recommendations about how that space might be improved and, with the appropriate permissions in place, perhaps to even help to implement some of these changes, then assess the impact those changes had.

It would also have been interesting to observe all three spaces at the same times on the same days, but as he was working on his own, with no research team to help carry out those observations, this was clearly not possible, and so it may be that the observation data has been affected by things such as the time of year, the week in which the observations took place, what was happening in the academic calendar at that time e.g. revisions or exams, and a variety of external factors such as staff or transport strikes, or the weather which may have had an effect on whether or not students came onto campus and used the observed Social Informal Learning Spaces on particular days.

Getting students to answer the questionnaire and take part in the focus groups also proved more problematic than first anticipated, and whilst the researcher was lead to believe that the questionnaire could be sent out to all of the students at the Higher Education Institution, and promises were made to that effect, it did not prove to be the case once the research was underway, not least because the people who were able to make that happen has moved on to other roles at other Higher Education Institutions by the time the questionnaire was ready to be deployed after lockdown.

The inevitable outcome of this chain of events was that the number of students which were able to be surveyed and were available to be in focus groups was considerably less than originally anticipated, and whilst this did result in a more manageable data set, it does mean that the validity of the data, and therefore the conclusions drawn from it, are perhaps not as robust as they were originally intended to be.

However, thanks to the researcher's association with the Laidlaw Scholarship Programme, it was possible to collect data from a cross section of students from across all of the Faculties and multiple disciplines, which could and should be considered a representative sample, even if it is relatively small sample of students compared to the overall population of the Higher Education Institution, and the researcher is grateful to all involved for their enthusiastic and thoughtful participation.

However, the sample group, whilst diverse in terms of gender, background, and ethnicity, did not include any non-typical learners, for example those with disabilities, and whilst it was mentioned in Chapter 1 about all three of Social Informal Learning Spaces studied having accommodations for students with disabilities, for example special desks for wheelchair

users, it would have been interesting if the researcher had been able to include the perspectives of disabled students.

Despite early pre-Covid plans to observe several Social Informal Learning Spaces on different Higher Education Institution campuses, the opportunities to do so were limited by the pre-Covid informal agreements to do so being withdrawn both during and post-pandemic, and therefore only students studying in spaces on one particular Higher Education Institution campus were observed. However, bearing in mind the aforementioned logistical problems with visiting three Social Informal Learning Spaces on one campus. One can only imagine the logistical problems of visiting more of them across more campuses in more cities.

Having said that, again with the benefit of hindsight, it might have been possible to visit one space on one campus in once city for one entire day at a time to do the observations, rather than visiting each location 50 times across the space of several weeks, but once again this may have compromised the integrity of the data and its subsequent findings, not to mention increasing both the cost and carbon footprint of the project.

6.6 Recommendations for Further Study

Having completed this extensive piece of research, there is no doubt in the researcher's mind that Social Informal Learning Spaces are, and will continue to be, vitally important for students studying on campuses at Higher Education Institutions around the world, and it is with this in mind that the following recommendations for further study are made.

Whilst the subject of the types of learning in which students engage within Social Informal Learning Spaces has been addressed in this research, the actual learning which takes place within these spaces has not, as it was outside the scope of this study, and it might be interesting to be able to research not just what the students are doing, but how they are doing it, and what effect the time spent in Social Informal Learning Spaces has on their learning.

It is important to note that whilst this study may be used as the basis for further research, and to inform the decisions when it comes to designing, creating, and running Social Informal Learning Spaces for your own Higher Education Institution campus, it is absolutely essential to observe, survey and interview students on one's own campus, rather than simply rely on the data presented in this thesis. Every campus is different, and every student population will

have its own thoughts and ideas about how that campus might be augmented and improved, and what kinds of facilities they need to be provided with, but what is vital to your success is the involvement of the students who will be using these spaces, as without them, one is only making best guesses as to what they might want, need, and prefer.

Having said that, if one is conducting research, rather than designing Social Informal Learning Spaces, it might be useful to consider working in collaboration with other Higher Education Institutions to conduct concurrent research, perhaps deploying teams of observers to collect data at different Social Informal Learning Spaces and on different campuses in different cities, and perhaps even in different countries to widen the scope of the research, and attempt to create some useful and more universal data set upon which further studies and researchers can draw.

If one is deploying a questionnaire as part of one's research, ideally it should be sent out to all of the students studying at the Higher Education Institution to give them all the opportunity of contributing to your data set. Whilst response rates are traditionally low for online questionnaires, at least one will have created an opportunity for everybody to have their say, and one's data validity should hopefully be all the better for doing that.

In this study it was only possible to conduct one focus group, the members of which were a subset of those who answered the questionnaire, whereas ideally the researcher would have liked to conduct several focus groups, once again to make sure everyone has the chance to have their input, and increase the validity of the data.

If possible, it may also be useful to conduct observations of students working in Social Informal Learning Spaces at different times of the year, not just during one particular semester, as it may be that there are seasonal or cultural changes to their study patterns and they ways that they choose to use on campus facilities.

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