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and Built Environment**



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**Designing social learning spaces:
Evaluating the relationship between perceptions
of design quality and student experience in UK
higher education**

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Declaration

I hereby declare that except where specific reference is made to the work of others, the contents of this dissertation are original and have not been submitted in whole or in part for consideration for any other degree or qualification in this, or any other university. This dissertation is my own work and contains nothing which is the outcome of work done in collaboration with others, except as specified in the text and Acknowledgements. This dissertation contains 78,580 words including appendices, references, tables and figures.

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Abstract

This research evaluates the relationship between perceptions of design quality and student experience in social learning spaces in the context of UK higher education. Social learning spaces – spaces available for students to gather, such as central buildings, lobbies, cafes and dedicated group-work spaces – are an increasingly important element of university campus planning and estate management. While the contribution that these spaces make toward formal and informal collaborative learning activities has been informed by scholars, little is currently understood about the relationship between the design quality of these spaces and its impact on student engagement; that is, students' active participation in the academic environment resulting in an enhanced learning experience. A case study employing qualitative and quantitative methods compared two sites; a series of conventional social and group-study spaces in Faculty of Engineering at Nottingham University and the newly designed award-winning social learning space The Pavilion Building at Nottingham Trent University, UK. Findings revealed that student perceptions of design quality have a significant positive correlation with social and learning activities and student experience. The study also identified four key design qualities of social learning spaces: attractiveness, convenience, comfort, and flexibility play a significant role in encouraging positive student experience at different levels, such as student engagement with learning activities as well as social activities, the feeling of support from the university. Furthermore, this research emphasizes the vital role of designers and student views in the process of designing successful social learning spaces.

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Chapter 1 :

INTRODUCTION

Over the last couple decades, in higher education there has been movement toward student-centered learning and the development of applied technologies; these shifts have brought about change to physical campus environments, which are now designed to accommodate new, interactive learning activities. However, there has been limited research undertaken to investigate and evaluate the effectiveness of the design of these spaces in the campus environment; to provide evidence to suggest whether the design is truly contributing to improved student experience. To begin with, this chapter will give an overview of the current research and explain the reason why this research is important to the research field of architecture. It will then present the background, aims, research questions and objectives. Furthermore, it also indicates the research approach and strategy of inquiry, as well as highlighting the philosophical assumptions and research scope, to set up the boundaries of the study. Lastly, the chapter details the thesis structure.

1.1 Problem definition and research question

Traditionally, the University has been defined and built for teaching activities; however, recent decades have seen changes in terms of how the university is conceptualised. While every institution may have different mission plans and strategies for tackling challenges, the university, generally, has the mission of ‘teaching and research, productive social development and service to society’ (Kenney, 2005, p. 28-29). In the new century, colleges and universities face many changes, such as increasing numbers, wider diversity and stage of development of students, changing learning needs, financial resources, technology and loss of community (Kenney, 2005). Therefore, how universities are transformed to deal with these problems has become an emergent theoretical and practical issue.

As a result, many ideas about university transformation have been developed. For example, ideas about the Civic University emphasize “a civic duty to engage with wider society on the local, national and global scales, and to do so in a manner which links the social to the economic spheres” (Goddard, 2009, p. 6). Another example is the learning landscape concept, which highlights transforming the concept of learning spaces to learning places in the whole campus (Neary *et al.*, 2010). More dramatically, Readings argues that the University will come to an end, as its function has been affected by these changes:

It is no longer clear what the place of the University is within society nor what the exact nature of what society is, and the changing institutional form of the University is something that intellectuals cannot afford to ignore (Readings, 1999, p. 2).

Consequently, rethinking the university in term of physical form, function and its contribution to communities becomes a significant requirement in both education and architecture research fields. Along this line, it is indicated that the institution places – campus or campuses and other physical locations – if properly leveraged can make a key difference in meeting today’s challenges” (Kenney, 2005, p. 11). Therefore, university physical environments, known as campuses need to be redefined as ‘a scholarly community ‘place’ where ideas, working practises and culture are exchanged and developed’ (Edwards, 2000). In addition, the university in the new century not only stands out for its environment form and function, but also because it is a “microcosm of the cultural values of its time, in its adherence to both tradition and innovation and its articulation of an ideal community” (Borsi, 2012, p. 157). Therefore, it is important to all researchers, planners and designers in the higher education sector

to create spaces not only for teaching; these spaces also need to contribute to student learning experience and encourage student engagement in the learning community.

In detail, as the educational focus has been moving from teaching to learning, institutional environments need to broaden their types of physical space. As we already know, student learning styles nowadays are various in terms of where, when and how learning happens. Therefore, not only classrooms but the entirety of the campus environment can be a learning space (Strange and Banning, 2001). In fact, it is easy to observe and recognise that many students have engaged with learning outside the traditional academic settings (Kenney, 2005). However, there is a limited understanding about these new types of learning spaces and in some cases, campus environments may not well support these new requirements:

We have observed on many campuses that institutional physical environments have not kept pace with these students' learning patterns. In many cases, the physical settings may actually inhibit learning (Kenney, 2005, p. 35).

In addition, due to the change in the way human learning process are defined and understood, the requirements for students to input information or the need of spaces for lecturers to present information to learners in university are less significant than the process by which such information is received critically by students. Furthermore, with technology advances, students nowadays have various of learning styles which may different from the past. In the review of teaching and learning spaces in the UK, Marmot (2008, p.4) emphasized that graduated students nowadays need to prepare themselves with more ability to think critically as well as solve complex problems to reach the requirements of working environment. Observing students' learning patterns, there is a blending of learning activities in students' daily schedules (Kenney, 2005). This puts the stress on university spaces to accommodate and facilitate more activities for students during their learning journeys. Furthermore, students now are digital natives; they grow up with computers and communicate through computers, phones or mobile devices as part of daily life. All of these technological connections can simply happen in a student's private room, therefore, there is a tendency for isolation around campus life which might lead to loneliness and lack of interaction. This requires the campus to put "higher priority on places where people can interact, develop social skills and build community", such as social learning spaces (Kenney, 2005, p. 20). It also requires the intervention of design for many new types of spaces to assist students in term of encouraging their social interactions and engaging them with the university community.

Along this line, how campus environments have changed to respond to the new climate is a significant question across higher educational studies. It is known that the physical environment of a university has a significant effect on the learning process of students; however, these effects need more empirical evidence and require more studies as Boy stated “we still lack frameworks and methods for understanding how space can or might impact on learning in post compulsory education” (2011, p. 84).

In short, as in the discussion above, learning is not only consolidated in lecture halls or classrooms; everywhere in a campus could accommodate learning. Therefore, it can be argued that many other spaces outside the classrooms, theatres or laboratories – such as squares in front of buildings, streets leading to lecture theatres or corridors, lobbies and atrium connected between departments – where students can engage in discussion are “part of the learning experience” (Temple, 2007, p. 32) and these social spaces “can be silent teachers” (Edwards, 2000, p. vii). However, there is a lack of deep, thoughtful investigation into how to design and evaluate the effects of these spaces on the student learning process. Temple writes:

We need a better understanding of the role of space in the dynamics of creating more productive higher education communities and its connections with learning and research. Literature throws almost no light on managerial decision-making about space issues affecting students or staff; this is a topic where further work would be useful (2008, p. 238).

Understanding and investigating the relationship between learning and its environment and what effect this has on this relation is a significant requirement of research in the context of design in the higher education environment. In addition, this type of study would identify which design attributes contribute to the success of these new learning spaces. The aims of this project are framed to address this need.

1.2 Aims

This study will focus on social learning spaces which play a significant role in connecting the whole campus. It is hypothesised that design quality of these spaces may have considerable influence on student learning experience as well as their perception of the campus. The social learning spaces in this project include entrances, atria, and corridors, as well as purposely designed pavilion buildings. By analysing these spaces, this research will illuminate to what extent the spatial environment of the campus can be beneficial to the learning experience of students in knowledge communities. From this evaluation, the design quality that contributes to positive student experience will illuminate. This result will be useful for the future design of social learning spaces.

1.3 Research question

What is the relationship between design quality of social learning space and students' experience?

In order to answer the main research question, the subsequent questions can be formulated:

1. What is the role of social learning spaces on students' learning experience?
2. What is the relationship between design quality of social learning spaces and students' learning activities, time spent, interaction and feelings of positive support?
3. What is the relationship between the perception of design quality and level of student engagement?
4. What are the design qualities that contribute to the success of social learning spaces?

1.4 Objectives

- a. Define social learning spaces: The literature will be reviewed from a wide range of areas: Education, Psychology and Architecture, to gain a thorough understanding of the theories of learning, student engagement frameworks, campus environments, design of learning spaces, design qualities and perception of design quality. Subsequently, the role of social learning spaces is defined in accordance with the contemporary learning theories. Via empirical analysis, the research will illustrate the role of social learning and its benefits to students' learning experience in practice.
- b. Develop and apply methods for evaluating social learning spaces: through the literature review, a theory framework to evaluate design quality of social learning spaces will be developed and used to evaluate selected case study spaces. Piloting and refining of methods including observation, questionnaires and interviews will be undertaken.
- c. Compare case study examples and relate finding back to existing literature: a synthesis of two case studies will bring empirical evidence to the research problem and will be analysed in the discussion chapter. This comparison would illuminate a number of qualitative, valuable traces for new knowledge.

1.5 Research methodology

1.5.1 Strategies of inquiry

This research will use Case Study Research as the main research strategy. Case Study Research is defined by Creswell as:

A qualitative approach in which the investigator explores a bounded system (a case) or multiple bounded systems (cases) over time, through detailed, in depth data collection involving multiple sources of information (observation, interviews, audio-visual material and document and report) and reports a case description and case-based themes (2007, p. 73).

This research will employ mixed-method quantitative and qualitative research through three phases of experiment, which will be discussed in Chapter 5. While quantitative research is based on the investigation of empirical results which are accurately measurable, qualitative research, in contrast, focuses on the exploration and explanation of the social facts based on description, prescription and prediction (Creswell, 2003). This research will be based primarily on the qualitative approach of the case study and will employ mixed-methods, both qualitative and quantitative, to capture a fuller picture of the social world. It is indicated that the combination of quantitative and qualitative methods will provide a comparatively deeper understanding of single case study.

Each of these methods will have strengths and weaknesses in different contexts. For example, in this research, use of different research languages in the questionnaire may introduce bias from the respondents. In contrast, quantitative methods such as the focus group and interview may have some bias from the personal differences and references. Therefore, the used of mixed-method will be appropriate to this study, as qualitative data will be used to cover the drawbacks of quantitative methods and vice versa. The details of the method will be discussed in Chapter 4 of this thesis.

1.5.2 Research assumptions

The first assumption relies on the philosophical approach to the study. This research is based on the ecological approach to the relation between humans and their environment, which indicates that humans are impacted by their environment and in turn they influence their environments (Strange and Banning, 2001; Kenney, 2005; Zeisel, 2006; Capdevila-Werning, 2014). In addition, this study rests on the reliability of architectural or environmental probabilism: it accepts that the environment may not determine users' behaviour. In turn, it is believed that students have a variety of behavioural options as well as learning styles and that the campus can be designed in a way that encourages positive behaviour or activities while discouraging undesirable

ones. Therefore, this research supports the idea that good design spaces could have a positive influence on student behaviour and, furthermore, superior design quality will bring value to the learning environment (Strange and Banning, 2001; Kuh, 2003; Kenney, 2005). Despite the quality design spaces could afford their users the opportunity to act in certain ways, it may not ensure that all of those activities will certainly happen (Bennett, 2007a) .

The aim of this study is to assess the perception of design qualities; however, the result also depends on whether students were mature enough to take part in the study seriously and whether they could indicate their opinions about their physical social learning environment as well as how these factors affect their activities. Humans will experience the environment with their conscious or unconscious mind. Therefore, the students may or might not be able understand their perception about the physical environment and be aware of these effects on their awareness as well as unawareness behaviour. Although in order to ensure that the architecture language in the questions were not biasing students' answers, explanation as well as consideration of wording problem in survey was carefully applied in this research, there might be some unavoidable bias in this research with regards to participants understanding, carelessness and unawareness. Furthermore, survey was applied in this study, for example, students who currently stay in the study spaces were chosen to participate in the research which will help them easily to refer the content of the question and their spatial experience at the time they answer the survey, some students may not fill in the questionnaire with high responsibility.

In general, while drawing on perception may not be a perfect approach, this is an effective route to a better understanding how the environment assists or limits student learning experience in their real context environment. Astin (1993) notes, "the student's perception of the college environment can be affected both by what the environment is really like and by how the student has been influenced by that environment" (p. 88).

1.5.3 Research scope

This research is based initially on the new concept of the learning landscape, which indicates that the university in the new century needs to transform the campus into whole physical and virtual places that support learning experience and engage students within their learning community. This study is grounded on this trend and focuses on improving the design of new learning places for students. Among many new spaces developed in the university, this will focus on how to improve the design quality of

social learning spaces, which are known as a linkage of function spaces where social learning activities take place frequently. These spaces could be the entrances, atria, and corridors, as well as cafeterias; the spaces to connect two buildings or the building built for social or informal learning purposes. While these spaces have already become significant places for students in campus structure, reflection on the design of these spaces tend to be limited in the research domain.

It is evident from the literature that the relationship between physical environment and student outcomes has been weakly defined, especially in the higher education sector (Temple, 2008; Painter *et al.*, 2012). Although this research will not examine the relationship between space and academic outcomes, it will consider the effects of activities, close contacts, peer to peer interactions, engagement level and connectedness to communities of learning on student learning experience. From this, it draws a link of these outcomes to the process of learning with reference to existing theory. In addition, although the users of social learning spaces will vary to include staff, students, as well as visitors, the focus of research is specifically on students because students is considered the main users of these spaces and their satisfying, perception, activities and progressing is significant to the mission of higher education.

This study only focuses on higher education in the UK and two case study based in the same geographical location: Nottingham city. Acknowledging that buildings will affect people differently, depend on local culture as well as environmental conditions, different case studies are required to confirm the results before they can be applied on the larger scale. Generalisability is the main concern of many studies in this same research domain, especially within social sciences research. In this project, the researcher notes that each case study has its own unique and complex nature; therefore, generalisability is limited. While, in this project, there is considerable comparison between two case studies, this research does not aim to produce theory that can be applied to all the institutions. In short, this work will offer an in-depth analysis to understand the research problem which has thus far been limited in the literature and will provide methods which could be used for further research.

1.6 Thesis structure

The thesis is organized into nine chapters as detailed below:

Following this introductory chapter, **Chapter 2** will define the main concepts regarding learning in higher education. This sets the foundation for the study and articulates the main purpose of the higher education learning environment. This background will also direct the research focus in terms of ascertaining the essential factors that affect students' learning process, which is the key to teaching and learning in higher education as well as the survival of institutions in the future.

Chapter 3 considers the developments within campus design, university spaces and the new form of social learning spaces. First, it presents the definition and morphology of the campus as well as the development of campus form throughout time. Then it provides a critical review of new changes to understanding of the learning environment and the concept of learning places in higher education. An overview of key design trends in learning spaces in higher education are presented so as to critically evaluate the conceptual framework as well as provide guidelines for designing successful learning spaces.

Chapter 4 discusses design quality and perceptions of design quality and attributes, noting that design quality and perception of design quality has been underrepresented in architectural empirical research of higher education. The next part of **chapter 4** will discuss how urban design has built theoretical design quality frameworks to evaluate public spaces. A comparison of architectural and urban design frameworks indicates several design attributes of relevance to the design of social learning spaces. The last part of this chapter will summarise the common criteria to evaluate learning environment in many recent studies. This will help to define the criteria that need to be applied in the case study of this research.

Chapter 5 will discuss, evaluate and justify the research methodology. By comparing different literatures on methodology, the study will justify the methods applied to collect data. The advantages and weaknesses of each method are also discussed to develop the mixed-method approach, to achieve the main aims of the research. The discussion will also explain and justify the choice of specific methods such as observation, questionnaire, focus group and semi-structure interview have been chosen.

Chapter 6 presents the first case study, namely four gathering spaces in the Faculty of Engineering at Nottingham University. It presents the analysis of these spaces

throughout different methods. The findings will be described, along with the presentation of observations, questionnaires, focus group and semi-interview data respectively.

Similarly, **Chapter 7** will introduce the second case study, namely the Pavilion Building in Clifton Campus Nottingham Trent University. It also presents and analyses observation, questionnaire, focus group and semi-structured interview.

Chapter 8 compares the two cases studies. In order to clarify significant findings, this chapter also highlights the similarity and difference between the empirical findings and the theoretical concepts from the literature.

Chapter 9 concludes the research by summarising the research findings and highlighting the contribution of this research to current knowledge, while also reflecting on the research limitations and giving suggestions for future study in this area.

Chapter 2 :

LEARNING CONCEPTS AND LEARNING IN HIGHER EDUCATION

You can't build effective spaces for learning without clearly understanding the learning activities intended for them (Brown and Long, 2006,p.10).

Recently, student learning in higher education and its relationship with the environment has been a topic of research focus due to the growth of student numbers and changes in the economics and technologies that are influencing the sector. While environmental conditions are key to accommodating students, teachers and their activities, the literature remains unclear about the connection between the spatial characteristics and learning process (Blackmore et al., 2011). Moreover, some recent studies contend that campus designers should understand the purpose of learning in higher education and how people learn in order to build appropriate spaces to accommodate these activities (Boys, 2011). In order to clarify these issues, this chapter will conduct a thorough exploration of the concept of learning; addressing how the concept has change in the new century and how these changes could affect the way educational environments are shaped.

2.1 A definition of learning in psychology and education

The concept of learning has deep roots in the fields of Psychology and Education. In psychology research the definition has been developed via different theories. For example, studies by Bandura (1986) emphasise behaviourist ideas; Jean Piaget, constructivism theory; the seminal work of Vygotsky works with the social constructivism concept and David Kolb brings to the fore ideas of experimental learning. Taking this material from the psychology research field, educationists developed their own approach to inform the curriculum, tools and the setting of the learning environment. From a Sociology perspective, Jean Lave and Etienne Wenger developed the idea of situated learning and community practices; ideas that are considered landmark contributions to how learning can be understood in a social context. This chapter will provide insight into the human learning process, by examining these theories respectively, with the purpose of opening up the discussion about how learning can be understood in relation to the learning environments of the 21st century.

2.1.1 Behaviourist theory

Behaviourist theory emphasises learning as the response to stimulations of context or environment and was developed by Bandura (1986). Bandura indicated that:

Most human behaviour is learned from the observation through modelling. By observe others, on forms rule of behaviour, and on future occasions this coded information serve as a guide for action (Bandura, 1986, p. 47)

Bandura (1986, p. 51) believed that personality learning process of one person is “an interaction between three components: environment, behaviour and one’s psychological process i.e. one’s ability to entertain images in mind and language”. In addition, it is pointed out in Bandura’s study that “attention, retention, reproduction and motivation” were the four main conditions for making an effective model of learning by observation (Bandura, 1986, p. 51). From this viewpoint, it is suggested that “behaviour is, therefore, a product of self-generated and external sources of influence” (Bandura, 1986, p. 454). A number of research pieces have investigated the relation between the environment and behaviour as well as internal cognition of the learning process. While these studies have been criticized for not covering the whole field of learning (Illeris, 2009), the important advance made by behaviourist scholars was the acknowledgement of the role of the external environment, which had been neglected, in shaping the learners’ behaviour in relation to the change in cognitive

process. The work also emphasizes that the physical environment should give priority to aspects of stimulation in order to help learners actively engage with the internal psychological learning process.

2.1.2 Experiential learning

From a different perspective, the work of Kolb (1984) suggested that the process of learning is an experimental circle which includes four steps: “concrete experience, observation and reflection, forming abstract concepts and testing in new situations” (Kolb, 1984, p. 38). The first stage is concrete experiment, where the learner experiences learning activities such as lab tasks or work practice. The second stage is observation and reflection on activities that have taken place during the activities. Thirdly, in the abstract concept phase, the learner attempts to conceptualize the experience from which they have observed and reflected. The last stage is to form the new idea, to test the theory or plan for the new experience task, as shown in Figure 2.1 (Kolb, 1984).

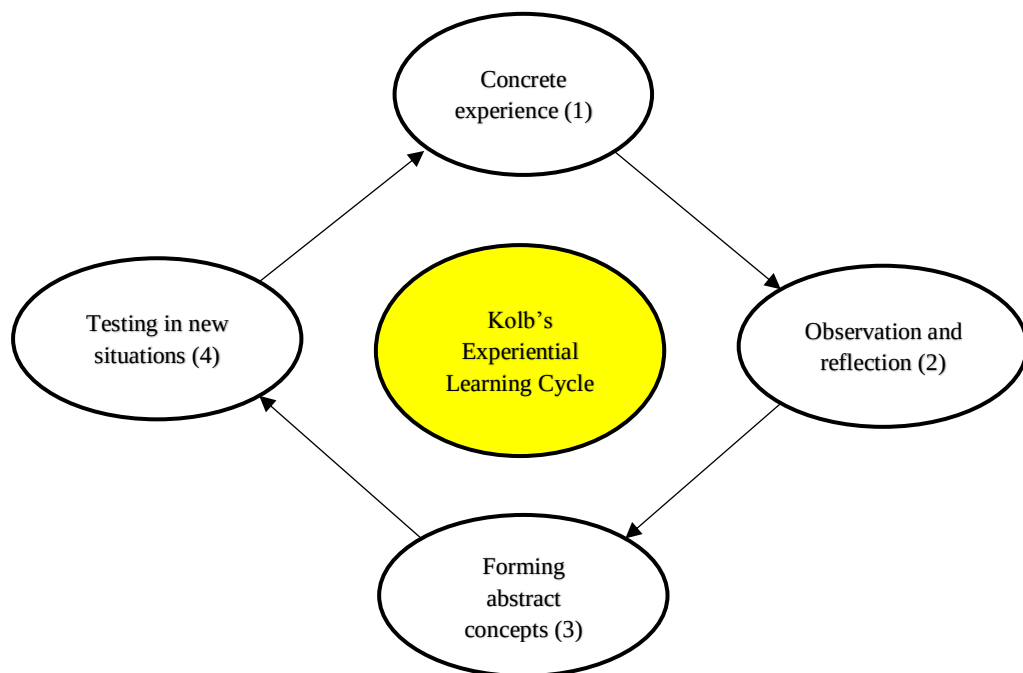


Figure 2.1: Kolb Experiential learning cycle (Kolb, 1984, p. 38)

Overall, according to Kolb (1984), “Learning is the process whereby knowledge is created through the transformation of experience” (Kolb, 1984, p. 38). Although debates on the model of experimental learning attracted many studies in psychology, the work of Kolb also contributed to the improvement of pedagogy and educational theories and approaches in terms of the role of ‘learning by doing’ (Blackmore *et al.*, 2011). However, from the philosophical perspective, Dewey (1938, p. 25) states that:

The belief that all genuine education comes about through experience does not mean that all experiences are genuinely educative [...] hence the central problem of an education based on experience is to select the kind of present experience that live fruitfully and creatively in subsequent experience.

Therefore, in practice, there was need of reconsider the conditions in order to create constructive learning experience for learners. Among education conditions, the physical environment was an important factor that could have an effect on the complex procedure of knowledge transformation. Furthermore, this work also raised the argument that the university environment should encourage positive student experience through interaction with the physical environment.

2.1.3 Social constructivism

In the 1950s, two psychologists, Jean Piaget and Vygotsky developed constructivism theories, which emphasized the significance of the social context to the process of learning. Contrary to behaviour theory, constructivism demonstrated that learning was an active process of constructing knowledge in the social context/environment. Piaget's studies explained that human intelligence is produced by the interaction between person and social environment. This work also highlighted the relation between individuals and social interactions; he demonstrated that "Human knowledge is essentially collective and social life constitutes an essential factor in the creation and growth of knowledge, both prescientific and scientific" (Piaget, 1995, p. 30). According to Piaget's theory, without external interaction with the social environment, learning cannot not be complete:

We believe that social life is a necessary condition for the development of logic. Thus, we believe that social life transforms the very nature of the individual, marking him pass from an autistic state to one involving personality. In speaking of cooperation, therefore, we understand the process that creates new realities and not a mere exchange between fully developed individual (Piaget, 1995, p. 210).

In the other words, Vygotsky's 'sociocultural development theory' of 1896-1934 indicated that the progress of cognition was a lifelong process and was affected by social interaction. In addition, the theory emphasised development; "one of Vygotsky's core ideas is that human beings, unlike animals, learn and develop by using cultural tools" (Saljo, 2011, p. 60). It indicated that "language, different forms of numeration and counting, memo-technical techniques, algebraic symbolism, works of art, writing schemes, diagrams, maps" were the main cultural tools individuals use to understand the environment such as "thinking and acting" (Vygotsky 1997, p.85). Significantly, Vygotsky's theory also underlined the importance of social interaction

in the learning process, as learning will not occur without external interaction and the learner's performance will be much enhanced by operational activities as opposed to unaccompanied work (Vygotsky, 1997). As Saljo explained:

In recent developments, in education research, however, Vygotskian ideas have become important for approaches to teaching and learning that emphasize the situated nature of knowing and the necessity of actively engaging learners in the process of appropriating knowledge and skills in cooperation with adults and various kinds of learning communities" (Saljo, 2011, p. 63).

This theory was used as the foundation to modern learning theory which has subsequently been applied widely in education sector, however, this theory might be not precisely informed by architecture design theory of learning spaces to apply this in their design.

2.1.4 Comprehensive learning definition

As discussed above, many learning theories were developed in the nineteenth century which were based on different perspectives, backgrounds and assumptions. Modern learning theory agrees that the concept of learning can "broadly be defined as any process that in living organisms leads to permanent capacity change and which is not solely due to biological maturation or ageing" (Illeris, 2007, p. 3). While behaviourism may have believed that learning was a response to environmental, stimulative factors, constructivism specified that learning was an active process in which learners constructed knowledge through a number of social activities using cultural tools. Modern social development theory understands that learning involves the complicated integration of two processes: "external interaction process between the learner and his or her social, cultural or material environment, and an internal psychological process of elaboration and acquisition" (Illeris, 2009, p. 8). This is illustrated in Figure 2.2.

In further detail, the content dimension referred to what students learn, which may include: "knowledge, skill, opinion, insight meaning, attitudes, values, way of behaviour, methods, strategies" (Illeris, 2009, p. 8). The goal of learners is to use this content to build meaning and the ability to cope with the real-world as well as improve their functionality to work and solve complex problems. The incentive comprised the 'feelings, emotions, motivation and volition', which delivered and guided the mental energy for the learning process. Then, this would enhance the 'sensitivity' of learners.

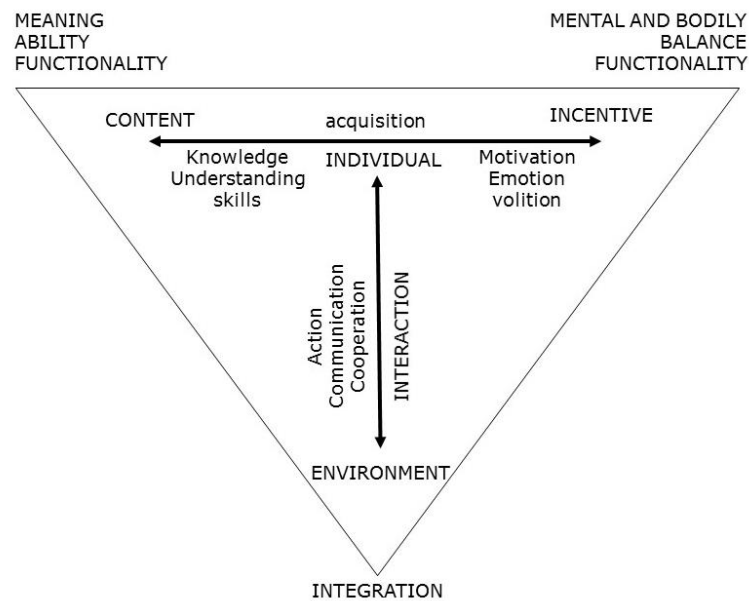


Figure 2.2: The three dimensions of learning and learning process according to Illeris's explanation (Illeris, 2009, p. 9)

In addition, as many psychologists or educationists insisted, there was a strong connection between content and incentive (Vygotsky, 1978; Furth, 1987; Piaget, 1952; Wenger and Lave, 1991). This relationship was confirmed by the development of advanced neurology (Damasio, 1994). However, both processes were introduced by the interaction which included actions, communication and cooperation with the external and social environment. Therefore, as social constructivism confirmed, learning is social action that requires the involvement of the learners with social interaction as well as their learning community. It was demonstrated that learning could not be understood as an isolated activity; this was a lifelong process.

In short, although these theories are well-known in Education, designers may not be well informed of these changes, which results in any such knowledge becoming irrelevant in the learning spaces' form (Boys, 2011). She writes:

Rather than assuming that learning is an intellectual process which is applied to different contexts, practised and then reflected on by individuals, learning here seen as already and inherently collaborative. Rather than operating through particular conversations between tutor and student, learning is seen to taken place through a community of "knowers" and this indicates not just knowledge but also a set of attitudes and culture (Boys, 2011, p. 39).

Therefore, while this research focus on the design and architecture of learning spaces in higher education, it is necessary to clarify what learning in higher education mean and how the learning has been changed in the new century. These issues will be discussed in the section 2.2.

2.2 Learning in higher education

2.2.1 Student centred approach in higher education

In contrast to learning in the school sector, learning in higher education had different requirements in term of philosophy and knowledge because of the leading role of the university in modern society. This mission has resulted in constant transformation and development of the university system to keep pace with change in society. Similarly, learning in higher education is also different from compulsory learning in school; it has been argued that: “Higher education has a responsibility to develop not only knowledge and skills but also, more crucially, an ontological dimension: who students are as well as who they are becoming”(Barnacle and Dall’Alba, 2017, p. 1328).

As the result of development in the theory of learning discussed above, the learning approach in higher education has changed significantly. Along this line, Harrison and Cain (2009) and Marmot (2008, p. 4) emphasize the concept of taking students as the centre of teaching and learning, indicating that:

Traditional teacher centred models, where good teaching is conceptualised as the passing on the sound academic, practical or vocational knowledge are being replaced with student centred approaches which emphasize the construction of knowledge through shared situation (Marmot, 2008, p. 4).

Furthermore, as a result, the higher education role also changed from being conceived of as “the place of instruction” to “the place to produce learning” (Marmot, 2008, p. 4). These changes have been considered as a result of the development in learning theory of cognitive and social interaction and the fact that knowledge has taken a key and important role in the economy, which required more ‘qualified, highly skilled, creative and flexible workforce’; emphasis is on “less factual knowledge, and more on ability to think critically and solve the complex problems” (Marmot, 2008, p. 4). This has resulted in a change in educational approach, with more focus now on student learning experience and what is beneficial for the student learning process:

Overall, the new science of learning is beginning to provide knowledge to improve significantly people’s abilities to become active learners who seek to understand complex subject matter and are better prepared to transfer what they have learned to new problems settings (Brandsford, Brown and Cocking, 2011,p.13).

2.2.2 Situating learning and community learning theory in higher education

This theory, as applied in higher education was inspired by the work Lave and Wenger (1991) which stipulated that learning cannot be assumed to be just the relation between

teachers and learners, or an individual's work which can be divided into thinking/reflecting or doing/practice. As an alternative:

Rather than asking what kinds of cognitive processes and conceptual structures are involved, they ask what kinds of social engagements provide the proper concepts for learning to take place [...] Learning is a process that can take place in a participation framework, not an individual mind (Lave and Wenger, 1991, pp. 14–15) .

Furthermore, it stressed the importance of social interaction and motivation in activities that university students taken in their scholarly community; as it is emphasised that:

As an aspect of social practice, learning involves the whole person; it implies not only a relation to specific activities but a relation to social communities – it implies becoming a full participant, a member, a kind of person. In this view, learning only partly – and often incidentally – implies becoming able to be involved in new activities, to perform new tasks, functions, to master new understandings. Activities, tasks, functions, and understandings do not exist in isolation; they are part of broader systems of relations in which they have meaning [...] learning thus implies becoming a different person with respect to possibilities enabled by these systems of relation (Lave and Wenger, 1991, p. 53).

It was also argued that the role of the learning community was significant to student development in higher education. The four components of social learning theory are shown in Figure 2.3.



Figure 2.3: Components of a social theory of learning: an initial inventory (Wenger, 1998, p.63)

However, there was a principle of flexibility for learning in higher education, as it also depended on what the students needed to develop from their initial background as well

as their own expectation for the skills and knowledge that they could gain in university. It was argued that:

Education should be an experience, not an end. It is the participation in higher education, the interactions with peers, teachers and diverse forms of knowledge that will enable people to live richer lives and contribute to greater social justice through work and other social activities. Higher education should enable students to develop and celebrate their own identities. (McArthur, 2011, p. 746)

2.2.3 Student engagement

Learning goes beyond just doing research in a library and submitting a term paper. Learning has multiple academic and social facets, all of which require student engagement (Kenney, 2005, p.36)

As the new theory of learning has been applied in the higher education, the focus is on students instead of teachers and the curriculum as in the traditional model. Along with technological development, contemporary education has more focus on the effectiveness of teaching and learning in the new century. Higher education has shifted the focus to student engagement as an essential metric to measure the success of an institution. Initially, Astin (1984) developed the theory of involvement which argued that the amount of “physical and psychological” energy that the student devoted to their learning activities had a positive correlation with their learning performance and development outcome. Other studies also supported this claim, indicating that lack of involvement in these activities is one of the factors that leads to the decision to discontinue study (Kift, 2004; Kuh et al., 2008; Tinto, 1993; Yorke and Londen 2007). Furthermore, it also emphasised that positive student engagement, such as being involved in “learning community and first-year programs [...] can be effective in promoting and improving student academic achievement, academic and social integration, involvement, satisfaction, sense of community and retention” (Kenney, 2005, p.36).

Based on learning involvement theory, Kuh (2001a, 2001b, 2003) presented the student engagement model, which has recently been applied in the US, UK and Australia to assess the time and effort that students give to their academic activities outside of the classroom and how the institution supports their students to achieve development (Kuh, 2003). It is defined in the following way: “Student engagement comprises the whole experience of education, broadening the mind, interacting, dialogue, discourse all the things higher education should be” (Kenney, 2005, p. 36).

From the research studies, Kuh (2003) indicated five key elements that would contribute to the academic outcome of college students:

- Level of academic challenge
- Active and collaborative learning
- Student-faculty interaction
- Enriching educational experience
- Supportive campus environment

Although these indicators were considered very important to students attending college or university programmes, it was hard to quantify these levels. Therefore, the application of these indicators was limited compared with the other marketing ranking types found in the national ranking magazines.

In further detail, Kuh's (2003) many activities contributed to five indicators and became essential in evaluating the development of students:

- Preparing for class (including studying, reading, writing, rehearsing and so on
- Working with classmates outside of class
- Tutoring or teaching other students
- Participating in community-based projects
- Discussing ideas from reading or classes with other people (faculty, other students, members of family) outside of class.
- Talking about career plan with a faculty member or advisor
- Working with faculty members on activities other than coursework

These activities were strongly associated with social interaction and formal or informal discussion with friends, peers and staff members. Research indicated that these engaging activities as well as social interactions with these purposes were valuable to the learning process (Kuh, 2003; Kenney, 2005). The nature of these activities meant they usually happened outside of the classroom and could happen anywhere in spaces which supported and facilitated them. Therefore, it put the critical stress on campus planning to create these supporting spaces for engagement, developing and learning.

Adapting these studies, the National Survey of Student Engagement (NSSE) in the US suggested including 16 of student engagement activities category (Kenney, 2005, p. 36). This framework has subsequently been applied in the UK and Australia, where student engagement has been used as one of the tools to evaluate and rank the success

of institutions, as an alternative to learning outcome metrics (Coates, 2005; Kuh, 2003). In both quantitative and qualitative research, Matthew, Adams and Gannaway (2010) found that there was a positive relationship between the use of social learning spaces and an increasing level of student engagement according to the student engagement framework. Furthermore, the latter research also emphasized the importance of spatial design, which would determinate the use of social learning space and learning behaviours among the students (Matthews, Andrews and Adams, 2011). However, there was still a lack of empirical investigation into which design attributes relate to which learning activities and how these contributed to student engagement.

2.3 Conclusion

In conclusion, psychology studies indicate that the definition of learning has been developed and changed due to the influence of different theories. While behaviourism believed that learning is the response to the environmental, simulative factors, experiential learning theories emphasised the role of ‘learning by doing’. In contrast, constructivism indicates that learning is an active process, in which learners construct knowledge through a number of social activities and by using cultural tools. Referencing various theories and neuroscience research, learning is now defined as a broad concept of a social action that requires the involvement of the learner as an entire person and member of a learning community. This clearly demonstrates that learning cannot be understood as an isolated activity; it is a lifelong process and the engagement in social interactions and with community environments is significant.

From these perspectives, the approach to pedagogy has also changed from teaching to learning-centred. As such, student engagement has become a critical issue in terms of fostering development in higher education. Along with developments in technology, these ideas have resulted in the transformation of the campus; placing stress on the improvement of university environments. Literature has shown significant change in the way psychologists and educators understand learning process, especially in higher education and its learning spaces in the new century. Practitioners need to rethink what learning is and how to foster learning activities and social interaction via their environments; critically, new types of spaces, outside normal classrooms, are required on the campus.

However, it is claimed that the design of learning space in higher education is not informed by the developments in learning theory. In addition, it has been argued that “creating learning spaces means re-engagement with our understandings and presuppositions of what counts as knowledge, curriculum and pedagogy” (Savin-Baden, 2008, p. 34). Therefore, deep understanding about the nature of learning is crucial to “inform the future design of learning spaces, in order to facilitate the changing pedagogical practices needed to support a mass higher education system with its greater student diversity” (Temple, 2008, p. 4). In light of this, the following chapter shifts attention to the design of learning spaces.

Chapter 3 :

CAMPUS DESIGN, UNIVERSITY SPACES AND SOCIAL LEARNING SPACES

If we design our buildings and spaces in certain ways, we can cause certain things – more effective learning, more vibrant community – to happen there. Physical changes can be a powerful tool in facilitating social and organizational change in an institution's culture (Kenney, 2005, p. 4).

University spaces may refer to all the buildings of the campus or the interaction between university buildings inside the city; it could refer to a learning community; it could mean spaces intended for teaching and learning, and other spaces (Temple, 2007). The campus in the new century must make a positive change to improve value and meet the university mission. In order to make effective decisions in campus planning process, it will require understanding of university spaces and their importance to teaching and learning as well as institutional missions more broadly. Therefore, this chapter will firstly review the literature on campus design: the history and trends. In addition, it will provide a critical overview on the definition of learning spaces and how the designs of these spaces have changed in the new century. Summarising significant design guidelines from literature to some learning spaces as well as conceptual frameworks for planning the campus, the chapter also indicates some important factors that designers must consider in their projects. These design guides will establish the theoretical framework that the researcher will apply to evaluate the new type of learning spaces in the campus. As emphasized by the literature, social learning spaces could potentially have become a new form of place that could encourage students' learning in many aspects.

3.1 Campus design: history and trends

3.1.1 Campus definition

Environment of a university – what we term a campus – is a place with special resonance. Aside from their functional necessity, buildings and landscapes form the heart and soul of these institutions. Higher education institutions are eager to give assurances of academic programmes of high standards of excellence, but it is crucial to remember that the campus too is part and parcel of the learning experience. Through its physical estate, a university can reinforce the high ideals of scholarship and institution values to create a unique and defining sense of place.

(Coulson, Roberts and Taylor, 2011, p. vi)

The university has been long defined and built for learning and teaching activities; however, the new century has witnessed a change in how the university can be understood and recognised. The university is defined with reference to the role of campus environment as a significant part of learning experience; “A university may be defined as a self-governing, mainly public funded, community of academic and student engaged in absorbing, advancing or disseminating knowledge” (Edwards, 2000, p. 2). Moreover, campuses not only stand out for their physical form and function, but “it [are] also a microcosm of the cultural values of [their] time, in its adherence to both tradition and innovation and its articulation of an ideal community” (Borsi, 2012, p. 157). From another perspective, as developing internet and virtual knowledge pervade various type of media, the requirement for inputting or presenting information is less significant than the process of how this information can be understood critically. In context of the transition in both pedagogy and technology, the campus now can be defined as a scholarly, community ‘place’ where ideas, working practises and culture are exchanged and developed. Thus, how the campus has changed to respond to the new mission is a significant question across higher educational studies.

3.1.2 History of the development of the campus form

Scholars have produced a number of studies over the past decade about campus design, which has entailed various approaches. For instance, Brian Edward’s (2000) in the book *University Architecture* takes a characteristics and functional approach to campus design and planning. From the history and contemporary trend of designing campus it is clear that they keep changing their concept and form to keep pace with changes in education, economic and technology. The summary of contemporary trends in campus design by Coulson et al. (2011), as shown in Table 3.1, explains how contemporary campuses are formed. It was noted by Coulson et al. (2015) that trends

include: adaptive reuse, hub buildings, interdisciplinary science research buildings, joint-venture buildings, new universities beyond the West, transnational education, commercial developments, large scale campus expansions, revitalizing master plans and online learning. These new trends in campus development reflect the fact that the university needs to develop its own building language to emphasize its role in modern post-compulsory education. University in nowadays also needs to compete for their students and promote their brand in the global market. Consequently, exhibiting their own iconic building becomes more popular trend in campus design. While there was no firmly evidence about the effect of these iconic branding buildings to the students' recruitment, scholars indicate it may increase the risk than benefits.

Table 3.1: The history development of university (Coulson et al 2011)

Category	Characteristic of university design
Early beginnings: Medieval University	Model of Cambridge and Oxford with the pattern of the enclosed courtyard.
The new world: American's first colleges	The University master plan favours the form of engaging with the community and open arrangement.
Nineteenth-century America: Picturesque nature	Groups building in the park-campus becomes the "urban institution"
Nineteenth-century America: The Beaux Arts Movement	Axial plans dominated by focal points and civic aesthetic
Nineteenth-century Europe	Mono functional building with "imbues new structure with symbolic resonance"
The Gothic Revival	The return of Oxbridge typology, with the model of "cloistered quadrangles" and "introspection"
The Post-war revolution	The architecture and planning change to the new idea of "less elitist" and "more democratic education"
Post modernism and Star-Architecture	The trend of rejecting the master plan and encouraging "iconic building" (Coulson, Roberts and Taylor, 2011, p. 35).

The overview of the university design characteristic throughout different time indicates that campus form always needs to change and adapt to assist university afford their missions. Architecture changes can be a powerful tool to reflect the development of one institution. In this scenario, transforming learning spaces could be the valuable reactions to these requirements in the new information era, which will be discussed in the following sections.

3.2 Learning environment in higher education

The interactions between higher education's built environment and the activities of teaching and learning, and research, taking place within and around it are not well understood. Where connections between the environment and educational activities are made, the basis for doing so tends to be casual observation and anecdote, rather than firm evidence (Temple, 2007, p. 4).

Similarly to the development of the campus form, learning spaces especially in higher education sectors also need to be changed. Much of focus in the new century is educators and designers have been inspired by new trends of technology rich learning environments (Chism, 2006). Conspicuously, there has been widespread evolution, such as new instalments of the screen, computer, and IT services in classrooms, laboratories or lecture theatres or redesign classroom's configurations. However, as learning theory already acknowledged that social interactions in many forms are significant for learning development, university physical spaces still have been an irrelevance to what theories indicated. It is indicated that "There is increasing focus in the twenty first century on what and how students learning and on the way of creating learning environments to ensure that they learn effectively – although much of this remains contested ground" (Savin-Baden, 2008, p. 22) The social interactions and physical conditions for these interactions occurring still have been neglected in the process of transforming of higher education.

3.2.1 Understanding learning spaces in higher education

The idea of the 'learning space' has been used in a variety of different ways by scholars in both education and architecture studies. Traditionally, the term "learning space" generally referred to the physical classrooms or lecture halls which were designed to direct the transferring of information from teachers to students. However, over the last two decades it has been noted that "While classrooms can still be regarded as our core learning spaces, it is obvious that a host of new factors and opportunities has dramatically changed this landscape (Brown and Lippincott, 2003, p. 14). From the viewpoint of embracing the students' learning experience, Kolb and D. Kolb (2005) suggested that "the enhancement of experiential learning in higher education can be achieved through the creation of learning spaces that promote growth production experiences for learners" (2005, p. 205). This was persuasive in terms of learning spaces having to accommodate, enable and foster the interaction between the individual and their social environment in both dimensions: content and incentive as discussed in Chapter 1. In other words, Savin-Baden defined learning spaces as a

“diverse form of spaces within the life world and academic, where learners have a opportunity to reflect and analyse their own learning position occur” (2008, p. 7).

Along this line, it was argued that if learning not only referred to the process of understanding facts, learning may not only happen in classrooms (Brown and Long, 2006, p. 91). Similarly, Brooks, Fuller and Water (2012) indicated that there has been clear change of objective from the “organization or geometry” of the space to the concept of “place”, which underlined on how the geometry of the environment was constructed through the social process and how it gave it meaning to users in their culture. Therefore, instead of focussing on learning spaces, scholarly ideas shifted to the perception of the learning environment; the idea of learning in “place” (Brown and Long, 2006).

3.2.2 The changes from space to the concept of ‘place’

According to new learning theories, tradition learning space categories are no long suitable in higher education. The work of the social constructivism psychologists indicated that people culturally transmit information from their perspective and organize perceptions by their communicative methods. This resulted in the following: “places of engagement where often disconnected thoughts and ideas, that have been inchoate, begin to cohere as a result of the creation of some kind of suspension from daily life” (Savin-Baden, 2008, p. 7). From that viewpoint, it was argued that many such hidden spaces were vital to the learning culture but were not recognised by institutional leaderships, developers and designers (Savin-Baden, 2008). Obviously, learning spaces can be seen differently by learners; however, this work indicated that there were some common categories such as:

- Physical and/or psychological removal from the normal learning environment
- The creation of specific time for writing of reflection
- Using social learning spaces for dialogue and debate
- Accessing digital spaces for discussion and reflection with and through others

(Savin-Baden, 2008, p. 8)

Furthermore, learning spaces could move beyond the normal concept to include the physical space and the temporal dimension. This idea was supported by Castells (1996, p. 411), as he indicated that “space is inseparable from time, it is crystallized time”. Thus, it argued that “locating oneself in spaces where ideas and creativity can grow

and flourish, spaces where being with our thoughts offers opportunities to rearrange them in spaces where the values of being are more central than the value of doing” (Savin-Baden, 2008, p. 8).

In higher education, it is believed that “learning spaces are often places of transition, and sometimes transformation, where the individual experiences some kind of shift or reorientation in their life world” (Savin-Baden, 2008, p. 8). Therefore, the old model of learning spaces, consolidated in classrooms, theatre lectures, study rooms or library areas is no longer suitable for the requirement of students. Buildings which provide spaces for necessary teaching and learning functions happen in the university. At the same time, building also have a vital role as a component of campus plan. However, not much of attention has been paid to the building and its architecture with regard to how these working together to define learning spaces and established the sense of the place. It is indicated that “If the university is to maintain some leverage in the world of intellectual thought, then it needs to regain learning spaces as places in which in-depth deliberation and intellectual positioning can occur” (Savin-Baden, 2008, p. 141). It became undoubtable that learning spaces and creating the sense of the campus places is the new challenges in architecture research in higher education.; and more studies were required on this in the new century.

3.2.3 Design trends of learning space in practice

The current design of the campus also reflected a transition in educational approach, where learning must be perceived differently from the past for both economic purposes and society’s values and requirements. Learning space design in the past focused on functional requirements and followed a traditional organization. However, the design trends have changed. Educators and designers have proposed three design trends, such as active and social learning strategies, human central design, and technology that enriches learning.

3.2.3.1 First trend: designing learning spaces for active and social learning strategies

Among the many trends, design has focused on social interaction between students and this has vastly affected the form and structure of learning environments in the contemporary university. Psychologies already understood that social interaction played a significant role in defining the learning process (Kolb, 1984; Vygotsky, 1997; Piaget 2001). Brown and Long (2006, p. 9.2-9.3) illustrated that “constructivist learning principles, specifically activities identified as encouraging learning, can be

translated into design principles that guide tactical decisions, ensuring that the designs we build and the technology we deploy serve a clear education purpose”. Furthermore, it required new and more spaces for the model of working in a group, discussion with a partners or web discussion (Brown and Long, 2006, p. 9.2). In addition, the design of learning spaces tried to encourage learners to be more active by taking multiple roles, such as presenting, listening, the critic and mentor as well as giving them opportunities to interact with their peers and friends in the learning environment. It argued that “We change in response to engagement with others. Space has a role in determining the quality and quality of engagements as well as its potential as an effective learning experience” (Gee, 2006, p. 10.3).

It became clear that active and social learning was a significant trend in designing learning space, which can be seen in many modern university projects. Due to this, a new definition of learning spaces such as social learning spaces, informal learning spaces, and group work spaces, community learning spaces and the concept of third place has become available to support students’ learning process. Accompanying with these new interventions, details of furniture design are recommended, such as “lightweight tables, wheeled chairs that permit easy reconfiguration of the room’s seating”(Brown and Long, 2006, p. 9.3).

It was claimed that design ideas lacked a holistic view about learning on the campus. In the other words, the active and social trend in designing learning space was more focus on the need of increasing more classrooms which were claimed just applying a “simple transition model” (Brown and Long, 2006, p. 9.3). It was criticized that, with the similar floor plan of the classrooms or such auditoria and lecture hall, these spaces hardly created a different idea about learning (Brown and Long, 2006, p. 9.3). In addition, this resulted in the expanding of many campuses across the UK and over the world, some of which were criticised as lacking controlling and the design might be not well referenced to the genealogy (Jameison, 2009). Therefore, it was significant to consider the development of space efficiency.

Similarly, there was more emphasis on collaboration in the learning process and the idea that “People learn from other people. If the environment limits random encounters, discourages conversation, or provide no comfortable place to sit, learning opportunities are lost” (Oblinger, 2006, p. 14.1). Therefore, many writers focused on these issues, providing the existing design with technology such as Wi-Fi, computers, white-boards and other forms to encourage students to engaging with others. Another view of this trend was the use of technology in the design to encourage the virtual

interaction such as sharing workplaces, computers, or social media. However, it argued that classrooms, libraries or lecture theatres were not the only spaces for study as it was indicated that, “If we look carefully, active, social and experimental learning happens continuously on our campuses and in the virtual spaces surrounding us” (Oblinger, 2006, p. 14.9).

As one part of this improved understanding, campus and university building design needs to give more consideration to social underpinnings of learning. Providing welcoming and flexible spaces, including informal meeting spaces should be as seen as part of support to learning through developing the wider learning landscape (Temple, 2007, p. 74).

In short, the trend of designing learning spaces focuses on active and social learning strategies has become a popular model in higher education, however, the infrastructure supports for this trend has not well established. It may result in the failure to achieve the aim of promoting activate learning as well as social learning of pedagogy theory. Therefore, more studies and considerations need to be paid to the design of new spatial types in order to achieve the real benefits for students from the active and social learning trend.

3.2.3.2 Second trend: Designing learning space focus on human

College and university space is for people – for learning, meeting, exploring, thinking or relaxing (Gee, 2006, p. 101).

As the result of the change in focus, the design of learning space also concentrated on human needs as the main priority. It was claimed that many studies on the relation between new space design and teaching and learning practice only focus on “tangible aspects of environment impact such as spatial density, light, noise, temperature, ventilation and air quality, rather than the intangible aspects of the ways both teachers and learners react, respond and use the spaces to enhance and optimise teaching and learning experiences” (Hall, 2013, p. 13). In particular, arguments in literature pointed out that much research on learning in person level such as cognitive and that paint the picture of “knowledge domain”(Lave and Wenger, 1991, p. 52); however, it noticed that these ideas hardly be seen in the practice of design learning spaces. While it was clear that person condition is important, another view suggested that:

In contrast, to insist on starting with social practice, on taking participation to be the crucial process, and on including the social world at the core of analysis only seems to eclipse the person. In reality, however, a participant in social practice-subjective as well as objective-suggests a very explicit focus on the person, but as a person in the world, as a member of a sociocultural community (Lave & Wenger, 1991, p. 52)

It was also indicated that learning spaces should provide students conditions both bodily and mentally to facilitate the learning processes. Instead of providing for the basic need of students, the focus moved to relating and supporting students in learning such as “assistance for research, computing, writing, media preparation and production, academic skills and English as a second language training” (Brown and Long, 2006, p. 9.4). Along with this, the design required more common spaces, food and drink spaces, and relocated office facilities, easy to access for students. All of these aimed to cater to human need, including personality and social requirements. Along this, Lori Gee argued that “Human centred design guidelines build on the premise that learning happens in many vary ways and that design possibilities supporting learning are equally numerous” (Gee, 2006, p.10.1).

With the main focus on human needs, Gee deployed the concepts of Judith Heerwagen regarding four main elements of productive and positive place: “cognitive effectiveness, social support, emotion functioning, and physical function”; she emphasized that, “if people are not comfortable and do not have a sense of well-being, they become distracted” (Gee, 2006, p. 10.2).

In addition, it was claimed that diverse learning and teaching style was also a key factor to consider in the design as “Our mission is not instruction but rather that of producing learning with every student by whatever means work best” (Barr and Tagg, 1995, pp. 13). It was agreed that students had their own style of learning and unique way of thinking; therefore, it was suggested that ‘space should be fluid so that it can accommodate different learning and teaching styles effortlessly’ (Gee, 2006, p. 10.3).

In this light, the Human-centred design approach also suggested that the design process should include the participation from the variety of the users, such as student, staff and teachers. In particular, it proposed that “the trends toward a more human-centred design required that the people who teach and learn in the built space remain engagement throughout the process, ensuring that effective teaching and learning remains focus” (Brown and Long, 2006, p. 9.7). In addition, there is a recommendation that “Building classroom spaces without a defined client base result in the design that meets no one’s needs optimally”(Brown and Long, 2006, p. 9.6).

Human centred design helps us keep people – not the latest technology – in the forefront of design decisions“ and “learning environment should be developed by those who will use them. (Brown and Long, 2006, p. 9.5-9.10)

3.2.3.3 Third trend: Designing learning space to focus on technology

New environments for learning are being designed or reshaped in response to changing pedagogical styles, to incorporate new information technology, and to allow for changing numbers and abilities of learners (Marmot, 2008, p. 6).

It is claimed that integrating new technology has been used as the main guide in many intuitions around the world, and Australia is a prime example (Jameison et al., 2000). Jameison also demonstrated that there are two approaches to design with technology on the campus. The first approach is redesigning the existing space, which integrates the new technology such as new computer for the lab; whiteboard is replaced by screen. The second approach, designing new space lead by architects who assume the needs of teacher and student. It is claimed that the two approaches would lead to failed outcomes (Jameison et al., 2000). This is due to many difficulties that architects have to face, such as the negotiating assumptions about pedagogy, users and project managers. Furthermore, there are many difficult conditions in the process of designing, such as “restricted budget, increasingly complex building code, regulatory requirements, and tight time frames” (Jamieson *et al.*, 2000, p. 6).

Brown and Lippincott (2003) argued that design for new learning spaces must be changed, referring to the change in information technology which allows learning to be formed in a variety of activities. Sharing the same idea, Lomas, Chris Johnson and Cyprien (2005, p. 16) described how: “As students become increasingly digitally literate, higher education also need to be concerned about the creation and support of virtual learning spaces”. Furthermore, it emphasized aspects: “First, as we sketched, we must think in term of variety of both real and virtual learning spaces. Once we widen our purview to include virtual spaces, then the second shift in thinking becomes clear: we must think about all support needed to make these learning spaces successful” (Brown and Lippincott, 2003, p. 14) (Lippincott, 2003, p. 14). Temple (2007, p. 53) indicates that “this shift to computer screens it is possible claim, is already a shift of knowledge, learning and human engagement”.

As the result of this, the practice of designing learning space changed vastly. For example, the presence of laptops, screens and other devices can be found in many innovative learning classrooms. Although the effect of technology on the students learning process is clearly perceived, it is argued that there is need to consider the impact of this on students’ recognition. It is argued that “architecture of complexity” (but not architecture of confusion) can encourage “new ideas and creations” (Temple, 2007, p. 74). However, there should be a clear recommendation of which kind of

technology, and research to evaluate its effects on students, before constructive application to university settings; the implementation of technology in the design must be guided by learning theory (Brown and Long, 2006, p. 9.10).

Although the technology designing trend could benefit some aspects, it is criticised for not covering the whole picture of the new environment. In particular, Jamieson (2005) indicates that too much technology in learning space could lead to the confusion for the users and bring drawbacks in terms of design. Mehuish (2010) also showed that there was limited effectiveness when the space contained overcomplicated technology. In particular, the study indicated that “technology, which could be seen as the *raison d’être* of the new spaces, had the potential to hijack the ethical model around teaching and learning that new spaces were designed to promote” (Mehuish, 2010, p.5). Similarly, the trend of using devices that enriched learning could have benefits in the short term; however, it is not all the only thing that design can provide and focus on this does not distinguish the higher education setting from other spaces, such as the workplace (Brown and Long, 2006).

3.2.3.4 Rethinking design trends

The discussion of the three recent design trends has shown that there have been some advantages and drawbacks to each approach. Although active learning has been the main scheme in education research recently, it has been argued that more studies on the link between interactive learning activities and physical design spaces is needed. In addition, it is also necessary to consider social learning as significantly important to students’ experience; and, the social aspect must be understood in terms of the relationship with people in the real world – social learning space should be looked at in relation to the whole campus. Secondly, it is argued that human-centred approaches may be the most important factor of the design process; to some extent, studies on this have to consider the social factors around people. In contrast, while technology may have a direct influence on student learning, there may also be some underpinning drawbacks, which need more empirical evaluating research.

.. any serious re-thinking of the architecture of post compulsory education needs to engage with the planning and resource-effectiveness of learning spaces, not just as an additional issue, but as something central to how space work. (Boys, 2011, p. 49).

3.3 The design principles of learning spaces

It can be seen from the design trends discussed in section 3.2.3 that there are newly emerging principles and philosophies of design. However, few of them are based on empirical investigation. In addition, changes in higher education have been guided by the unclear notions and most empirical research is focused on the school sectors. Thus, many suggested frameworks can be criticized just based on assumptions made about the learning process and lack of evaluating evidence (Boys, 2015). In detail, some aspects were not clearly related to the design and theory in practice. A synthesis of these design principles is presented in Table 3.2.

Table 3.2: The Design frameworks for individual learning spaces

(Colour code: Interaction, Flexibility, Activities, Technology, Human factor,)

Author/ project	Design principle	Methodology/ approach	Category of spaces
Jamieson et al (2000)	-Space for multiple uses -Maximise the inherent flexibility -Make use of the vertical dimension -Integrate previously discrete campus functions -Feature and function to maximized user control -Maximise align for different curricular activities -Maximise student access and ownership	Design approach Student centre approach	Learning space/ classroom
Obliger (2005)	-Designing learning space around people -Support multiple types of learning activities -Enabling connections, inside and outside -Make space flexible -Accommodating information technology -Design for comfort, safety and functionality -Reflection of institutional values	Theory Student centre approach	Learning spaces
JISC (2006)	-Flexible – to accommodate both current and evolving pedagogies -Future-proofed – to enable space to be re-allocated and reconfigured -Bold – to look beyond tried and tested technologies and pedagogies -Creative – to energise and inspire learners and tutors -Supportive – to develop the potential of all learners -Enterprising – to make each space capable of supporting different purposes	Design approach Student centre approach	Learning space/ classroom
Lori Gee (2006)	-Healthful -Stimulating -Balancing community and solitude -Adaptable	Design approach Human centred	Learning spaces/ classroom
Melhuish (2011b)	Symbolic role of space: Visibility, Exclusivity, Interface Functional role of space: Flexibility, Interactivity, Regulation	Qualitative/ Ethnographic -Observation -Sensory video -Interview -Focus group	Innovative spaces
Harrop and Turpin (Harrop and Turpin, 2013)	-Destination -Identity -Conversations -Community -Retreat -Timely -Human factor -Resources -Refreshment	Observational sweeps Coordinate and photographic mapping	Informal learning spaces

Although there was some difference in the terminology used and the focus of categories, there were many similar aspects: interaction, activities, flexibility, the human factor and technology were found to be the five key ideas underpinning these frameworks, which will be discussed below.

3.3.1 Interaction ●

To begin with, scholars seem to agree that the design of learning spaces should maximise the interaction among students in the form of conversation (A. Kolb and Kolb, 2005; Oblinger, 2005; Melhuish, 2011b; Harrop and Turpin, 2013). They also emphasize the relationship between students and their knowledge communities (Harrop and Turpin, 2013). Therefore, it is argued that interactions have to be understood in a deeper sense and both among students and other students in their community. However, it is argued that spaces should strike a balance between community and solitude (Gee, 2006). These factors are not well discussed in the literature and it is not clear how interaction can be improved at the scale of campus planning. Therefore, it requires more studies.

3.3.2 Flexibility ●

Next, another dominant theme is that learning spaces need to be designed as flexible and multi-functional (JISC, 2006; Oblinger, 2005; Jameison, 2000; Melhuish, 2011). It is suggested that the design of the learning environment should allow various activities to happen. In addition, it emphasises breaking down the boundaries between different users and maximising the utilising of the spaces (Oblinger, 2005). However, it is noted that space identity also needs to be considered. Furthermore, how the flexibility may link to the learning process is not well explained, which could become a metaphor issue to the design.

3.3.3 Technology ●

The third issue is the space should accommodate information technology, which can be found in a number of the frameworks in the research domain such as the work of Jamieson (2000), Oblinger (2005) and JISC (2006). In these frameworks, it is recommended that learning spaces provide information technology such as wireless, or allow the use of laptops, PDAs and other electronic devices and the use of social media such as web, streaming or simulation. This idea incorporates effective learning tools into university spaces. For example, a computer area in a café space, corridor, or hubs which allow for a physical and virtual learning experience. However, the impact

of technology and the virtual environment should be considered, as it could be a distraction to students (Graetz and Michael J. Goliber, 2006).

3.3.4 Activities ●

Supporting multiple types of learning activities is another important aspect. This emphasises the need for social activities; space should be able to hold functional activities and encourage social activities. However, it seems that the practice of design could not accommodate all activities in one space. Therefore, it needs to be clearly defined what activities in campus spaces constitute. Oblinger's framework suggested using walls for exhibition, hallways as informal discussion spaces, or having blackboards installed in the lobbies to encourage the "think stop" or brainstorming (Oblinger, 2005). These are common features in university spaces nowadays. While this idea should be successful in some circumstances, like an informal learning zone in the library, it may not be applicable to the others. It is argued that the key is a relationship between spatial elements and activities; for example, if the spaces fail to invite people to stay, these features of interior design, such as blackboards and wall exhibitions, would not be useful. Therefore, there is the need for more understanding of intangible aspects, which will affect how people feel in spaces.

3.3.5 Human factor ●

Next, functionality is a theme shared between Oblinger (2005), Jamieson et al. (2000) and Gee (2006). At the micro-scale, Oblinger (2005) suggested that the users should have enough space for laptops and elbows. Furthermore, the functional aspect refers to the wider context of use; it is indicated that "beyond the holding class, space for storage may be important – for example, backpacks and coats for student or supplies for faculty" (Oblinger, 2005, p. 6). Accessibility is also emphasised for students with disability considerations. From a different viewpoint, it is argued that the form of mixed functions, such as food and drink or communal areas may generate more interaction compared with the separation form (Jamieson *et al.*, 2000). Furthermore, it is indicated that refreshments such as foods and drinks play a significant role in focusing learners on their studies (Harrop and Turpin, 2013). This is also an issue of comfort and convenience. Cafés and food spaces are a common theme in library and informal learning zones, however, it is argued that designed space should not over-depend on them (Harrop and Turpin, 2013).

In contrast, some less common but still considerable factors need to be discuss. For example, safety and security, identity and temporality are also essential aspects in

attracting students and maintaining the level of occupation in a space; other scholars may not focus on these. Another factor is ‘enabl[ing] connection, inside and outside’, one of Oblinger’s principles. It is suggested that the design should extend to external space and beyond to the connective space such as ways, arcades, cloisters and verandas which may be turned over to a valuable transitional informal learning realms (Jamieson *et al.*, 2000). These ideas emphasize the need for connectivity, which is key to good use of learning space in term of ecology.

3.4 Design framework in campus scale/place design framework

With a different scale to the above, studies have tried to build a framework for the overall campus and learning environment, such as Educating by Design (Strange and Banning, 2001), Design with Distinction (CABE), and Re-sharpening our learning landscape (Neary *et al.*, 2010). The common features of these frameworks are considering the campus as the whole environment for learning. The studies have some shared characteristics.

Table 3.3: Design framework of the campus

Author/ project	Design principle	Methodology/ approach	Category of spaces
Strange and Banning (2001)	-Community: become fully a member -Involvement: Participation, engagement, role making -Inclusion and Safety: sense of belonging	Theory/learning community approach	Campus spaces
Design With Distinction CABE (2005)	-Recruitment: cosmetic environment structure and functional features -Retention: external view; structure and functional feature; size, proportion and openness -Performance: motivation, interests, facilities	Literature review -Research design (profile) -Qualitative: interview, focus group, observation, photographs and images -Quantitative: questionnaire	Campus spaces
Prakash Nair and Annalise Gehling (Nair and Gehling, 2010)	Marketplace: thoroughfare; meeting place Character: productive; safe; inviting	Theory approach/urban design	Corridors, classroom and formal learning; indoor and outdoor public spaces in the school
Neary (2010) -Learning landscape	Expression: identity and branding; condition and maintenance Efficiency: Circulation permeability; Flexibility Effectiveness: way finding and orientation; effective use; security	Theory and research approach (qualitative research)	Campus spaces

3.4.1 Educating by Design

Strange and Banning (2001) developed a framework of designing the campus by relating space to theories of community learning. They argued that physical environment can be seen as the third teacher, which can help to shape the learning process. They emphasized the purpose of the learning environment: “environmental safety and inclusion, a structure for involvement, and conditions of the community” (Strange and Banning, 2001, p. 107).



Figure 3.1: A Hierarchy of Learning Environment Purpose (Strange and Banning, 2001)

In detail, it was suggested that the campus environment should begin by creating an inclusive, safe and secure environment for students (Strange and Banning, 2001). Secondly, as the main point of education is to engage students in the process of taking risk and dealing with challenge (Sanford 1966), campus needed to attract student involvement in effective learning experience. The last powerful characteristic of the environment is building a community of learners. The success of communities is assessed by three elements: “commitment to community, sense of empowerment and sense that one matters to others within the community” (Strange and Banning, 2001, p. 163). Although Strange and Banning drawn on many detailed characteristics of the physical environment, it can be argued that these characteristics lack empirical evidence for the effects they have in practice.

3.4.2 Design with distinction

In regard to the architectural perspective, an important report ‘Design with Distinction’ by CABE (2005) investigated the impact of new design on recruitment, retention and performance of staff and students in five institutions. Using both qualitative and quantitative method with questionnaire and interview, the report drew

up a valuable link between design environment and user satisfaction and suggests some important factors that design should focus on.

In detail, the recruitment referred to all the factors that would affect on the choice of students and staff before participating in different institutions. On the other hand, the retention reflected of the decision to stay or leave university by staff. For students, retention was defined as “the maintenance of student’s satisfactory progress toward their educational objectives until the objectives are attained” (CABE, 2005, p.30). Although students’ retention was important to the university reputation as well as economic goals, it argued for a relationship between overall course retention and space may not be well defined. The third aspect was examined by the performance; however, performance may not be well understood by students. The report was based on surveys, which asked staff and students to indicate whether the design of buildings would impact their performance.

Overall, the key factors for the recruitment and retention of both staff and students are: situation, structural and functional; and cosmetic and environment. In other words, academic, social aspects and facilities were the main criteria for student and staff performance. In addition, the findings of this research pointed out that, along with the traditional aspects such as function and cost, the cosmetic and environment features of buildings required more attention in the design process. These findings were supported by literature which argued that “good quality higher education cannot be supported without good environment” (Edwards, 2000, p. 48). Furthermore, it indicated that students were affected mostly by design features, such as size, proportion, openness, external view, and external surroundings. It illustrated that the design quality of the building contributed to the positive experience of students regarding their institutions; however, whether design quality effects student’s activities and how it contributes to their learning process remain unclear in this research.

3.4.3 Life between classrooms

Taking the urban design perspective, mainly based on the theory of Jan Gehl about social life in public space, Nair and Gehling (2010) emphasized that campuses may share similar characteristics with public places such as the marketplace, thoroughfare and the meeting place. In further detail, the marketplace refers to the place where performed transactions happen. Like shops and stalls in public city, these spaces could be learning studios, lecture theatres, cafés and other spatial facilities (Nair and

Gehling, 2010). In the campus, thoroughfare can be defined as spaces that encourage people to move by foot or bike to access other facilities. It suggested that the thoroughfare spaces, such as a corridor, can be an interesting in terms of generating transaction or as a place for meeting and interaction (Nair and Gehling, 2010). The last category is the meeting place, which was defined as a space to encourage people to stop and talk with others. With the campus, it is suggested that the most heavily used pedestrian route should be identified and marketplaces and meeting places should be added around them. In this framework, the meeting place seemed easy to create; however, it requires the right furniture, such as chairs, tables, materials and views to engage with users in a similar way to shops engaging customers.

Through this discussion, it has been argued that public spaces are significant to the success of campuses and they should include the characteristics of being productive, safe and inviting. However, there needs to be more discussion of the specific design aspects of these places.

3.4.4 Learning landscape qualitative analysis

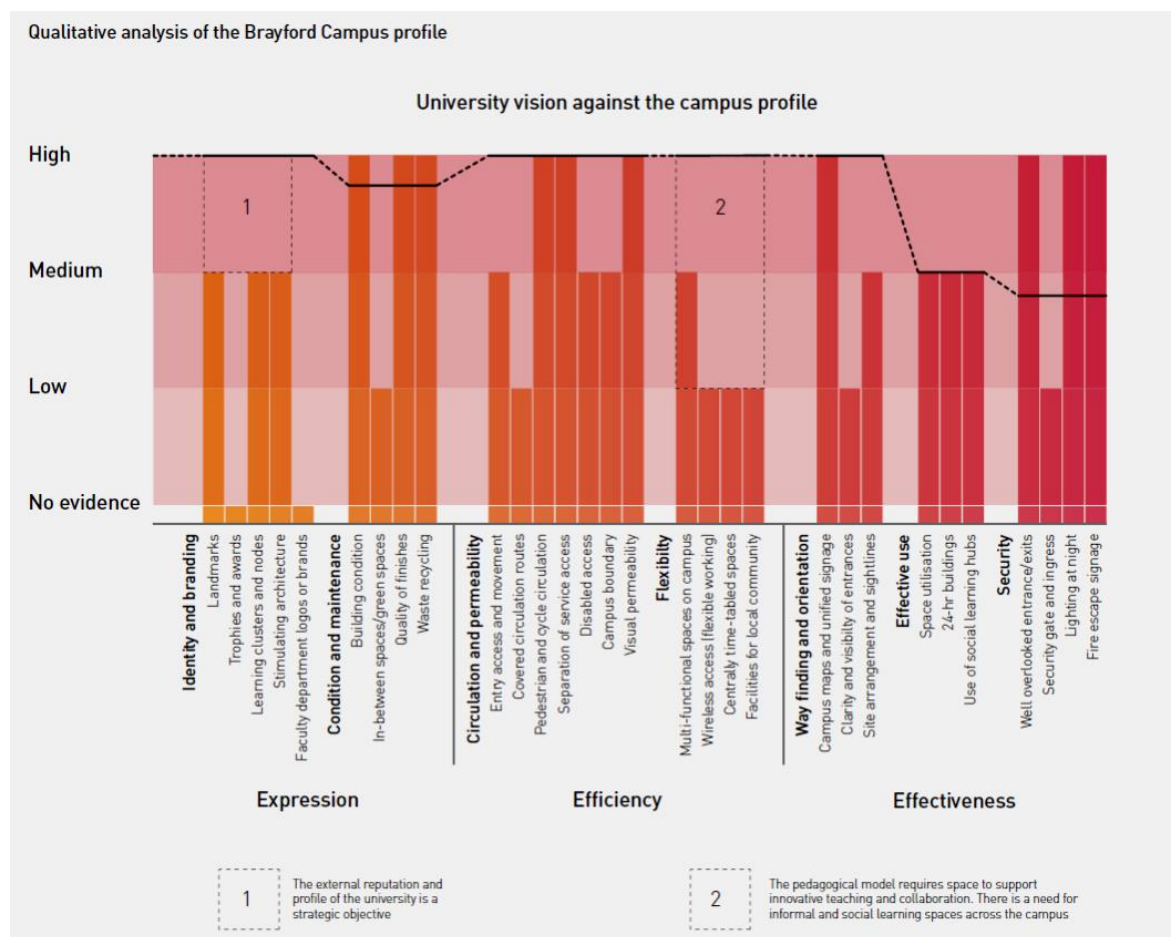


Figure 3.2: An example of learning landscape profile (Neary *et al.*, 2010, p. 10)

Based on the idea of learning landscape, the Learning Landscapes in Higher Education report has raised concerns about scale or special design in campus environments. It also focused on a link between separate learning and teaching spaces with regard to the whole campus structure. Neary et al. (2010) proposed the quality analysis of a campus profile based on three main criteria: expression, efficiency and effectiveness. The first aspect, “expression”, is examined by identity and branding, which can be captured by design aspects such as landmarks, trophies and awards, learning clusters and nodes, stimulating architecture and faculty department logos and brands. It also encompasses condition and maintenance, which includes building condition, in-between spaces, quality of finish and waste recycling. It is indicated that there is no evidential support for the idea that trophies and awards or faculty department logos and brand affect the expression of a campus. In addition, there is no clear explanation of how “stimulating architecture” can be defined. It was agreed by scholars that the condition, maintenance and finish of buildings are significant factors; however, it was argued that waste recycling was less important than the in-between spaces or greenery, which contradicted the result of this analysis.

Secondly, the efficiency criterion is examined in term of circulation and permeability, which cover entry access and movement, circulation routes, pedestrian cycle circulation, disabled access, campus boundaries and visual permeability. Another factor contributing to campus efficiency is flexibility, which is defined by multi-functional spaces on campus, wireless access, centrally timetabled spaces and facility for the local community. It is argued that access and movement and visual permeability directly affect the use of the campus; however there is no clear evidence regarding how these aspects link to campus satisfaction.

The last remaining aspect is effectiveness, which can be assessed in terms of finding one’s way, orientation, ‘effective use’, and ‘security’. The role of way finding and orientation are likely to show in the form of legibility (Strange and Banning, 2001), or in the micro-scale of innovative learning space in the concept of visibility perception (Melhuish, 2011b). Security was also an important factor affecting the time spent and the sense of belonging (Strange and Banning, 2001; Oblinger, 2005; Boys, 2011) . However, in this report, there is not a clear description of how these aspects can be expressed through design.

Overall, Neary et. al (2010) gave insight to the campus as the whole, rather than each individual learning space and has introduced the question of how to think holistically about campus design. The report also emphasized the importance of developing a

framework to analyse and guide the design of the learning landscape in higher education. However, the framework proposed may not be practical as there was not a clear description of what the framework criteria are and how these criteria link to the positive effects on the student learning process. While the learning landscape qualitative profile is a useful tool to evaluate campus expression, efficiency and effectiveness, how these factors link to the student learning process was not well explained in the report. Furthermore, there was not a clear method of how to evaluate these design features in practice. Therefore, sharing some agreements with this framework as the overall concept, more studies are required to specify the design factors that correlate to learning process in student daily life in university environment.

3.5 Social learning spaces

3.5.1 Social learning space - the new concept for higher education

Just as recent building designs for post compulsory education have been surprisingly little informed by contemporary architecture theories, so much of the assumed importance of moving from formal to informal learning spaces has little direct connection with current education theories (Boys, 2011, p. 37).

The concept of learning space in higher education has been changed to the ‘idea of learning place’. In this scenario, it was noticed that social learning spaces had become a comprehensive form of various learning activities and potentially fostered many different learning interactions, both in terms of physical and mental states. Set amongst the traditional learning spaces such as the classroom or lecture theatre, additional social learning space nowadays plays a key role in students’ daily experience on the campus. While learning theory already insisted on the role of social interaction in learning process, especially in higher education, interaction also generates a of sense belonging and community connection. Social learning spaces were initially defined as the places where dialogue and debate could occur in informal and less bounded settings (Savin-Baden, 2008). However, by extension they were defined as “areas of the campus spacious enough to accommodate large groups of individuals interacting informally for academic, social, and personal purposes; often several of these purposes are combined, for example, sharing a pizza while discussing studies and social activities or a group study session involving focused participant interaction” (Kenney, 2005, p. 15). Spaces available for students to gather in this way typically include central buildings (for example libraries), lobbies and entrance spaces, cafes and dedicated group work spaces; these spaces are an increasingly important element of university campus planning and estate management. As learning has changed and students access learning materials online whenever and wherever they want, social learning spaces have become even more significant as spaces for gathering and accommodating learning activities. It was noticed by Boys (2015, p.95):

The development of innovative types of learning- more interactive, informal and social- is challenging a conventional lecture theatre, seminar room and specialist lab arrangement. New technologies are interacting with physical space to suggest different kinds of blended and hybrid relationships.[...] This suggests that what is needed is both a better understanding of what matters about space for learning and the development of a more diverse range of actual spaces in higher education which produce an efficient and flexible match across formal, informal, social and specialist requirement.

However, limited research has been undertaken to evaluate the effectiveness of the design of these spaces, meaning that although such spaces are being designed for student use there is little evidence to suggest whether the qualities of those designs are truly contributing to improving the student experience. It also claimed that there is little understanding of how learning outcomes may be changed by the design of learning spaces in higher education (Harrison and Hutton, 2014). In short, there is a lack of evaluation about how new design influences students learning experience.

3.5.2 The architecture of social learning spaces

Although the debate about new types of learning environment remained unclear, a number of these are being constructed worldwide due to its demands. A number of architecture examples were found on the campus. They were promoted as landmark educational buildings, while it indicated that the design of these may generally refer to office design (Boys, 2015). Swanston Academic Building, RMIT University, Melbourne, Australia (Figure 3.3) or Melbourne School of Design, Melbourne University, Australia are the examples. It criticises that the applying of “what might be called a ‘corporate aesthetic-linked to shifts in contemporary office design or to continuity with primary and secondary school; environments, through bright colours and novelty features” to these designs reflected the unfruitful thoughts of design qualities (Boys, 2015, p.103). The design of these spaces could not distinct the characteristics of higher education to other architecture and express the innovative value of institutions.



Figure 3.3: Swanston Academic Building, RMIT University, Melbourne, Australia (Boys,2015,p.96)

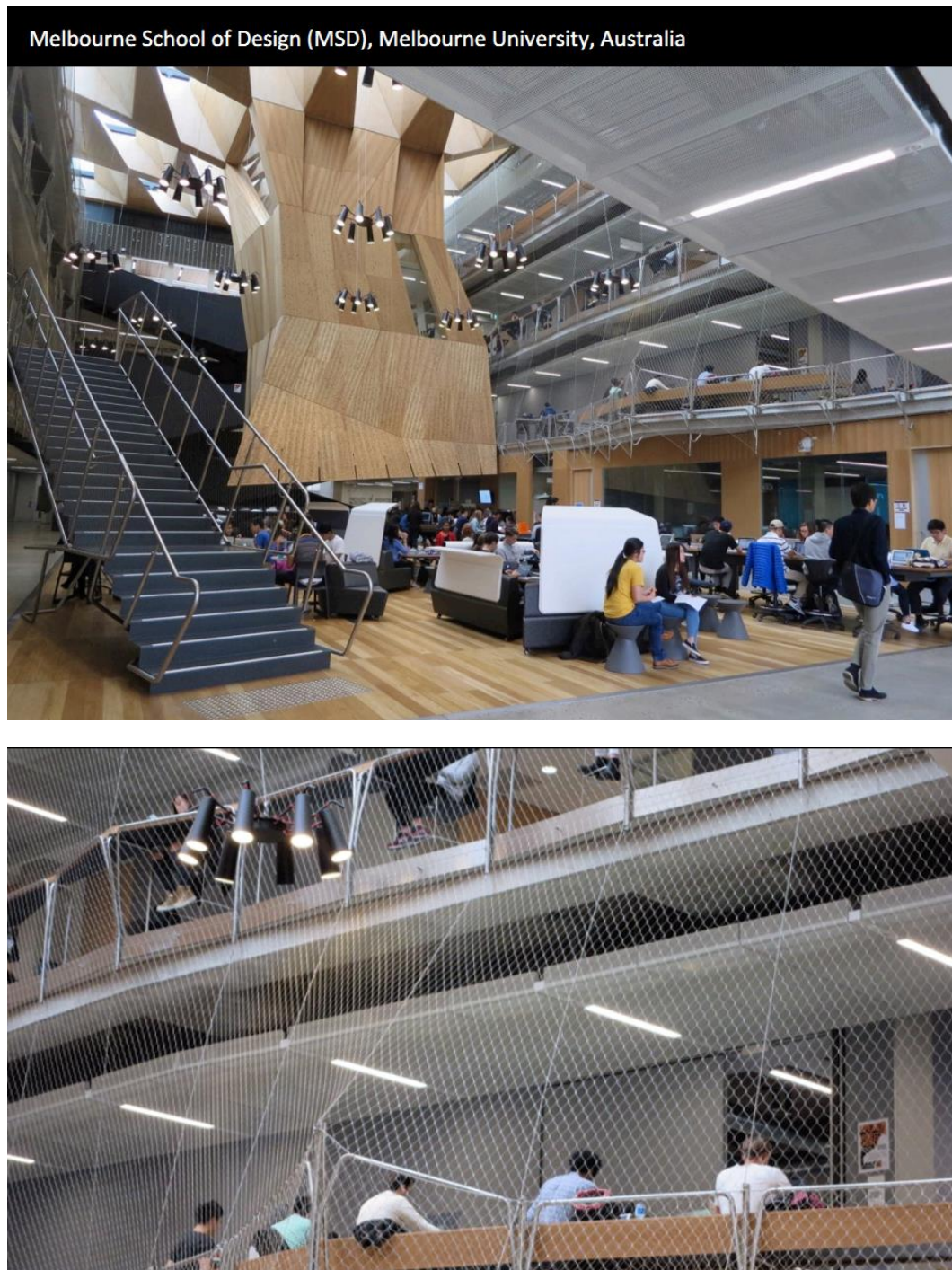


Figure 3.4 Melbourne School of Design, Melbourne University, Australia (Boys, 2015,p)

Some other example was indicated the application of ‘fashion’ concept or ‘un-clear’ design framework would result to the feel of ‘childish’ or ‘unsatisfactory’ as in the new innovative learning space of Brighton University Figure 3.5 (Melhuish, 2010).



Figure 3.5: University of Brighton -the Centre for Excellence in Teaching and Learning in design (Melhuish, 2010)

Although university has been investing to promote the interaction between students. This concept is becoming popular for theme some new innovative spaces in higher education. However, without undertaking relevant research and empirical evidences, there is still many remain issues in these. A typical example would be Social Learning , International and Postgraduate Student Centre, Queen's University Belfast. While this project seeks to reuse of existing structure promotes social learning as well as 'improved energy use', there is an unclear connection to how this space could engage with students learning. It could only give an impression of library settings in a renovation structure (Figure 3.6).

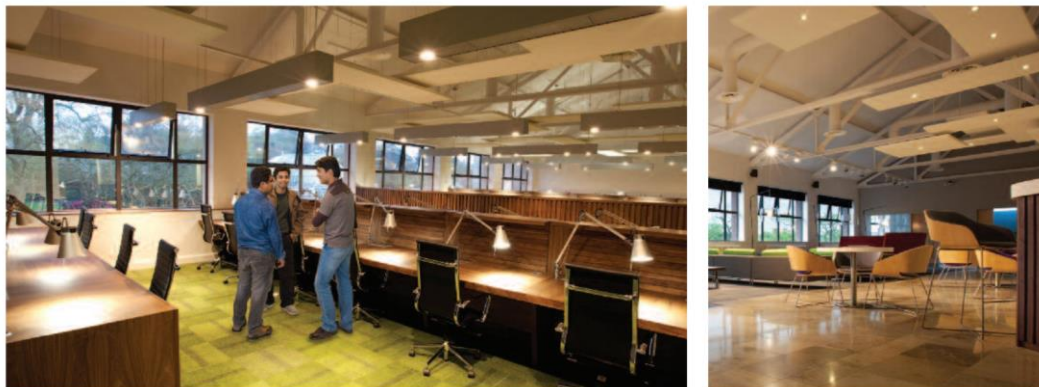


Figure 3.6: Social Learning , International and Postgraduate Student Centre, Queen's University Belfast (RIBA, 2011, p. 9)

On the contrary, there were a few projects that try to start from educational aspects rather than just only adapted from general design trends. One example is Solna Campus, Karolinska, Stockholm , Sweden where the educational aspects are the focus points of design intention. This is an example of how renovative projects make an impact on students' perception about learning spaces that university offers to them.

“We tried early in the project to create unique and memorable features for specific places, like the ‘cottages’ in one of the linking corridors at our campus in Solna”(Nordquist, Kitto and Reeves, 2013, p. 27).



Figure 3.7: Solna Campus, Karolinska, Stockholm, Sweden (Nordquist, Kitto and Reeves, 2013, p. 26)

Overall, through above examples, it confirms that university and college, nowadays, has been seeking for many new learning space designs which more focus on social interaction. Social learning spaces have been vastly developing in many campuses; however, without considering relevant research and evidence base, many of those are inefficient. As buildings are costly and the source funding have been limited, universities should have efficient strategy to develop and manage their spaces to make

sure those will add appropriate value to their mission of teaching and learning. As Boys (2015) discussed:

Creating Buildings with strong visual presence that promote a contemporary identify for a university or college, we also need to have a better understanding of how space and technologies interact with students (and faculty). This is in terms of effective learning, teaching, and research and in relation to well-being, belonging, and engagement-spaces(whether physical or virtual) that help keep students on campus, immersed and supported their studies.(Boys, 2015, p. 124)

Therefore, more empirical research needs to ensure new design of social learning spaces will enrich students' experiences.

3.6 Discussion

This chapter provided definitions for the university campus and followed this by describing the kinds of learning spaces and the design principles underpinning them. Key criteria for designing social learning spaces, and design frameworks for the campus as a whole, were identified. The literature reveals a transformation of learning space and campus design in higher education over time. As the definition of the traditional university has been modified, it was shown that the physical form of campuses also transformed to adapt with new missions. In the last century, learning spaces in higher education has been a significant concern of scholars. There has been evolution from a focus on space to the concept of place. This leads to three main design trends as designing learning for active and social learning strategies, Designing learning space to centre humans and Designing learning space to focus on technology and five main design principles; interaction, activities, flexibility, the human factor, and technology. From the large scale of campus planning, some main design frameworks have been suggested to encourage activities, learning and community. Consequently, social learning has become a new form of education which could potentially contribute to the success of the campus in the future.

Within this context, there is a need for more research from both designers and educational practitioners to accommodate changing understanding of the purpose of higher education. In fact, although the research on learning spaces has noticed significant changes in theory, it has been noted that design of learning environments are not well informed. Neary (2011) has pointed out that there is a gap between academics knowledge and designing practice: "Academic writing on space and

spatiality has not been used to inform the design of pedagogic spaces” (Neary and Saunders, 2011, p. 349). Boys (2011) also claimed that many new designs can be exciting and attractive to students, but this is not reflected in any “conceptual framework, appropriate research methods or strategic critique to be developed” (Boys, 2011, p. 5). Furthermore, Neary (2011) indicates “the process of the design and development of teaching spaces needs to be about much more than the shape of classroom and laboratories and the kinds of furniture and technology that are put into them” (Neary and Saunders, 2011, pp. 350–351).

From the above discussion, if the whole campus has the potential to become a learning space (Bennett, 2007b), designers need to take a different approach and need new frameworks to evaluate these spaces. This requires critical thinking about how design could accommodate the learning process on the campus. Social learning spaces should be a key research topic, which needs more focus as its role in both student learning process as well as a university connection point to the creation of harmony and coherence in the learning landscape. Therefore, as claimed by Temple:

Further research is needed on the uses of social spaces in supporting learning, and how they may be most effectively provided. The role that space plays in the dynamics of creating productive higher education communities is not well understood, and needs further study (Temple, 2007, p. 8).

The case studies that follow undertake such study. Before looking at case study, however, the next chapter reviews literature relating to perception of space and design qualities in general, which is needed to understand perception of social learning space, in particular.

Chapter 4 :

DESIGN QUALITY AND PERCEPTION OF DESIGN QUALITY

People want to be in places that feel good to them. They prefer nicely appointed places with beautiful views rather than adequate but uninteresting places. Further, people want to feel good about the physical places they are affiliated with: their home, their workplace, sometimes their city and state. Why should it be any different on campus? (Kenney, 2005, p. 5).

Design quality and perception of design quality are a significant concern for designers, to ensure their projects will satisfy clients and users as well as gain them high recognition in terms of the value that design offers to society. It has been indicated that “Higher education has little experience in posing design questions about the learning behaviours it may want to encourage, and we are sceptical of claims that architectural design can directly affect specific learning behaviours” (Bennett, 2007b, p. 15). Therefore, it is worth examining the link between design and behaviour. In particular, this chapter will reflect on what is meant by design quality, its attributes and its effects on the users. Next, the chapter will review the theory on perception of spaces and spatial experience in the higher education environment. Then, by synthesis and comparison of different qualities of public spaces in urban design as well as from an educational perspective, this chapter will bring together the theoretical design qualities that may be significant to guide the design of learning spaces. Lastly, it will discuss contemporary procedures for evaluating the design of learning spaces to establish the ground for the methods that will be applied in this study.

4.1 Design quality

Design quality is an issue that has attracted much debate within architectural discourse. In 1998, the new trend of measuring building performance followed the publication of *Rethinking Construction in the UK* (Gann *et al.*, 2003). According to these arguments, there had been limited understanding and measurement of design quality, meaning: “a new generation of buildings might be produced where emphasis on measuring and reducing time, cost and waste in the process would lead to a loss of functionality and boring, unattractive building design” (Gann *et al.*, 2003, p. 319). While the existing problem of defining the ‘value’ of the design was unsolved and the question of “what was meant by good design?” was still unclear to many scholars (Loe, 2000), the quality of building design and how to measure the quality became a significant concern in public sector. Kenney writes:

Good design is not merely how a building looks, it is an innovative and creative process that delivers value. Design provides value by delivering good buildings that suit their purpose and places that enhance the quality of our lives(2005, p. 20).

A study on the value of good design, undertaken by CABE (2002, p.2) confirmed that “How the built environment looks and feels” has become increasingly important to users. It also indicated that “85% of people agreed with the statement: ‘better quality buildings and public spaces improve the quality of people’s lives’ and thought that the quality of the built environment made a difference to the way they felt” (CABE, 2002, p.2). The majority of respondents in the CABE study believed that a well-designed environment has “positive influences on the quality of daily life, professional productivity, educational attainment, physical well-being, levels of crime and house values” (CABE, 2002, p.3).

This led to a number of design guides and frameworks, developed to articulate and evaluate the value of design quality (Cabe-Detr, 2000; Cabe, 2003) . However, it was acknowledged that:

Measuring the quality of design poses major conceptual and practical problems. Some attributes of buildings have physical parameters – such as the level of light in a room, measured in lux; others are more perceptual and subjective – such as the feeling of warmth emanating from a particular heat source. Designers of buildings have long been interested in the overall value added through their efforts and the legacy of design decisions on future generations of users [...] The challenge was to develop a method for understanding the value of buildings in relation to their design for different uses and in meeting a wide variety of physical, aspirational and emotional needs of occupiers and users (Gann *et al.*, 2003, p. 320).

Therefore, measuring design quality has been a challenging for researchers. It has been indicated that design quality consisted of both objective and subjective components; therefore, it was hard to quantify and capture (Gann *et al.*, 2003). It was highlighted that understanding the views of users, such as whether spaces could satisfy requirements and what users' thoughts or feelings were as they interacted with the buildings, were significant for the designer. However, answers would be dissimilar or conflict depending on individual differences and type of user group. As the result of this, while many new approaches and indicators were developed, such as PROBE (The Post-Occupancy Review of Buildings and their Engineering), Housing Quality Indicator or BREEAM (Building Research Establishment Environmental Assessment Method), there were still many disagreements about how to present and apply these tools in design work and decision making.

In addition, there was no indicator for education buildings, despite the vast change in term of types of spaces developed. Therefore, it also required more studies applied to different users group and diverse type of environments, especially in higher education where many changes had recently occurred. In the other words, it was indicated that some evaluation methods avoided measuring intangible attributes which were difficult to capture and interpret. It was recommended that:

Rather than avoiding intangible attributes, the research team sought to find a way of capturing viewpoints on them in order to extend the dialogue about design quality in buildings. The viewpoints captured may reveal different and conflicting understandings of design, which can then be discussed. This has the potential to uncover information that is hitherto lost in future design iterations and this attribute provides one of the dimensions to our concept of a 'tool for thinking' (Gann *et al.*, 2003, p. 322).

Furthermore, it emphasized the need of common language to capture and explain the results, as many evaluations were only available and understandable to the expert community.

In short, while design quality is very hard to measure, it brings enormous value to design projects. The result of this measurement may contain conflicting views from different user groups. However, these conflicts may hold the potential to provide new information for designers; Simon (1962) writes that "good design often resulted from complex and uncertain starting points". Furthermore, Vincenti noted that the design process was "often evolutionary and non-linear, involving interdisciplinary approaches" (Vincenti, 1990). Scholars began to believe that design quality should be the result of "iterative cycles of cumulative development, where 'satisficing' decisions are acceptable, rather than optimal results" (Gann *et al.*, 2003, p. 320).

4.2 Perception of space and spatial experience

As the discussion above, capturing perception of space or user's feelings when they interact with the building are important to designers. Perception of space has had multiple meanings in psychological and architectural studies. While people may perceive the environment in different ways depending on individual personality (Lévy-Leboyer, 1982), it was confirmed that the perception of environment influenced a certain degree of human behaviour. Kenney (2005, p. 54) emphasized that "the physical environment has a major impact on human feelings, behaviour, interaction, engagement, and community". While the literature has limited studies specific to campus learning spaces, it has been indicated that:

Common sense and experience suggest that when the physical environment of the campus, building, or classroom, supports desired behaviour, better outcomes result. From the behaviour setting point of view, campus design and spaces do not merely create a functional space, mood, or atmosphere; they facilitate certain behaviours (Strange and Banning, 2001, p. 20).

Although the question of how the environment influences human experience from the architectural viewpoint still attracts studies, the current literature indicates three key approaches to understand the nature of these effects: architecture determinism, possibilism and probabilism (Strange and Banning, 2001).

Firstly, architecture determinism suggests there is a direct and casual link between behaviour and physical environment (Ellen, 1982); such as, people move in certain directions as result of limited access from the building. However, the physical aspects of the campus environment may offer many other nonverbal or implied messages to students. For example, 'welcome' banners would give an 'unwelcome' message to students and their families if they were sited in a hard-to-see location. Therefore, it was argued that architectural determinism gave simple and unreasonable views on the complex relationship between human and environment, as it did not account for the presence of the other factors such as users or activities which would affect perception in real, physical spaces (Strange and Banning, 2001).

By contrast, possibilism believed that physical environment was a "source of opportunities that may set limits on, but not restrict, behaviour" (Strange and Banning, 2001, p. 13). For instance, if the employability service was located on the second floor, far from where students gather, it would limit the number of times that students visit this service. The third position is architectural probabilism. It indicated that the probability of certain behaviours would be increased or decreased by the built environment. For example, by the design features of the environment such as layout,

location and facility or space arrangement, the spaces will render some behaviour more likely than the others. It does not mean all people in this spaces would do the same thing or have the same response to the environment though, as people may perceive and respond to the verbal and nonverbal messages from the environment differently. However, it is supposed that some behaviours or activities may happen more often than the others as result of the environmental influence.

While it is noted that “different campus present themselves differently and different people perceive even the same campus in a different way” (Kenney, 2005, p.78), Strange and Banner (2002) support the view that well-designed physical learning environments may not determine users’ behaviour, but may offer “many possibilities for human responses, rendering some behaviours more probable than the others” and “it is the nature of this influence to be both functional and symbolic” (Strange and Banner, 2002, p. 13).

Similarly, Kenney emphasizes that learning environments have to create “a good first impression and ongoing feelings of warmth and belonging” among the students (Kenney, 2005, p.78). Levy-Leboyer noted that:

If we wish to investigate the determinism of the environment for behaviour or individual action in designing the environment, it will be necessary to remember that the environment, as the cause or the seat of behaviour, is not objective environment, but is each person’s personal environment, perceived, interpreted and transmuted by individual personality (Lévy-Leboyer, 1982).

Therefore, it is indicated that the relationship between perception of design quality and student learning should address both subjective and objective multisensory experience (Strange and Banning, 2001). In order to achieve this, it is noted that the nonverbal messages which are the link between the functional and the symbolic aspects of physical spaces (Rapaport, 1982) are usually more truthful to the users than verbal messages (Mehrabian, 1981). The perception of design quality is key to express nonverbal messages of the campus environment to their students:

If one had to say which was telling the truth about school, a speech by the principal or the actual school building, classrooms, material he or she responsible for providing, one should believe the building (Sir Kenneth Clark, cited in Anderson 1971, p. 291).

To sum up, while there may be different views on how the campus environment could influence student experience, scholars have agreed that designers should give priority to the quality of environments that they offer to students because this “could hinder or promote learning” (Strange and Banner, 2002). However, the perception of the design quality of the physical environment and its impact on learning in higher education has

been neglected (Banning and Cunard, 1986; Boys, 2010). Research carried out in the design of education spaces claims that a high quality of environment improved pupils' progression, preferment, behaviour and achievement (CABE, 2002). However, the effect of the perception of design quality on students' activities and their level of engagement in learning activities is still an under-researched topic.

4.3 The design quality of spaces in urban design theory

Looking at the literature of urban design, there is a detailed description of how to achieve a high quality by applying design attributes. However, in order to customise these in the campus design, it is noted that there is a need for more empirical study and evaluation. To adapt urban design qualities to social learning environments, a comparison of these frameworks is indicated in Table 4.1. Although these frameworks may have some differences in expression, which depends on circumstances, many similar aspects are identified and discussed.

Table 4.1: Design quality framework of public space; the urban planner perspective

Author	Quality of public space	Type of space	Location and context
Kevin Lynch (1960)	Performance: Vitality, Sense, Fit, Access, Control Meta-Criteria: Efficiency, Justice Image of the City: Legibility, Building Image, Structure and Identity, Imageability	City and public place	Three cities in the US
Bentley et al. (1985)	Permeability, Variety, Legibility, Robustness, Visual, Appropriateness, Richness, Personalisation	Key qualities of responsive places	UK
Jane Jacobs (2000)	Safety, Contact, Diversity, Density	Street, sidewalk	American city
Moughting (1992)	Function: Activities, Concept of centre, Concept of portal Form: Enclosure, Legibility	Street, square and plaza	UK
Montgomery (1998)	Activity Form Image/perception	Place making	
CABE (2000)	Character, Continuity and enclosure, Quality of the public realm, Ease of movement, Legibility, Adaptability, Diversity	Good public space	UK
Jan Gehl (2010a)	Quality of outdoor environment, Contact, Activities, Sense, Communication and dimensions	Life between buildings	European city

To begin with, Kevin Lynch (1960) builds up the framework for the city with emphasis on the performance of public spaces, which can be reflected by five dimensions: vitality, sense, fit, access and control. In 1985, Bentley adds emphasis on the quality of responsive place in terms of 'permeability variety, legibility, robustness, visual, appropriateness, richness and personalisation' (Bentley et al., 1985). Moughtin (1999)

suggests the framework for designing street and squares with two main dimensions of the form, including ‘enclosure and legibility’; and function, including, ‘Activities – Concept of centre, Concept of portal’. When observing and writing about streets, Jacob (2000) argues that successful public streets should have a degree of ‘safety, contact, diversity and density’. Sharing similar ideas, for the public spaces in between the buildings Jan Gehl (2010) emphasized the need for ‘close contact, activities, sense and communication and dimension’. Adapting many authors’ ideas, CABA (2007) suggested that characters of successful public spaces should comprise: Continuity and enclosure, Quality of the public realm, Ease of movement, Legibility, Adaptability, Diversity’. This framework has been applied widely in many urban design practices.

In short, although there are different languages to explain what the design attributes of good public space, scholars seem to agree on some important attributes such as legibility, character, enclosure, activities, interaction, diversity and accessibility. Social learning spaces act as the social place for students, which provide both socialising and learning facilities. It would be suggested that these qualities of public place could be used to evaluate the successful of social learning spaces as well. Therefore, the qualities of public space are reviewed in the following section according to two dimensions – form and function – which will provide the foundation for assessing the design quality of social learning spaces.

4.3.1 Form

From an architecture perspective, form refers to the configuration of physical spaces and is the most important language and material to work on. However, the designed form often creates misunderstanding between architects and users, since their views may be different. Therefore, form should be evaluated with a degree of common sense instead of solely design language.

4.3.1.1 Legibility

With regards to the form of the spaces, Kevin Lynch in the book *Image of the City* (1960) advises that the quality of public spaces should allow people to orient and navigate via the physical form. In the other words, according to Bentley et al., (1985) legibility described the ease with which users understand spatial/physical form and configuration. Sharing the same ideas about how to encourage people in space, from the urban design perspective, there is the demand that:

We would like to know not only where but when we are and how "now" relates time past and to come. By emphasizing the clues of time and season, by exposing the scars of history and

the sign of future intention, the visual environment may effectively be used to orient its observers to the past, to present with its cyclical rhythms and to the future with its hopes and dangers. (Lynch, 1990, 471)

Lynch (1990, p. 470) wrote that the term legibility referred to “the degree to which the inhabitants of a settlement are able to communicate accurately with each other via its symbolic physical feature”. Furthermore, clarity in public space also refers to the idea of “way findings” which has been explained as a degree of spatial orientation and the individual experience; these assist users to create their own plan and guide their own movement through the physical environment (Lynch, 1990). This could lead to the feeling of comfort and welcome when users enter the environment. In addition, legibility can generate the feeling of security, give the sense of “self-identity” and establish a relation between occupants and the environment (1990, p. 470). Similarly, the concept of legibility is found in Moughtin’s et al. (1999, p. 23) theory of streets, squares and plazas, as he described that legibility can “create the sense of community”. Furthermore, it suggests that legibility “can support the civic pride and social cohesion and be a means of extending one’s knowledge of the world” (Lynch 1990, 470). Besides this, Lynch emphasized that “It confers the aesthetic pleasure of sensing the relatedness of a complex thing, a pleasure vividly experienced by many people when they see a great city panorama before them (Lynch, 1990, p. 470). Moughtin (1999, p. 219) added that legibility not only applied to guiding the inhabitant in their movement; it also influenced the perception and action of people in an urban environment (Moughtin, 1999, p. 219).

In terms of learning spaces, scholars emphasized that the design of learning spaces should have clarity of flow with use of appropriate signs; “so that spaces support and guides learners rather than [act] as a barrier to progress” (Pearshouse *et al.*, 2009, p. 31). On the scale of the campus, it is believed that the sense of community can be generated by the two characteristics: legibility and mystery, which refer to two issues of safety and opportunity (Strange and Banning, 2001, p. 28). Since the campus can now be defined as a public place where students exchange knowledge within their scholarly communities, legibility can be a significant feature. Educational writers point out that a legible environment can be defined as “those [places] with open and distinctive landmarks, a landscape through which one could wander and feel safe but not become lost” (Strange and Banning, 2001, p. 28). In addition, psychology research found that the sense of feeling lost in space and the feeling of being “stupid” when moving in the wrong direction can give students stress and anxiety (Hunt, 1984). It is suggested that, similar to public space, learning spaces should not give a sense of

“uncertainly of mild” to the users. In order to attract learners, the design should give a degree of being “easy to understand” and “welcoming” to the students. It is stated that “its attractiveness to outside users is one of the key virtues of the spaces” (Melhuish, 2011a, p. 82). “Physical access and signposted” was also seen as important (Melhuish, 2011a, p. 82).

Similarity, ideas on achieving legibility can be found in urban design literature. For example, Lynch suggests “shaping the circulation system as a comprehensible sequence and a comprehensible geometry” or emphasizing the “pattern of open space and centres” (Lynch, 1990, p. 471). Also, Moughtin (1999) indicated that legibility could be improved by a clear design strategy in terms of material, colours and building heights. In order to capture the perception of legibility, it is suggested that interviewing people and inhabitants about the level of legibility would be the way to evaluate the quality of public place. However, the result will be relatively different depending on the culture and perception of participants.

4.3.1.2 Identity – Fit – Character

Literature suggests that place should have its own character, and this is significant to the success of public places as well as learning environments. “Identity is the characteristic that allows us to differentiate one space from another”, wrote Arthur and Passini (1992, 87). According to CABE (2000, p.15), places with identity “promote character in townscape and landscape by responding to and reinforcing locally distinctive patterns of development, landscape and culture”. In order to design a distinct place, it is suggested that the designers should understand the perception of users about the form of place. It also requires the designer to understand ‘the physical and human geography, the history and morphology of past uses, the natural landscape and buildings, both on a site and around it’ (UDC, 2000, 22). In a campus environment, each learning place needs to own its unique character, which may as a result become a referable destination for students to come and reside in the campus. Though the building language is aesthetic, the identity of place can be found in the reflection of their users’ cognitive maps.

It is argued that learning space design in contemporary campuses seem to lack identity in favour of promoting technology and flexible furniture (Kenney, 2005). Therefore, more focus on identity is required (Temple, 2014). Gee writes:

Learning involves both focused attention and peripheral perception: good space design is visually stimulating. While space should not distract from the ability to focus, it can provide

sensory stimulation that influences the experience and thus learning. Space can also be the silent curriculum that complements and increase the engagement (Gee, 2006, p. 10.3).

However, how to evaluate the identity of the space is a problem that many researchers faced. It is an intangible factor, which cannot be quantified and is influenced by participants' personality, culture and social background. Therefore, there was limited understanding of how the identity of learning space can affect students' learning in a campus environment. Furthermore, while some attempts have been made in post-occupation surveys, there has been limited explanation in term of a common language to clarify quality to the users. Consequently, the results may not be consistent between different studies.

4.3.1.3 Enclosure – personalisation – control

Enclosure is found to be an important design quality of public place, as many theories have emphasised. The literature indicates that the feeling of enclosure, created by the physical form of the space has an influence on the sense of safety and security (Carmona, 2010). Although enclosure is the key factor, how to measure and evaluate this aspect in the environment has not been well researched. Specifically, urban designers, Camillo Sitte and Zucker emphasized that enclosure needs to be defined by the ratio of depth, height and width. Moughtin (1999, p. 99) also added that “the key to the enclosure in the square is the treatment of its corners”. He also explains “the more open the corners of the square the less the sense of enclosure, the more built up or complete they are, the greater the feeling of being enclosed” (Moughtin, 1999, p. 99). The second physical factor that affects enclosure is the relation of the height and roof line with the size of space. He demonstrates that “if it is too high in relation to width, a feeling of oppression may result; if it is too low, a feeling of exposure and vulnerability” (Moughtin, 1999, p. 100). Furthermore, it suggested that a strong sense of enclosure can be created by the unity of shapes, architecture styles or street furniture (Moughtin, 1999, p. 147).

In campus design, the sense of enclosure and security can encourage the feel of belonging and help the student to get involved in the activities available (Strange and Banning, 2001). It is argued that, when students stay within the boundary of the campus, they tend to stay longer as well as have closer contact with their community; social activities may happen to a greater extent. The physical factors can enhance the sense of enclosure and increase the level of safety and security; however, it is also indicated that too much enclosure can limit social interaction between public and private space. Specifically, it is agreed that any learning space should create a degree

of enclosure and safety to encourage users to stay, however, especially in social learning spaces where students are encouraged to interact and communicate with their wider learning community, the degree of enclosure needs to be thoughtfully balanced.

4.3.2 Function

The function can be seen as the key to success of public spaces, indoor and outdoor. In term of function, the main questions are “what happens in the physical environment” and “how the spaces facilitate the activities via its features”. From an urban design perspective, functional consideration relates to potential ability to support users’ activities or create a convenient and safe place for pedestrians; the ability to change to fit with various of users’ movement, maintain the suitable intensity and ensure a good level of security and privacy (Rowley, 1994). Considering that campus spaces share some of the same functional aspects of public places, functional aspects in the campus should be examined by activities, interactions and adaptable to different students’ requirement to maintain a high level of use in each design spaces.

4.3.2.1 Activities

Activities are the key factor to the success of any public space whether it is in the city or on the campus. In detail, John Sorrell, chairman of CABI, in the book *New Public Space* has stipulated that “a good public space is one that is full of people, a place that tempts those people to slow down, to stop, chat, or simply to watch the world go by, a place that enriches the lives of those who use it” (Jan, 1987)**Invalid source specified..** This idea is shared among urban writers such as Jacob, Moughtin and Gehl who emphasise that activity is key to the vitality and visual attraction of streets, square and plazas. This will now be examined in greater depth.

Firstly, it is emphasized that the environment needs to provide the condition for “necessary activities” to happen. For example, public places should provide enough space for a variety of people and for diverse activities (Moughtin, 1999). In addition, its physical condition, such as temperature, air quality or external views and the choice of material should enable people to feel comfortable to stay (Gehl, 2010a).

Secondly, the diversity of uses of the buildings is also essential (Moughtin, 1999), as this generates more activities to draw people in. It is suggested that the diversity of uses of public space is the main source of closer contacts: “ The activities generated by people on errands or people aiming for foods or drinks is itself an attraction to still other people” (Jacobs, 2000, p. 46).

The third element is the suggestion that there is the need for high density (Jacobs, 2000; Moughtin, 1999; Gehl, 2010). It explains that the presence of people can bring still more people, and people inclined to watch other peoples' activities as well.

From the psychology discussions of Piaget, Kolb, Vygotsky and Bandura, it was clearly demonstrated that the learning process could not be understood as an isolated activity; learning is a process of engaging with the environment. This would indicate that being involved in a number of activities, such as cooperation with peers and participation in the community, would result in a more successful learning process. Agreeing with this concept, the institution should facilitate and encourage students to become involved in community activities which support them in becoming a full member of the academic community (Lave and Wenger, 1991). Therefore, learning spaces should support the multiple types of learning activities that students require to create a strong connection between students and their environment (Oblinger, 2005). Examining the activities can enable the researcher to understand how space can encourage the degree of learning through the physical element. Activities can be examined by mapping methods and the mapping behaviour technique (Gehl and Svarre, 2013). The greater diversity of activities the spaces offer students, the more appealing the spaces might be in students' perception.

4.3.2.2 Interaction

Close interactions are important in public spaces. Examining the street life in America, Jane Jacobs (2000) indicates that interaction is encouraged in high density places. Similarly, Gehl specifies that high density results in close contact, which encourages more social activities (Gehl, 2010b, p. 15).

The interaction between students is the main concern of many studies in the field of education design. As many discuss in the literature, campuses should encourage students to have a degree of interaction with their physical environment. Interaction here can be defined as the amount of contact that students have – which could refer to the number of people or peers they know on their campus. A good campus should encourage and allow students to have a contact with their knowledge community. However, many studies still remain on the smaller scale such as classroom or seminar rooms and most interactions evaluated relate to learning discussion or group-work interactions (Painter *et al.*, 2012). However, it has been insisted that learning process requires social interaction beyond formal or conventional interaction for learning.

Therefore, when searching for traces of interaction, the researcher should include both social interaction as well as learning interactions.

Observation is the most common technique to capture interaction between students (Melhuish, 2011a; Crook and Mitchell, 2012; Harrop and Turpin, 2013). It is indicated that questionnaire could also capture the fuller picture of the interaction between students as students may not be aware that their social interactions are also useful for their studies as well. Students also may refuse to mention their social interactions, as it may not give a good image in front of another researcher (Zeisel, 2006). Therefore, in order to understand the nature of the interaction between students in physical spaces, observation would be an appropriate technique to collect accurate data. Furthermore, combining this with other methods, such as questionnaire and focus group, can be useful to gain a depth of understanding about the patterns of interaction and the reasons behind the choice of interaction.

4.3.2.3 Adaptability – flexibility

Similar to the views of design guides in education, discussed in Chapter 2, flexibility and adaptability are key to the successful of public place. According to Lynch (1990), in order to achieve good quality form, the structure of a space should allow the place able to adapt and be flexible to facilitate different ways of using the environment. Furthermore, the function of the place should be able to change and be easy to maintain, to keep pace with the changing city (Evans *et al.*, 2007, p. 12). It has been stated that:

New development needs to be flexible enough to respond to future changes in use, lifestyle and demography. This means designing for energy and resource efficiency; creating flexibility in the use of property, public spaces and the service infrastructure and introducing new approaches to transportation, traffic management and parking (Evans *et al.*, 2007, p. 12).

Carmona *et al.* (2010) conclude that even in the design approach there is a need for flexibility and adaptability as there is a danger of ‘generally desirable design principles becoming inflexible dogma’ and of design and place-making being reduced to a ‘formula’ which would ‘negate the active process of design that relates general principles to specific situations through the application of design intelligence: design principles should be used with the flexibility derived from a deeper understanding and appreciation of their bases, justifications and interrelations’ (Carmona, 2010, p. 11).

In terms of campus design, flexibility has appeared as a key aspect. As applied technology for teaching and learning in higher education changes, for instance towards

wireless laptops, broadband networks and online libraries, students can work and study differently than the traditional learning approach. Many projects have used flexibility and adaptability of learning spaces as the main theme of the design. However, it is argued that flexibility in design is not just about the new technology (Temple, 2008); it should be flexible enough to allow new uses and the design should incorporate human need (Gee, 2006). For example, it is mentioned that “there are no longer huge separations between eating and drinking and working [...] flexible study/eating/wireless laptop space is getting larger (Gale, 2006). Similarly, Temple (2008) emphasized:

The implications for the design of learning spaces seem to be limited, however: flexibility in space design should be the priority. The rapid (and unanticipated) growth over the past few years in the use of wireless-enabled laptops using broadband networks has meant that the need for specialist ICT spaces may be declining. The further technological change will be equally unpredicted. Future-proofing in space design terms can best be achieved by providing comfortable, pleasant spaces that can be readily used in a variety of ways (Temple, 2008, p. 75)

Therefore, it is recommended that flexibility is essential to the design of learning spaces in the new century.

4.3.3 . Accessibility and connectivity

Connection is the link between spaces which is formed by location, access, openness and visibility. It is argued that the success of one space not only depends on physical performance or the functional dimension; it is also based on its connectedness with other spaces (Bligh and Pearshouse, 2011). It is argued that the connection between spaces can be encouraged by location, an external view and surround, accessibility and the visual. The connection aspect can be defined as the relation between spaces and the whole campus. As students often come to university with a clear intention and specific schedule, the movement and connection between spaces on campus are essential to maintain use as well as create interaction.

To sum up the, through the discussion of design quality frameworks from both urban designers and educational practitioners, it is clear that there is a need for critical thinking about what design attributes will be suitable to apply to campus environments and social learning spaces. Lack of understanding may result in design failing to achieve the standard of ‘good quality’. Furthermore, it may result in nonverbal messages that are contradictory to the professed identity of the institution.

4.4 Evaluating the design of learning space

Having considered the features that indicate quality, the research now turns to questions of how to evaluate these qualities. The different views and positions of researchers lead to a variety of proposed frameworks and structures for designing learning spaces, which may lead to an unclear direction for process and decision making. Therefore, evaluation is a necessary process. In this circumstance, the main aim of the Bligh and Pearshouse (2011) was to understand and classify the typology of learning space evaluation, which can be categorized by seven aspects.

4.4.1 Demand model

The demand model refers to quality analysis of space in term of the metrics, such as density or booking statistics, or financial aspects such as external bookings or the utilization and frequency of functional space used; it could measure space per students or staff (Neary *et al.*, 2010, p. 7). Furthermore, the model takes into account the issue of size and cost of development. Although this model is used widely in the higher education sector due to the advantage it has of being a “holistic, developing a picture of provision across a variety of spaces; benchmarked and linked to estimate of what an institution can afford; suggestive since it can be used to set utilization targets, emphasize spaces that may need to be marketed more widely or suggest priorities for investment; analysed and presented in formats which influence policymakers” (Bligh and Pearshouse, 2011, p. 7).

However, there are some drawbacks of this model, indicated by Bligh and Pearshouse (2011), such as change of the space over time could make comparison difficult or the innovations in design solutions are hard to achieve just based on measuring demand. In addition, the objective measures used are without any concern for users’ perception (Bligh and Pearshouse, 2011). Furthermore, this is claimed that different kinds of measuring would lead to the different assessments of trends and it is hard to know which one is more important. Subsequently, SMG (2006) noticed that the quality, sample size of the data collection of the demand model is uncertain and inconsistent. Finally, this model is claimed to “not discriminate between the factors that cause a space to have given levels of utilization or occupancy – ecological properties, technology provision, popularity, etc.” (Bligh and Pearshouse, 2011, p. 7).

Therefore, on the one hand, it is indicated that there is the need to balance all the factors contributing to the learning space, such as the cost and needs of users (SMG, 2006, p3). On the other hand, it is argued that the demand model lacks concern for teaching

and learning theories (Bligh and Pearshouse, 2011). It is noted, therefore, that the demand model guidance can be useful for space management but is insufficient.

4.4.2 Outcome model

Outcome model is normally conducted from an education perspective, to highlight the effect of space on learning outcome using statistics and comparing measurement methods. This is could prove to be a substantial way to ascertain the effect of space on learners; however, it is noted that there is a difficulty in defining the link between space and outcome (Temple, 2008, p. 237). It is noted by Student Involvement Theory, inspired by Astin (1984, p. 518) and psychologists such as Vygotsky and Kolb (1984), that the “environment influences on student development”. Dobbin (2009, p. 11) emphasized that “ultimately learning success must lead these evaluations, what contributes to students’ mastering academic content, finishing courses and completing degrees?”. One research which focused on the relation between space and outcomes is the work of Brooks (2011a); this research attempted to keep the constancy on factors such as times, material of course, assignments, introduction behaviour and other elements and tried to capture the difference of assessment on students outcome in two classroom designs (Brooks, 2011b). This research contributed to recognition of the effects of space on learning, but there remain some questions about its structure and the comparison methods are not practical when trying to separate the scale of space from the scenario (Bligh & Pearshouse, 2011).

Along the same line, Hunley and Schaller (2006) carried out research named Assessment Framework for Learning Spaces. This research investigated “institution growth, quality of person-environment interaction, learning outcomes and personal engagement” (Hunley & Schaller, 2006, p. 13.1). In their later work, Hunley and Schaller (2009) developed the proxy measurement due to “the complexity of assessing specific learning outcomes” (Hunley & Schaller, 2006, p. 28). Bligh and Pearshouse (2011) pointed out that “outcomes constitute a quantitative measurements success for the whole institution as a learning environment”; it is argued “the direct measurements of these outcomes within learning space evaluation are unlikely to be fruitful” (p. 9).

Therefore, Bligh and Pearshouse (2011) argue for the use of proxy measurement, coordinated with other model aspects such as student experience and satisfaction.

4.4.3 Satisfaction model

The satisfaction model is more focused on the user experience and the contentment of learners in space, assessed collecting survey data. An example of this is the JELS

project, which collected student feedback about their satisfaction with the learning space. The main theme was “how people perceived the space and the impact it had on the individuals, learners” (ibid. p.11). The main tools used in this model were surveys, interviews and focus groups. Furthermore, the SOLSTICE framework indicated the need for the voices of staff and academics.

Temple (2008) argued that in practice there are many hidden factors that will impact student learning; besides, the impact of space may not be easy to count; therefore, the result may not be accurate and valid. Moreover, many other researchers have noticed that students lack the confidence and maturity to articulate their assessment of space Neary et al. (2010). Moreover, scholars also share the idea that there is the need for wider understanding of the effect of space on students’ experiences such as “how students feel about their place in the institution” (Temple, 2008, p. 233) or “the engagement between space and occupants” (Thomas, 2010, p. 503).

4.4.4 Scenario provision model

The scenario provision model evaluates the provision of the space according to certain aspects: technology, configuration, and facilities supporting learning activities. In comparison to the other models, this may be more innovative in terms of creating a direct link to spatial design (Bligh and Pearshouse, 2011). The method often considers and evaluates the appropriateness of the infrastructure of the rooms over time and for different users. In order to achieve the aim, it is needed to be clear what kind of activities might happen and what kind of furniture and technology or facilities would aid and enhance the activity engagement. Although the model advances understanding of how students and staff engage and what they need from the design environment, it has been claimed that this is not much related to learning theory (Bligh and Pearshouse, 2011). Furthermore, the role of learning style, which also had an effect on the scenarios of learning, does not underpin in this model (Neary *et al.*, 2010, p. 42). In practice, it is said that instead of using the scenario model to evaluate the collaboration between learning and technology, an uncertain supporting factor, it might be “best overcome by evaluating activity within the space in which it takes place” (Bligh and Pearshouse, 2011).

4.4.5 Activities support model

The activities support model is used to understand what activities space can support in practice. These studies mainly focus on “the interactions of students and staff and located those within physical space” (Bligh and Pearshouse, 2011, p. 10). The relation

between the occupant and physical space is an assessment by the way of mapping the properties of the space (shape or configuration) and cultural support such as “how the social identities of the actors within the space are understood by those present” (Bligh and Pearshouse, 2011, p. 11). While this model helps to establish dialogue between design and evaluation, it is criticised: it is said to be “thwarted by both the problems of theoretical contributions to design principles [...] and lack institutional memory about design principle” (Bligh and Pearshouse, 2011, p. 11). Furthermore, although some research that tries to conduct observation or ethnographic gathering of data, this method may be disapproved as others claim that the findings might just base of the assumption of priority theoretical in history traditions (Melhuish, 2011a)

In general, the activity support learning space evaluation model will begin with observation, estimate the exhibition of learning activities and then map back to the spatial characters (Bligh and Pearshouse, 2011). Then, it will use the data to compare against the primary idea of the design. While the evaluation of scenario model is popular, the activity model has more advantages and is more closely related to teaching and learning processes – it, however, is not used widely in practice as it may hard to realize as students’ activities usually complex hard to differentiate (Bligh and Pearshouse, 2011).

The research of Bligh and Lorenz (Bligh and Lorenz, 2010, pp. 18–22) has described the teaching process in small seminar groups, noting the effect of physical space at the micro-scale. Using different methods, such as audio-diaries, behavioural observation, on-task conversation and focus group, Crook and Mitchell (2012) aimed to understand student behaviours in relation to new technology library environments (Crook and Mitchell, 2012). Although this example has many advantages, Bligh and Pearshouse (2010, p.12) also outlined some challenges. These can be summarised as:

- How can evaluations focus on the micro-scale and provide guidance broad enough for institutions to utilise?
- How can non-academic staff be supported in undertaking activities they may regard as research and therefore the domain of academics?
- How can the link between design and evaluation processes be operationalised?
- What kind of knowledge is produced by these researchers like evaluation?

These are important factors that the researchers could address in further research; Neary et al. noted that “such problems are often derived from the failure to appreciate the wider contextual factors, which contribute to a design’s success in situ, resulting in problems of conservatism as design ideas are superficially re-used elsewhere

without attempting either to recreate the wider original context or to adapt the design to its new setting” (Neary *et al.*, 2010, p. 27).

4.4.6 Spatial ecology model

The spatial ecology model is defined as research that examines the relationship between learning spaces in universities. It is explained that “spatial ecology learning space evaluation highlights the fact that spaces derive much of their value from physical context and connectedness with other spaces” (Bligh and Pearshouse, 2011, p. 12). It is clear that space cannot be understood in isolation, as it has a relationship with the ecology provision surrounding it. Temple (Temple, 2008, p. 232) argues: “centrally driven plans to increase space utilisation may reduce the opportunities for informal learning. So, space provides benefit students if its affordances complement other surrounding spaces (such as informal area surrounded by lecture theatre) [...]”. This is a feature that micro-scale evaluation models fail to explain. Concerned about this concept, Jamieson (2003) suggested: “overall, a university campus needs spaces designed to generate interaction, collaboration, physical movement, and social engagement as a primary element of the student experience” (p.121). An example of this is the learning landscape framework of Neary *et al.* (2010), which evaluated the campus in term of expression, efficiency and effectiveness. This framework tried to capture the identity and branding, condition and maintenance, circulation and permeability, flexibility way finding and orientation properties, effective use and security (Neary *et al.*, 2010). In comparison, another method carried out by Hillier (2007) named Space Syntax indicated ways of understanding space as “a movement economy” at different scales. However, the application of this has gained little attention, except for the work of Kaynar (2005) in the museum context. Therefore, it is noted that this area needs more research.

4.4.7 Brand model

The brand model is generally focused on the spatial contribution to the overall image of the institution. However, in practice, it is claimed that architecture prestige is sometime taken over the focus of innovative in teaching and learning. (Bligh and Pearshouse, 2011, p. 13). It is indicated that the branding model also has some limitations as “genuinely innovative new spaces may initially perform less well than more conventional facilities (which produce well-understood social spatial cultural relation)” (Watson 2007, p.256). Therefore, it is recommended that robust and prestige design building investments have to accompany with innovative teaching and learning methods (Bligh and Pearshouse, 2011, p. 13). Furthermore, it is argued that the

branding building should also help the campus to create place attachment among the students. It implies that the contribution of alumni students will create benefits for the university in the future.

In short, learning space design needs a better understanding as well as evaluating in order to improve their performance and encourage new innovative concepts for its development. While literature exhibited a variety of evaluation frameworks such as Demand model, Outcome model, Scenario provision model, Activities support model, Spatial ecology model and Brand model, there are still some problems and weaknesses in them. It is argued that learning space evaluating should value the design as well as directly link to teaching and learning climates. Furthermore, in order to make the result of evaluation more convincing, valuing different methods as well as research perspective and a willing to take a risk in research are much needed in the field of learning space design. Furthermore, each type of learning space may require different method and model of evaluation to examine its effects precisely.

4.5 Conclusion

This chapter has established the theoretical background necessary to analyse, design and evaluate the design quality of public places or learning environments. Within the literature, scholars emphasize that design quality adds value to the buildings and plays an important role in improving the quality of peoples' lives. However, measuring design quality has been problematic, as design quality contains both intangible and tangible factors. It has been asserted that the perception of design quality and spatial experience were important to evaluate, as well as to provide a concept for the design process. Although there remains a debate around how to define and examine the relationship between the environment, human perception and human behaviours, there has been an understanding that the environment may not determine people's behaviour or activities; instead, it may render certain possibilities and encourage some behaviours more than others, as encouraged by explicit and implied messages.

This chapter also provided a comparison and synthesis of some of the design quality frameworks that have been developed in urban design studies, to extract some key factors for design quality. For example, in term of form, the attributes of legibility, identity and enclosure are important. With regards to functional factors, activities required are quality of environment, comfort, views, diversity of uses, interaction, flexibility and adaptability. In addition, accessibility and connectivity with other spaces are also significant to the successful.

The chapter went on to present an analysis of five existing learning space evaluation models which have recently been used in empirical studies. Overall, throughout these models of learning space evaluation, it seems that there is a need to develop an evaluative model specifically for social learning spaces which can guide new designs and evaluate existing ones. In summary, it is concluded that, while the literature has emphasized the role of perception of design quality in student learning experience in the campus environment, limited research has been done in this field. As the campus has changed in its structures and added new types of public learning spaces, there has been no clear theoretical background and empirical studies to guide developments. As the campus in general and social learning spaces have served as both public places for social interaction and also for learning among students, some understanding of urban design quality could be applied to this context. Research methods which focus on specific types of social learning spaces are required to provide a critical assessment of what has been built and how to build new, high-quality infrastructure in higher education. The following chapter proposes such a method in further explanation.

Chapter 5 :

METHODOLOGY

The research methodology is the key to the success of any research project; development of a methodology that addresses the research aims and objectives requires significant consideration. This chapter explains the rationale behind the employment of both qualitative and quantitative research methods. First, the philosophy and the approach of the project are explained; following this, an evaluation of the suitability of mixed methods with regards to the research aims and objectives is clarified; and, finally, the processes of data collection, research ethics considerations and analysis are described.

To reiterate, the aim of this research is to identify the design qualities most conducive to higher education architecture and, in particular, to investigate the relationship between the design quality of social learning space and student experience. In order to address the research question, this research undertake a number of steps. First a theoretical framework for how to design a good quality social learning space is developed. Second, an appropriate methodology with which to investigate the affect of the design quality of social learning spaces on the user is established. Third, two case studies are carried out, based on the mixed method of qualitative and quantitative research, to investigate the affect of design quality on the user. Fourth, a design framework for social learning spaces is recommended. This chapter articulates the methodology to address this research aims and objectives mentioned` above.

The research question requires some specific measurements to establish a clear correlation between design quality of social learning space and student experience due to the fact that design quality is difficult to quantify, since it contains both objective and subjective components(Gann *et al.*, 2003). This is especially true of users as opposed to architectural professionals; if they are not trained in design, they will not find it easy to define and discuss design quality alone. Therefore, beside the quantitative methods, additional methods from the field of qualitative research are employed, to enable a deeper and wider understanding of the relationship between the design quality and student experience and to overcome some of the limitations of a

survey alone. Following this principle, the methodology is developed based on the research framework proposed by Creswell (2014), as shown in Figure 5.1.

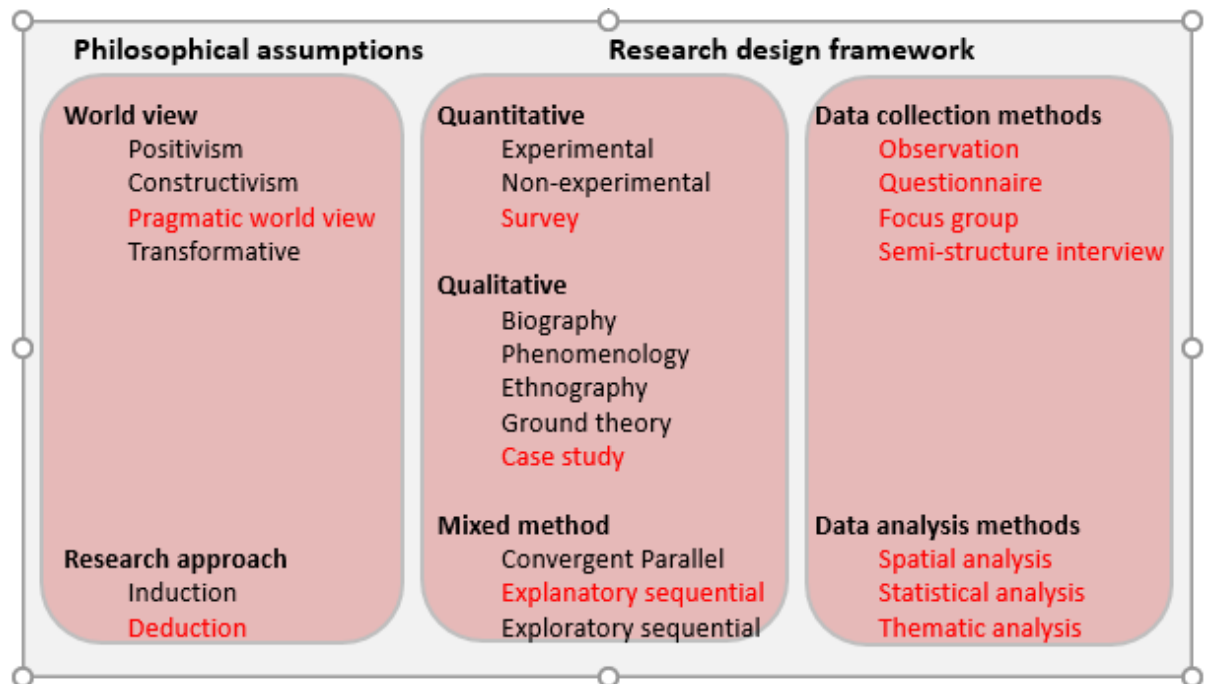


Figure 5.1: Overview of research framework (adapted from Creswell, 2014)

5.1 Research philosophy and approach

5.1.1 Research philosophy

In social science, philosophical assumptions are one of the most important aspects from which to judge which framework is most appropriate for research. To justify the research stance, perspective and validity of any new knowledge, it is useful to discuss the worldview inherent in the research; these are considered the basis for the beliefs guiding all research actions (Guba, 1990). There are four main worldviews widely presented in the literature: post-positivism, constructivism, transformative and pragmatism (Newman, 2009).

Of these world-views, pragmatism is the most suitable for this study. Unlike positivism and constructivism, which focus on either the objective or subjective position of the researcher, a pragmatic worldview focuses on “actions, situations, and consequences rather than antecedent conditions” (Creswell, 2014, p. 10). Moreover, pragmatic research maintains a greater focus on research problems and tries to use whatever is the appropriate approach to understand the problem (often mixed methods), with the guiding idea of utilising what works (Creswell, 2014). As it places distance between itself and any overarching philosophical system, this method can encompass inquiries from both qualitative and quantitative data collections. Creswell (2014, p.11) mentions that pragmatism “is not based on a duality between reality independent of the mind or within the mind”. Also, differing from transformative philosophy, which foregrounds the role of politics and political change in the research environment, pragmatic researchers focus on the question of: “what and how to research based on the intended consequences[...where they want to go with it” (Creswell, 2014, p. 11). In the pragmatic approach, all contexts – whether they be social, historical or political – can be acknowledged. Therefore, “multiple methods, different worldviews, and different assumptions, as well as different forms of data collection” are simultaneously valuable to the study (Creswell, 2014, p. 11).

This research reflects the pragmatist worldview, as spatial design has strong relationship with many disciplines: social theories, education and psychology. There are many, wide-reaching views and assumptions about what learning means and how to measure it (Painter *et al.*, 2012). As a consequence of the fact that there is no one idea of how to measure learning, research in the field of learning space design has failed to give any conclusion about the best method to measure learning outcomes (Painter *et al.*, 2012). Acknowledging this difficulty, the focus point of the study is the behaviour of students instead of their learning outcomes. However, it must be accepted that such behaviours only *indicate* student engagement but do not then prove that they will necessarily see better outcomes as a result. However, research shows that there is a strong relationship between these specific learning behaviours and the students’ satisfaction

in term of their educational experiences as well as the benefits that students receive from these experiences (Astin, 1984; Kuh, 2003; Painter *et al.*, 2012). These activities refer to, “how frequently student interacted with instructors and faculty, the amount of time they spent studying or using academic resources and how academically oriented their peers were” (Painter *et al.*, 2012, p.21). Based on this concept, this research will establish the connection between the perception of design quality specific in the social learning spaces and student learning engagement- student experience in general. In particular, the researcher seeks to develop a design attribute that successful social learning spaces should have which will be an essential guidance to practical architectural work in the future.

5.1.2 Research approach

Any research can be based on an inductive or deductive approach; this research applies a deductive approach. With the former, theories or hypothesis are a result of collecting and analysing data. In contrast, with the deductive approach, as applied here, the researcher looks for existing theories in literature to form the hypothesis, before searching for evidence. This method can direct researchers in the process of collecting data; its findings enabling researchers to evaluate and refine the hypothesis or proposed theory (Bryman, 2004). Despite this study’s preference for the deductive approach, it is nevertheless advisable to strike a balance between numerical and social phenomena explanations (Zeisel, 2006). As recommended, different methods are applied to support and examine the validity of the result.

Adapting the current research, the research framework displayed in Figure 5.2 can be summarised as the following sequence. First, the researcher proposed a framework for design quality of a social learning space, which includes eight aspects: “design appropriate to the context”, “design quality and appearance”, “legibility”, “coherence”, “diversity and richness”, “sense of security”, “accessibility” and “flexibility”. This framework has been constructed based on previous studies from education, psychology and architectural literature. While educational theories describe the social learning space by conceptual terminology, psychological theories concern the perception of the users (Boys, 2011). On the other hand, in the architectural view, social learning space is simply, “the physical setting in which learning takes place” (Boys, 2011, p.9). Dealing with the divergent views and frameworks regarding this subject (learning environment), the researcher has had to synthesise critical ideas to develop a suitable framework. It is *believed* that the decided upon characteristics promote learning experience of the users (hypothesis). However, the framework design was evaluated through the first case study, in which an investigation of the relationship between design quality of social learning spaces and student experience was carried out by employing a mixed method of quantitative and qualitative research to collect and analyse data. Following this, an

improvement to the framework design and survey questionnaire was made, before conducting the second case study. This process enriched the evidence with which to evaluate and confirm the final proposed framework design. This process is illustrated in Figure 5.2.

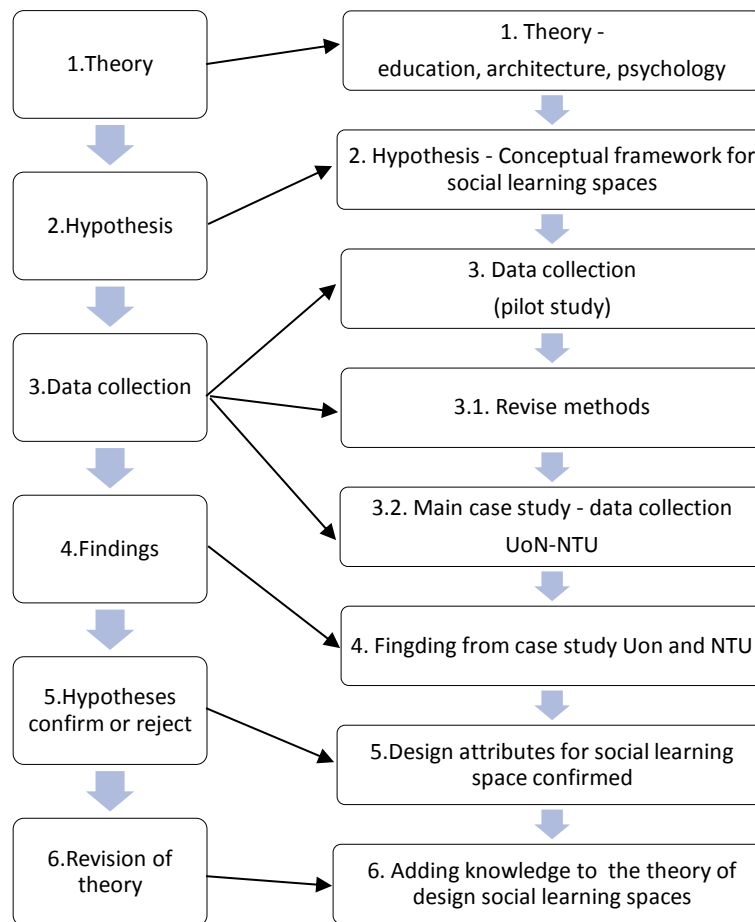


Figure 5.2: The process of deduction (left) and adapting it to research strategy (right)

5.2 Research method

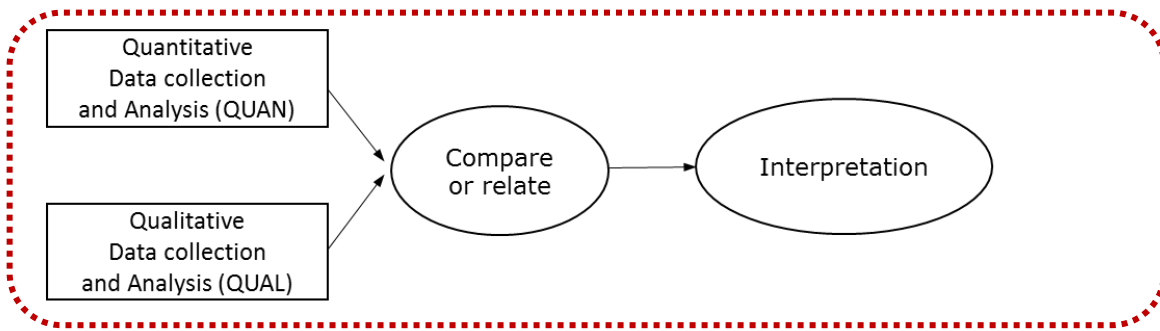
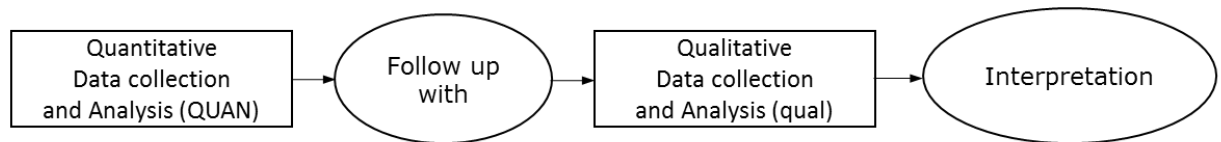
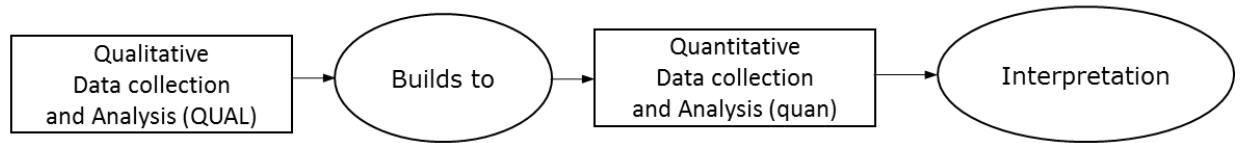
Following the research philosophy and approach described above, the research method presents how data will be collected and analysed during the case studies. Several research methods have been reviewed to identify which enables the research question to be answered. It has been shown that a mixed method, using both quantitative and qualitative research is the most appropriate. This is said to allow the researcher to evaluate the research question from various perspectives and to collect more evidence to consolidate an optimum framework for designing social learning spaces (Creswell, 2014).

5.2.1 Mixed methods research

The mixed method research resides between qualitative and quantitative approaches, “integrating the two forms of data and using distinct designs that may involve philosophical assumptions and [a] theoretical framework” (Creswell, 2014, p. 4). The advantage of mixed methods resides in the accepted idea that, ‘all methods have bias and weaknesses and the collection of both quantitative and qualitative data [neutralise] the weaknesses of each form of data’ (Creswell, 2014, p. 14).

Triangulation of data helps the researcher to understand their problem in its wide-ranging implications and viewpoints (Cousin, 2009). The process of conducting the mixed method involves both qualitative and quantitative data collecting stages to answer a research problem (Yin, 2014). Then both forms of data are analysed individually. The rigorous process of collecting and analysing data is important when verifying the result. Finally, the two forms of data are merged or integrated to draw the conclusion. Mixed method research is divided into three different types, depending on the sequence of the data collection and integration of data analysis (Yin, 2014). These are: convergent parallel mixed methods, explanatory sequential and exploratory sequential (Figure 5.3). Convergent Parallel Mixed Methods qualitative and quantitative data are compared to consolidate and clarify the result, then it gives depth and richness explanations for the findings.

Thus, in this study, the research method adopted is the convergent parallel mixed methods approach; this strategy enables the researcher to consolidate findings from quantitative data as well as qualitative data at the same time, so then the findings will be synthesis extract. Moreover, this approach enables the researcher to gain a deep understanding of the relationship between design quality of a social learning space and student experience – both of which are evidenced through quantitative and qualitative elements.

Convergent Parallel Mixed Methods**Explanatory Sequential Mixed Methods****Exploratory Sequential Mixed Methods****Figure 5.3:** Three Mixed Methods Design (Creswell, 2014, p.220)**5.2.2 Case study approach**

Broadly speaking, the case study approach is the most appropriate for research that seeks to examine the object as a whole in a complex context. A case study is also suitable for researchers who are interested in “information specific to the particular study object and context rather than information easily generalizable to a large population” (Zeisel, 2006, p. 98). It is specified in the literature that user’s responses to the learning environment is a complex and is affected by various factors (Zeisel, 2006). In addition, learning itself is defined as a social process that is significantly influenced by the context in both physical and philosophical capacities (Painter *et al.*, 2012). Therefore, specific information and context of the environment could not be excluded from learning environment studies like social learning space.

Thus, a case study is the most suitable research method to deal with an informal learning environment, which has more challenges than formal spaces. While formal learning spaces are normally scheduled for use by specific users, informal learning spaces are often comprised of “found spaces”, such as spaces between buildings, the corner of the lobby, the cafeteria or group study rooms (Painter *et al.*, 2012, p. 15). Students may not have use of informal spaces included in their schedule; however, a large proportion of group or individual learning activities

are nevertheless completed in these areas (Painter et al., 2012). Therefore, it is hard to predict when and who will use these spaces for what purposes. Therefore, to set up an experimental environment in which to measure all the variable effects on users in the social learning spaces is impractical. Furthermore, the use of social learning areas involves the social organisation of the group of students or tutors with their own unique history, background and experience. Thus, it is very difficult to separate the context from variables, in order to fit the experiment condition (Painter et al., 2012).

Due to reasons mentioned above, the case study – which may include diaries/logs, focus group and interview – is the most common approach in the research of informal learning spaces (Foster and Gibbons, 2007; Melhuish, 2010; Harrop and Turpin, 2013). Therefore, the application of mixed methods in the case study approach is most appropriate to this study. Regarding data collection, an on-site survey via a set of questionnaires is carried out. Subsequent to this, some methods associated with the qualitative approach are employed: observation, focus group and semi-structure interview.

Selecting a case study is an important decision for the success of the case study research project. As social learning space is the new spatial phenomenon, there will be several social learning spaces to be chosen as typical examples to explore. However, as the project will inspect the efficient of building performance and explore students' perception which may affect university image and reputation, the permission to conduct the study is the most important factor to consider in this research. In addition, ethical issues also a significant concern in this study. Therefore, instead of choosing a case study which may reflect the most successful design or performances, in this project, the researcher priority the available accessibility and contact of the chosen cases. Considering each project and building would contain its unique story behind its performance, the researcher believes that new knowledge would be discovered through the depth understanding and long-term investigating in context. Therefore, two case studies were chosen accordingly are the University of Nottingham and Nottingham Trent University. The two cases base in the same city and have quite a similar background in term of students' culture and environmental conditions. Although the two cases study that may not have strong comparative features, these represent two main approaches to develop social learning spaces inside campuses nowadays. The first trend is renovating existing space to social learning spaces to satisfy the need of users. The second tendency is inventing a new design for social learning spaces to promote a new type of learning and transform the existing image of the campus. Although generalisation would be limited in this study, both of the cases are valuable to this evaluation research as it would provide various views for a unique practical problem.

5.3 Data collection and analysis methods

It is demonstrated in the literature that design quality, including architectural design, is difficult to quantify (Gann *et al.*, 2003). This is because it contains both objective and subjective components; it is therefore suggested that using different methods to measure these components is important. Questionnaires could be used to measure objective aspects; however, this has some limitations in terms of measuring subjective views. Students who have little knowledge of design quality might not have an awareness of how it would affect their use of the space. In addition, previous studies of this topic indicated that student might lack the maturity to answer questionnaire seriously (CABE, 2010). This is compounded by the general drawbacks that come with survey methods; Oppenheim (1992) summarises: they can result in biased answers, loss of spontaneous responses and irritated respondents. In light of this, qualitative methods, such as focus groups and semi-structured interviews will be follow up the questionnaires, to address the limitations of the survey method and to deepen the insights of the investigation. The sequence and purpose of applying different data collection methods is illustrated in Figure 5.4.

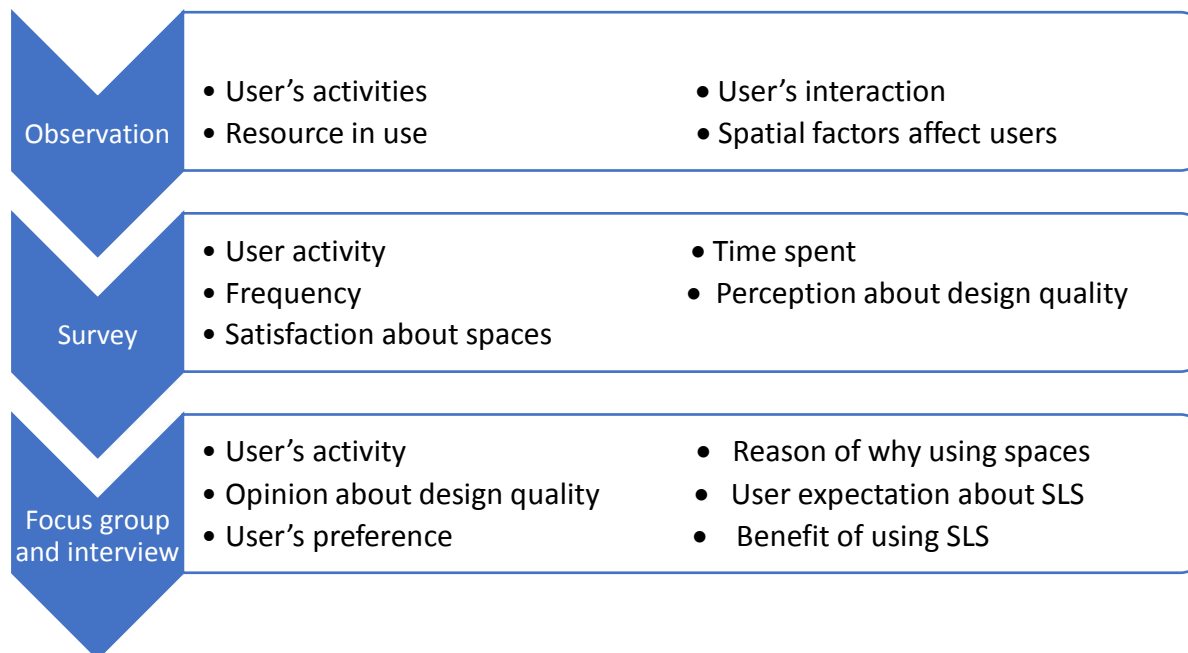


Figure 5.4: The sequence of data collection methods

5.3.1 Observation

In social science research, observation of behaviour is used to generate data about “peoples’ activities and the relationships needed to sustain them; about regularities of behaviour; about expected uses, new uses and misuses of place and about behavioural opportunities and constraints that environment provide” (Zeisel, 2006, p. 191). Observation is defined as a

systematic way to record how humans react to the environment (Zeisel, 2006). It aids the researcher to answer the question of: “how a physical environment supports or interferes with behaviours taking place within it, especially the side effects the setting has on relationships between individuals or group” (Zeisel, 2006, p. 191). It also offers insight about the real context of the environment, as “observation of physical traces provides rich impressions and is highly illustrative” (Zeisel, 2006, p. 161).

Compared to other methods, observation allows the researcher to capture the direct action of participants in a real context. For example, respondents could avoid reporting unacceptable behaviour when they answer a survey or interview question; however, their behaviour in the real context could, in contrast, be recorded by the observer (Zeisel, 2006). Furthermore, by looking at people, the researcher can understand the dynamic situation and reasons that make an activity happen. It is indicated that complex chains of events affect how people respond to the environment; the truth of a reaction is only captured when in the real conditions. Therefore, observation is appropriate for capturing the learning environment in its real context.

Observation has been used in several research pieces in the field of teaching and learning environments; however, spatial characteristics tend to be undervalued in these studies. The research of Brook and Mitchell (2011b) is based on behaviour observation in library spaces. While it showed the importance of the mixing between social and learning activities in real contexts, the relations between the design of the space and activities, especially the architectural features, are given little attention. Similarly, the observation used in the research of Harrop and Turpin, which performed as the quantitative tool, has more focus on the behaviour, material and activities that users doing in the design of new informal learning space. In this, “percentage of occupancy, percentage of learner working individually, in pairs, in group, size of top, presence of freshmens, percentage of learner using a pc, laptop or neither and preference type of space” were the main focus points, but again, there is little attention on the design quality (2013, p. 64). The work of Matthew et al. (2011) used observation and interview in the social learning areas of science students in Queensland University. However, the results of this observation are dominated by the interview material. Therefore, there is room for observation to be applied in the field of environment research, especially for the consideration of social learning spaces. In addition, how the environment limits or support specific activities is an important question to consider. Therefore, this study adapts the observation method from previous studies; however, the focus is the design quality of the physical environment, which is an area that has not yet been fully explored.

In this research, the observation or mapping activity by observation is used to examine the relationship between physical design of environment and user activities as well as interaction

and material in used. Throughout literature reviews, mapping behaviours method which used widely in urban design research in public spaces was chosen. This method provided precious evidences about human activities and behaviours in public spaces which also can be applied in social learning spaces. Similarly to the mapping activities by observation which adapted from study of Gehl and Svarre (2013), in this studies, the observer recorded what happens in the layout by symbolization, which is representative of different types activities of the users. Furthermore, using the walking through mapping technique, the observer records the users' activities in a different physical environment nearby in approximately same amount of time, to get the total picture of the studied areas. In other words, some descriptive notes adapted from the ethnographic study of Melhuish (2010) and environmental behaviour observation of Zeisel (Zeisel, 2006) are applied. This requires more descriptions in the form of writing and photos, to interpret the user's behaviours. In addition, informal discussion with the users about their purpose and intention in these spaces is conducted; adapted from the work of Harrop and Turpin (2013), Brook and Mitchell (2011b), Matthews et al. (Matthews, Andrews and Adams, 2011). Although the quality of learning is not quantifiable by the observation, recording users' behaviour in a variety of environment could nevertheless give insight into the influence of the environment on the users' choice of learning spaces and what they often do in the studied spaces.

Amount of observation time was adapted from the research of Brook and Mitchell (2012), in which the duration of each observation lasts about 20 minutes. However, in order to reflect the series of spaces, the observation session was reduced to 15 minutes for each space and this saved the last 5 minutes for the researcher's reflection and preparation, before moving to the next of the investigated spaces. Overall, it will take a total 1 hour for the observation of the three spaces. The sequence of observation times were at 10.00am, 12.00pm, and 3.00pm. The reduction of time led to less capacity for depth of description in terms of individual activities. Therefore, the prototype of category and symbol was introduced, to help the researcher save time in observing each of study space.

5.3.1.1 Observation procedure

The observation strategy attempts to maximise understanding of the activity pattern in social learning spaces; therefore, the procedure includes three main focus points, mapping user's activities to a map. Then, descriptions of each participant's activity is to be noted beside the symbol, to give more information about user behaviour. This method is referred to as ethnographic observation theory in education research (Cousin, 2010). Examples of ethnographic observation are Melhuish (2011) and behaviour observation Crook and Mitchell (2012).

At the beginning of each observation section, a note on environment was recorded, such as whether features or any special events occur in spaces or related spaces (Cousin, 2009). Secondly, the activities of the users, based on defined categories (see Table 5.1), are marked on the layout. In the observation section, the user was marked by the symbol on the spatial map, to record the user location and their activities (Gehl and Svarre, 2013). If some activities did not fit the categories, a direct note would be added to the map to record what happened. After that, data is imported to an Excel file to be analysed. Thirdly, the interactions will be identified as belonging to two categories: in a group or alone. In-group means that the user came to a group or interacted with another group member during the observation time. Bolding the symbol and drawing the arrow will be used for marking the interaction in the group setting. If two groups of users are close together, an arrow will be used to connect the groups on the map. On the other hand, “user alone” means that the user has no interaction – such as talking or discussing – with any surrounding people.

Table 5.1: Symbol and category of activities (adapted from Gehl and Svarre, 2013)

Activities	Symbol	Symbol	Material
Writing	Δ	H	Handout
Reading	$\diamond$	B	Book
Using laptop		L	Laptop
Using phone		P	Phone visible on the table
Eating/drinking	$\square$	F	Food
Talking	$\bigcirc$	D	Drink
Standing	$\otimes$	Bold if the user in group	
Sleeping/take nap		Add the arrow if the user has talking same time with main activity	

5.3.1.2 Observation pictures

Pictures were taken in the between observation sections, to record the users' activities. Notice of the observation, which was advertised in the study space, informed the users about the presence of the researcher. However, in order to limit the distraction to the occupants and to protect the confidentiality of the users, the pictures are only to be used if mapping cannot record enough information. In some cases, the space was overcrowded, and the researcher could not manage to record everything in time; photographs were used to help the researcher to record special activities happening in the investigated spaces. All the activities recorded by pictures were transferred to the map after the observation session finished. Pictures were used in case of unanticipated activities or events happening in the spaces. All the pictures were transferred

to the computer; all published pictures blurred out the faces of users, to make sure all the users retained their anonymity.

5.3.2 Observation piloting test

In order to identify the suitable time and sequence of the observation test, piloting was carried out before the real test was applied. The pilot observation test was conducted over one week, from the 5th of October to 9th October 2015, which was the second week of the autumn semester. The process of the pilot test was followed step by step as discussed in the observation method above. The purpose of the pilot observation test was to become familiar with the spaces, define the activities patterns and estimated requirement the time for each observation section. In the pilot test, studied space was Telford Exhibition Hall. Some informal observations, on 1st to 3rd of June 2015, show that after 4pm there are few people in the spaces. Therefore, pilot observation took place over five days on 5,6,7,8,9 of October 2015, with the interval times at 10am 12pm and 3pm.

The result from the piloting observation has shown some significant the multiple used patterns of student's activities happened in the three studied spaces. First, while students have used Telford Exhibition Hall as the place to meet and socialize before working on their notes, handouts and laptops, other students socialised before moved to the lecture/seminar rooms together. There was also a significant number of students stayed in a group or in pair. They focused on their individual notebook, laptops but they also discussed with their friends regularly. In contrast, it was a few of users in have no interaction with others; they tend to seat alone and work with their laptops, books, pens, handouts and notebooks surrounding. There was a small number of students used the space for refreshment and had no interaction; most of them played or looked at their phone in the meantime. Observation also showed students generally stayed less than 2 hours in these spaces, however, some students also came back afterwards.

From the piloting study, the category of student's activities was changed. As it was noted that students always had multiple tasks to do and their activities also changed by the time of observation happened. Therefore, instead of using a variety of symbol to mark different activities on the plan (according to the Table 5.2), the shorter categories were applied. The table below indicated activities was recorded by 2 categories for students such as "engage with learning activities" and "engage with social activities". Bold was used to indicate whether students have interactions or no interaction with others. For the staff, there were two categories were used as "staff use with no interaction" and "staff use in group" Furthermore, in order to record correctly the nature of activities that students do in the space, several written notes was

added next to these classified symbols to clarify which was the major activities or subsequence ones, what material students used for their works, their attitude toward the tasks, emotion, or any special reaction that they may show by their gestures, facial express or postures. Although these notes were recorded by researcher views which may a source of bias and assumption, they provided in-depth the nature of learning activities and people reactions in a real environment.

Table 5.2: Symbol and category of activities

Symbol	Activities	Common notes
△	A student who engaged with learning alone	HD: handout
▲	Students who engaged with learning in a group	NB: notebook
○	A student who engaged with social activities individual	Lt: laptop
●	Students who engaged with social activities in a group	P: Phone
□	Staff who used alone	F: Food
■	Staff who used in group	Bold if the user in the group
*	Take a nap/relax	Add the arrow indicated the interaction with others →

As discussed in section 5.3.1.3, pictures also used to record the scenario of each studied space; however, through the pilot test, research noticed that the present of camera disturbed and interrupted the users. Therefore, limited pictures were taken in order to maintain the real nature of activities happen in the study spaces.

5.3.2.1 Limitations withdraw from the piloting study

Through the pilot observation study, there was some limitations of the observation method. Comparisons between the three spaces are limited to the time observation occurred. The delay of 20 minutes between locations may result in un-captured uses of each space. Furthermore, the observation could only reflect the general purposes of the users; however, the complexity of learning activities may be difficult to express in short-term recorded action. In addition, observation also entailed some assumptions of observer about what users seemed to do but not sure what they really did with their belongings such as phones, laptops or notes. Therefore, the

in-depth discussion in the focus group setting, and open discussed, is essential in terms of investigating the complex ways social environment impact upon the learning process.

5.3.3 Survey method

The survey method offers ‘a quantitative or numeric description of trends, attitudes, or opinions of a population by studying a sample of that population’ (Creswell, 2014, p. 13). Questionnaires are a useful method to identify regularities in groups of people. By comparing answers between different people to the same set of questions, surveys generate valuable quantitative data, especially ‘when investigators begin with a very well- defined problem, knowing the major concepts and dimensions they want to deal with’ (Zeisel, 2006, p. 257). In environmental behaviour research, qualitative methods, such as observation, focus group or interview are usually applied to define initial issues to construct the questionnaire (Zeisel, 2006, p. 257). By analysing the questionnaire responses, the researcher can find detail about phenomena. In this study, the observation is applied to give the overview users activities, time spend in the venues and the purposes of users when they are in the spaces. These first raw data would be used for two purposes. First, it helps researcher to define the time frames, activities pattern and observation behaviour code for the main study. Secondly, it establishes some main category of activities and focus points for the questionnaire design. From these initial data, the questionnaires are designed and modified through different case studies to provide precise measurement about each space in term of satisfaction about the design quality, comfort, users’ needs, rating about design attribute of the spaces, preferences and reasons for learning behaviours in the spaces are being investigated.

5.3.3.1 Approach to respondents

While in some studies the location of survey data gathering may not be vitally important, it is an important factor for research that focuses on how participants respond to physical settings or location. Therefore, instead of using online survey methods, this study used self-administered questionnaires in the investigated spaces themselves. The researcher approached respondents and explained the purpose and intention of the study. Then questionnaires were completed by participants and collected by the researcher later. This approach to data collection helped to achieve ‘high response rate, accurate sampling and a minimum of interviewer bias, while permitting interviewer assessments, providing necessary explanations and giving the benefit of a degree of personal contact’ (Oppenheim, 1992, p. 103). In addition, it ensured that participants who answered the survey use the physical spaces. Hence, it was easy for participants to recall their experience and perception about the design quality of the space.

Furthermore, these reduced misconceptions by the participants, as they had the chance to discuss anything unclear with the researcher.

To achieve valid results, selecting a random sample in which, ‘individual in the population had an equal probability of being selected’ is important (Creswell, 2014, p. 158). In this study, the questionnaire was disseminated in three different times in one semester. Therefore, participants were randomly chosen; after the qualification they used a space at least once.

5.3.3.2 Survey Structure

A well-structured survey plays an important role in preventing bias and misleading elements in the data collection process (Zeisel, 2006). The focus problems were placed at the first part of the survey. This allowed the researcher to catch participant expectations and interests in the first instance and this limited fatigue which could be a potential factor influence the consist of answers from participants (Oppenheim, 1992). The survey was divided into small modules, which clustered groups of related questions. This helps to minimise participant fatigue (Zeisel, 2006). The sequence of questions followed from easy to difficult in each module. In addition, there was the need to balance different types of questions, which are open or closed questions in each module. Classification questions or personal data, such as age, gender and another category choice should introduce at the end of the survey to avoid being ‘off-putting to respondents’. This organisation of the questions was careful considered as it is emphasized that accurate data can only be generated by the positive relation between inquirer and respondent (Oppenheim, 1992). Therefore, the structure of questionnaires was carefully considered and tested by pilot work, before being applied in the main study.

In the survey, an explanation that emphasises the mean of the term in this specific context are important. It is indicated that ‘the quality [...] questionnaires data rests heavily on whether questions address topics that are salient to respondents and the researcher’s purpose and whether questions are asked so that answers may be understood clearly’ (Zeisel, 2006, p. 287). Therefore, explanation and definition are applied in the questions which may content multi meanings to ensure that the participants’ answers correspondent to the questions and. In addition, the wording was a significant concern of the researcher; therefore, some pre-tests were taken and some participants asked about the legibility of the questions before the survey was disseminated. This helped to avoid misleading aspects and bias from the questionnaire itself as well as from respondents.

5.3.4 Survey Piloting

In this study, to collect accurate data three version of questionnaire were developed. Initially, base on literature version 1 of survey was generated. First version of the questionnaire

contained four parts as showed in (Appendix 2a). This was used in the pilot test to examine whether it could generate appropriate and reliable data. Withdraw from the result of pilots study, there was some changes to the survey. It was noticed that participants ‘put off’ when they were asked about their peception at the beginning. Therefore, the structure of the survey was changed where ‘used value’ was placed as the first session accordingly as showed in Table 5.3 .

Table 5.3: Difference between questionnaire -Version 1 and version 2 (shown in appendix 2a,2b)

Version 1 (apply for piloting)	Version 2 (apply for case study 1)																		
Questionnaire sheet (version 1) Please indicate whether you are: ☐ University staff ☐ Student: ☐ 1st year (Course:.....) ☐ 2nd year (Course:.....) ☐ 3rd year (Course:.....) ☐ 4th year (Course:.....) ☐ Postgraduate (Course:.....) ☐ Visitor I. Perception of spatial quality Please indicate your perception about the design of this space 1. How do you rate the design character, image and response to the context of this space? (i.e. the space has its own character and relates well to its' context) <table border="1"> <tr> <td> ☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable </td> <td>Further comment:</td> </tr> </table> 2. How do you rate the design quality and appearance of this space? (i.e. the space is visually appropriate, attractive, well designed in terms of shape, material and/or colour, attractive and fit for purpose, providing architectural quality) <table border="1"> <tr> <td> ☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable </td> <td>Further comment:</td> </tr> </table> 3. How do you rate the design coherence of this space? (i.e. the space and buildings have collective value when seen together and create places which are distinctive and understandable) <table border="1"> <tr> <td> ☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable </td> <td>Further comment:</td> </tr> </table> 4. How do you rate the legibility of this space? (i.e. The design of this space allows the users to form movement routes easily, and allows an easy understanding of its function) <table border="1"> <tr> <td> ☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable </td> <td>Further comment:</td> </tr> </table>	☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable	Further comment:	☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable	Further comment:	☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable	Further comment:	☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable	Further comment:	Student experience questionnaire Name of the space: ☐ ESLC Atrium, ☐ ESLC Social learning space, ☐ Telford Exhibition Hall, ☐ Coates Cafe University: University of Nottingham Investigated date:/...../2015 I. Please indicate whether you are: ☐ University staff ☐ Student: ☐ 1st year (Course:.....) ☐ 2nd year (Course:.....) ☐ 3rd year (Course:.....) ☐ 4th year (Course:.....) ☐ Postgraduate (Course:.....) ☐ Visitor II. Please indicate how you have used this space 1. How often do you use this space? ☐ Daily (or attempt to use it daily) ☐ Several times per week ☐ Several times per semester ☐ Never use (please specify why)..... 2. How many hours per week you might spend in campus? hours/week (approximately) 3. How many hours per week you might spend in social learning space (i.e. like this space)? hours/week (approximately) 4. Why do you use this space? ☐ Socialising (meeting friends, peers or colleagues) ☐ Meeting and discussion with peers, exchange information) ☐ Learning (group work, working on course work alone or with friend) ☐ Refreshment (break, eating or drinking, reading, smoking, using social media) ☐ Social cultural events (research show case, exhibitions, meeting events) Other comment (please specify) 5. How long would you usually stay in this space? ☐ 15min (pass by or may stop for chatting) ☐ >1 hour (stay for a short time) ☐ >3 hours (stay for a while to work on something) ☐ Can be whole day (stay for long time as part of learning time) Other comment (please specify) 6. How many people do you typically know when you stay in this space? ☐ Many friends (≥10) ☐ Some of my friends (5-9) ☐ Few of my friends (1-4) ☐ Many Acquaintances (knowing them by sight and/or name) (≥ 10) ☐ Some Acquaintances (knowing them by sight and/or name) (5-9) ☐ Few Acquaintances (1-4) ☐ None										
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☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable	Further comment:																		
5. How do you rate the density, diversity and richness of this space? (i.e. The space has a number of various elements in the scene and promotes a variety of functional choice for users) <table border="1"> <tr> <td> ☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable </td> <td>Further comment:</td> </tr> </table> 6. How do you rate the sense of security and safety in this space? (i.e. the design of this space encourages the sense of a safe environment and promotes occupation for a long duration) <table border="1"> <tr> <td> ☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable </td> <td>Further comment:</td> </tr> </table> 7. How do you rate the accessible characteristics of this space (entrances, doors, pathway, etc.)? (i.e. the space has good connection and is well integrated into the surrounding spaces and buildings) <table border="1"> <tr> <td> ☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable </td> <td>Further comment:</td> </tr> </table> 8. How do you rate the flexibility and adaptability of this space? (i.e. the setting of spaces can easy to be changed to fit with variety purposes of uses) <table border="1"> <tr> <td> ☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable </td> <td>Further comment:</td> </tr> </table> II. Use value 9. How often do you use this space? ☐ Daily (or attempt to use it daily) ☐ Several times per week ☐ Several times per semester ☐ Never use (please specify why)..... 10. How many hours per week you might spend in campus? hours/week (approximately) 11. How many hours per week you might spend in social learning space (i.e. like this space)? hours/week (approximately)	☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable	Further comment:	☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable	Further comment:	☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable	Further comment:	☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable	Further comment:	III. Please indicate your perception about the design of this space 7. How do you rate the design character, image and response to the context of this space? (i.e. the space has its own character and relates well to its context) <table border="1"> <tr> <td> ☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable </td> <td>Further comment:</td> </tr> </table> 8. How do you rate the design quality and appearance of this space? (i.e. the space is visually appropriate, attractive, well designed in terms of shape, material and/or colour, attractive and fit for purpose, providing architectural quality) <table border="1"> <tr> <td> ☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable </td> <td>Further comment:</td> </tr> </table> 9. How do you rate the design coherence of this space? (i.e. the space and buildings have collective value when seen together and create places which are distinctive and understandable) <table border="1"> <tr> <td> ☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable </td> <td>Further comment:</td> </tr> </table> 10. How do you rate the legibility of this space? (i.e. The design of this space allows the users to form movement routes easily, and allows an easy understanding of its function) <table border="1"> <tr> <td> ☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable </td> <td>Further comment:</td> </tr> </table> 11. How do you rate the density, diversity and richness of this space? (i.e. The space has a number of various elements in the scene and promotes a variety of functional choice for users) <table border="1"> <tr> <td> ☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable </td> <td>Further comment:</td> </tr> </table>	☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable	Further comment:	☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable	Further comment:	☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable	Further comment:	☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable	Further comment:	☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable	Further comment:
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12. Why do you use this space? ☐ Socialising (meeting friends, peers or colleagues) ☐ Meeting and discussion with peers, exchange information ☐ Learning (group work, working on course work alone or with friend) ☐ Refreshment (break, eating or drinking, reading, smoking, using social media) ☐ Social cultural events (research show case, exhibitions, meeting events) ☐ Other comment (please specify)..... 13. How long would you usually stay in this space? ☐ 15min (pass by or may stop for chatting) ☐ >1 hour (stay for a short time) ☐ >3 hours (stay for a while to work on something) ☐ Can be whole day (stay for long time as part of learning time) ☐ Other comment (please specify)..... 14. How many people do you typically know when you stay in this space? ☐ Many friends (≥10) ☐ Some of my friends (5-9) ☐ Few of my friends (1-4) ☐ Many Acquaintances (knowing them by sight and or name) (≥ 10) ☐ Some Acquaintances (knowing them by sight and or name) (5-9) ☐ Few Acquaintances (1-4) ☐ None III. Occupant Satisfaction 15. Please identify your impression of the space ☐ Exciting/attractive/cool ☐ Welcoming ☐ Comforting ☐ Safe ☐ Bland ☐ Unwelcoming ☐ Uncomfortable ☐ Other (please specify)..... 16. Overall, how satisfied are you with the configuration of this space? ☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable 17. Overall, how satisfied are you with the design of this space? ☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable	12. How do you rate the sense of security and safety in this space? (i.e. the design of this space encourages the sense of a safe environment and promotes occupation for a long duration) <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 2px;"> ☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable </td> <td style="width: 50%; padding: 2px;">Further comment:</td> </tr> </table> 13. How do you rate the accessible characteristics of this space (entrances, doors, pathway, etc.)? (i.e. the space has good connection and is well integrated into the surrounding spaces and buildings) <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 2px;"> ☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable </td> <td style="width: 50%; padding: 2px;">Further comment:</td> </tr> </table> 14. How do you rate the flexibility and adaptability of this space? (i.e. the setting of spaces can easy to be changed to fit with variety purposes of uses) <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 2px;"> ☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable </td> <td style="width: 50%; padding: 2px;">Further comment:</td> </tr> </table> IV. Please indicate your satisfaction about this space 15. Please identify your impression of the space ☐ Exciting/attractive/cool ☐ Welcoming ☐ Comforting ☐ Safe ☐ Bland ☐ Unwelcoming ☐ Uncomfortable ☐ Other (please specify)..... 16. Overall, how satisfied are you with the configuration of this space? ☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable 17. Overall, how satisfied are you with the design of this space? ☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable	☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable	Further comment:	☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable	Further comment:	☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable	Further comment:
☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable	Further comment:						
☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable	Further comment:						
☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable	Further comment:						
18. How does this space meet or exceed your needs as a user? ☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable 19. How satisfied are you with the comfort this space provides? ☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable 20. Please rate whether the space provides a positive environment for activities and social interactions? ☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable 21. Does the design of this space communicate the vision and identity of the academic environment? •This space represents the vision and identity of the University of Nottingham ☐ Yes ☐ No •This space represents the vision and identity of the Faculty ☐ Yes ☐ No •This space represents the vision and identity of the Department ☐ Yes ☐ No 22. How do you rate how this space promotes your sense of belonging to the academic environment? ☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable To which of the below does this space promote your sense of belonging to: ☐ University ☐ Faculty ☐ Department 23. Please describe any other comments about the space below (if applicable) <i>Thank you for taking time to answer these questions</i>	18. How does this space meet or exceed your needs as a user? ☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable 19. How satisfied are you with the comfort this space provides? ☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable 20. Please rate whether the space provides a positive environment for activities and social interactions? ☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable 21. Does the design of this space communicate the vision and identity of the academic environment? •This space represents the vision and identity of the University of Nottingham ☐ Yes ☐ No •This space represents the vision and identity of the Faculty ☐ Yes ☐ No •This space represents the vision and identity of the Department ☐ Yes ☐ No 22. How do you rate how this space promotes your sense of belonging to the academic environment? ☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable To which of the below does this space promote your sense of belonging to: ☐ University ☐ Faculty ☐ Department 23. Please describe any other comments about the space below (if applicable) <i>Thank you for taking time to answer these questions</i>						

After the case study one, the survey was reviewed and modified. The main reason for these changes as the result of the survey may not reflect in depth users' opinions. Furthermore, some character of the design quality might not be understood by users who may not have design background. In addition, although the relationship between the students' use value and time spent was demonstrated, there was a need of link between student experience and perception of design quality. Therefore, the version 3 of survey was different to version 2 accordingly (as indicated in the Table 5.4). In particular, the main focus points with regard to student's use

value was remain as the first part of the survey. There was a changing in the scale for these use value questions. In addition, perception about overall satisfaction of design quality was moved to this part of the survey. First, came questions relating to intention to use the space and amount of time users would like to stay. In addition, frequency of using the space is examined on the scale of daily, weekly and per semester. Second, participants were asked about their overall satisfaction with the space, such as design quality, comfort and expectation. This group of questions was set up to measure the degree of user satisfaction in a 5 points Likert Ordinal scale (answers were: ‘very satisfied’, ‘somewhat satisfied’, ‘neither satisfied nor dissatisfied’, ‘somewhat dissatisfied’ and ‘very dissatisfied’).

The second part of the questionnaire investigated the intensity of activities in each study space. These questions were based on the informal learning activities and employed the continuous scale measurement, which ranged from 0 to 100 percent (equal to the range ‘never’, ‘rarely’, ‘sometimes’, ‘often’ and ‘always’). This part was different from the older version of survey.

The fourth part of the survey measured the perception of users of the physical environment. In this part, the design quality of the space was divided into five main themes, such as ‘comfort’, ‘access’, ‘physical design factors’, ‘technology’ and ‘place attachment factors’. These variables were measured by semantic differential style questions. Participants were instructed to mark the perception on the line scale, correspondent to each design factor. In addition, respondents were required to report how these factors affected their choice of using studied spaces for learning or social purposes.

Fifth, the information and classification part formed the end of the survey. In addition, this part also included a series of question to measure student learning engagement level. The student engagement survey has been developed and widespread in Australia and US which contain 16 prompt questions. In this study, a part of questionnaire were adapted from the Students Engagement Survey presented in Matthew et al.’s (2006) study, which were measured by a 5-point Likert scale.

Table 5.4: Comparison between questionnaire -Version 2 and version 3 (shown in appendix 2b, 2c)

Version 2 (apply for case study 1)	Version 3 (apply for case study 2)																																												
Student experience questionnaire Name of the space: ☐ ESLC Atrium, ☐ ESLC Social learning space, ☐ Telford Exhibition Hall, ☐ Coates Cafe University: University of Nottingham Investigated date:/...../2015 I. Please indicate whether you are: ☐ University staff ☐ Student: ☐ 1st year (Course:) ☐ 2nd year (Course:) ☐ 3rd year (Course:) ☐ 4th year (Course:) ☐ Postgraduate (Course:) ☐ Visitor II. Please indicate how you have used this space 1. How often do you use this space? ☐ Daily (or attempt to use it daily) ☐ Several times per week ☐ Several times per semester ☐ Never use (please specify why)..... 2. How many hours per week you might spend in campus? hours/week (approximately) 3. How many hours per week you might spend in social learning space (i.e. like this space)? hours/week (approximately) 4. Why do you use this space? ☐ Socialising (meeting friends, peers or colleagues) ☐ Meeting and discussion with peers, exchange information) ☐ Learning (group work, working on course work alone or with friend) ☐ Refreshment (break, eating or drinking, reading, smoking, using social media) ☐ Social cultural events (research show case, exhibitions, meeting events) ☐ Other comment (please specify)..... 5. How long would you usually stay in this space? ☐ 15min (pass by or may stop for chatting) ☐ >1 hour (stay for a short time) ☐ >3 hours (stay for a while to work on something) ☐ Can be whole day (stay for long time as part of learning time) ☐ Other comment (please specify)..... 6. How many people do you typically know when you stay in this space? ☐ Many friends (>10) ☐ Some of my friends (5-9) ☐ Few of my friends (1-4) ☐ Many Acquaintances (knowing them by sight and or name) (> 10) ☐ Some Acquaintances (knowing them by sight and or name) (5-9) ☐ Few Acquaintances (1-4) ☐ None	I. Please indicate how you use this space (please tick one item for each) 1. What is the main purpose of your use? ☐ Social purpose (relaxing, meeting or talking with friends not related to academic work) ☐ Learning purpose (individual study, group work, meeting academic staff or peers) ☐ Both social and learning purpose *(could you approximate how much with % figure: Social:.....%, Study: %) 2. How often do you use this space? ☐ Daily (or attempt to use it daily) ☐ Several times per week ☒ Several times per semester ☐ Several times per year ☐ Never (please specify why)..... 3. How many hours do you usually stay in this space? (in hours approximately) <table border="1"> <tr> <td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>More than 10</td> </tr> </table> 4. How long would you like to stay in this space if you do not have any schedules or classes? (In Hours approximately) <table border="1"> <tr> <td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>More than 10</td> </tr> </table> 5. How many acquaintances do you typically know in this space? (person you might recognize by sight or name) <table border="1"> <tr> <td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>More than 10</td> </tr> </table> 6. How many friends do you typically know in this space? <table border="1"> <tr> <td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>More than 10</td> </tr> </table> 7. Overall, how satisfied are you with the design of this space? ☐ Very satisfied ☐ Somewhat satisfied ☐ Neither satisfied nor dissatisfied ☐ Somewhat dissatisfied ☐ Very Dissatisfied	0	1	2	3	4	5	6	7	8	9	More than 10	0	1	2	3	4	5	6	7	8	9	More than 10	0	1	2	3	4	5	6	7	8	9	More than 10	0	1	2	3	4	5	6	7	8	9	More than 10
0	1	2	3	4	5	6	7	8	9	More than 10																																			
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☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable	Further comment:																																												
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12. How do you rate the sense of security and safety in this space? (i.e. the design of this space encourages the sense of a safe environment and promotes occupation for a long duration)

☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable	Further comment:
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13. How do you rate the accessible characteristics of this space (entrances, doors, pathway, etc.)? (i.e. the space has good connection and is well integrated into the surrounding spaces and buildings)

☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable	Further comment:
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14. How do you rate the flexibility and adaptability of this space? (i.e. the setting of spaces can easy to be changed to fit with variety purposes of uses)

☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable	Further comment:
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IV. Please indicate your satisfaction about this space

15. Please identify your impression of the space

☐ Exciting/attractive/cool ☐ Welcoming ☐ Comforting ☐ Safe ☐ Bland ☐ Unwelcoming ☐ Uncomfortable ☐ Other (please specify):

16. Overall, how satisfied are you with the configuration of this space?

☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable

17. Overall, how satisfied are you with the design of this space?

☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable

18. How does this space meet or exceed your needs as a user?

☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable

19. How satisfied are you with the comfort this space provides?

☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable

20. Please rate whether the space provides a positive environment for activities and social interactions?

☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable

21. Does the design of this space communicate the vision and identity of the academic environment?

-This space represents the vision and identity of the University of Nottingham

-This space represents the vision and identity of the Faculty

-This space represents the vision and identity of the Department

22. How do you rate how this space promotes your sense of belonging to the academic environment?

☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable

To which of the below does this space promote your sense of belonging to:

☐ University ☐ Faculty ☐ Department
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23. Please describe any other comments about the space below (if applicable)

Thank you for taking time to answer these questions

II. Please indicate which of the following activities that you have done in this space (please mark the frequency of activities in the second column)

Activities	Never 0%	Rarely 25%	Sometimes 50%	Often 75%	Very often 100%
Social					
☐ Talking with friends (not relate to learning)					
☐ Using social media not for learning purpose					
☐ Relaxing (break, eating or drinking)					
☐ Using computer for learning purpose					
Individual					
☐ Reading handout or course material					
☐ Using an online learning system to discuss or complete an assignment					
experience activity category					
☐ Explaining course material to one or more students					
☐ Asking another student to help you understand course material					
☐ Preparing for exams or assessments by discussing or working through course material with others					
☐ Asking questions about course material					
☐ Discussing your academic performance and/or feedback with teaching staff					
☐ Talking about your career plans with teaching staff or advisors					
☐ Discussing ideas from your course with staff outside taught sessions, including by email/online					
☐ Working with teaching staff on activities other than coursework					
Interact with staff					
☐ Interacting with others to exchange information					
☐ Developing professional or social contacts					
☐ Attending in department/faculty events (research showcase or exhibitions)					
Networking					
Other (please specify)					

III. Please indicate the degree to which these parameters apply to this space

Parameters	Very	Slightly	Fair	Slightly	Very
A. Comfort					
Noise level of this space					
Temperature					
Artistic space					
Natural lighting of this space					
Comfort of furniture					
Location of this space					
Easy to access					
C. Appearance					
Volume of this space					
The height of this space					
Shape of this space					
Material of spaces					
Colour of this space					
The view outside of this space					
D. Technology					
Computers and printers access					
Laptop support					

IV. Please indicate the degree to which these parameters apply to this space

Parameters	very	slightly	fair	slightly	very
A. well design place attachment					
Attractiveness					
The space has its own identity					
Welcoming familiarity with					
Complexity of the design elements					
Cohesive (unity) of the design					
Sense of understanding function of the space					
Interest perceived in the space					
The degree of privacy in this space					
Enclosure of the space					
Degree of ownership					
Visual appropriateness for its use					
Sense of safety in this space					
Flexibility and adaptability					

V. Background Information

1. Please indicate whether you are:

University staff ☐ Visitor ☐ Student

1st year (Course:)

2nd year (Course:)

3rd year (Course:)

4th year (Course:)

Postgraduate (Course:)

Male ☐ Female ☐

Home student ☐ International ☐

Full time ☐ Part-time ☐

Age: <18 ☐ 18-20 ☐ 21-25 ☐ >25

Living in campus ☐ Living in off campus ☐

2. Do you consider yourself as a regular user of social learning spaces? (Spaces designed for socialising, group or individual work outside formal classrooms or lecture theatres etc: Tetford Exhibition Hall, Coates Café, ESILC social learning spaces, Coates design studio...)

Yes ☐ No ☐

3. In total, how many hours per week do you spend in all social learning spaces on campus?

hours/week (approximately)

0-1 ☐ 1-2 ☐ 2-3 ☐ 3-4 ☐ 4-5 ☐ 5-6 ☐ 6-7 ☐ 7-8 ☐ 8-9 ☐ 9-10 ☐ 10-11 ☐ 11-12 ☐ 12-13 ☐ 13-14 ☐ 14-15 ☐ 15-16 ☐ 16-17 ☐ 17-18 ☐ 18-19 ☐ 19-20 ☐ 20-21 ☐ 21-22 ☐ 22-23 ☐ 23-24 ☐

4. Overall, What is your perception about the design of social learning spaces on this campus?

Bad ☐ Fair ☐ Good ☐ Very Good ☐

5. Please specify in which social learning space you spend most time?

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Thank you for taking time to answer these questions

5.3.5 Focus group

Focus group research is based on the principle that rich data can be elicited from the group interactivity. (Cousin, 2009, p. 51)

As the above discussion about the difficulty of quantifying the design quality implies, a focus group is deemed necessary to follow up the findings from the survey and observation. This form of data collection enables a deeper and wider understanding of the relationship between the design quality and student experience.

Focus groups have been widely used in qualitative research, especially in social science research. Its principle is based on the notion that, “when people gather to talk about something, their contributions and understandings will be enriched by the group dynamic” (Cousin, 2009, p. 51). This method could assist researchers to generate “understanding and insights” via the constant engagement with “the empirical data, literature and the moderator’s reflexivity” (Cousin, 2009, p. 62). Learning processes are complex, where learners could give attention or no attention on what they learn (Blackmore *et al.*, 2011). This could also be a conscious or unconscious process. The fact that students may find it difficult to recall their experience of learning means it may be hard to respond to a direct interview question. Therefore, the focus group is useful to give a depth of insight about how students view social learning spaces and how these spaces have assisted or limited them in their study. Such groups generates more ideas and enriches descriptions by giving platform to various perspectives (Cousin, 2009). Compared with interview methods that have been done by a number researcher, the focus group will give the participants a chance to discuss and interact with others and the researcher to clarify their own thoughts.

5.3.5.1 Validity

In order to gather valid data, Glaser and Strauss (1976) have indicated that the trustworthiness of the focus group depends on “purposive sampling” and “achieving saturation” (Cousin, 2009, p. 53). First, “purpose sampling” means the consideration of the diversity views of the group to ensure a variety of perspectives are collected and to reflect about the common experiences. Saturation means the researcher should continue to investigate in further groups, until no new insights are generated (Cousin, 2009, p. 54). Therefore, the focus groups were conducted several times until I noticed similar ideas were repeated in the participants’ responds.

It is indicated that there are three factors that strongly affect the validity of research in focus group methods: *interpersonal*, *intrapersonal* and *environmental*. Firstly, *interpersonal* includes issues relate to age, gender, ethnicity and social power. However, depending on the focus research problem, the effect of age can vary. In this study, although researcher tried to

select participants from different years of their studies to limit the bias. In addition, it is indicated that the researchers should try to avoid the affects relating to power status and ethnicity in the discussion of the focus group. The focus group has gathered the data from students with variety of nationality. Secondly, *intrapersonal* refers to the ‘unique biology and dispositions’ that each participant brings to the group discussion (Cousin, 2009); therefore, researcher should keep the balance of group discussion. To limit this bias, in the focus group discussion, sometime researcher has to encourage all the participants to join the conversation and ensure all participants could contribute their thoughts. Thirdly, *environmental* refers to the comfort and distraction that comes with the setting, which might have an affect on the conversation between participants. Therefore, minimising the distractions and creating comfortable environments is recommended, to reduce the bias in group discussion. In addition, moderation by the researcher is also a source of bias in the focus group method. In this study, the participants arguably have limited knowledge about the design aspects. Therefore, explaining and involving in the discussion to facilitate the conversation between participants are required. While this may have affected the nature of reality recorded, it also reduced the bias from misconception. Therefore, on balance, it increased the degree of reliability of response.

5.3.5.2 Participant recruitment process

In this research, target participants were defined by the frequency of using investigated spaces before the group was chosen. The users of the social learning spaces were approached directly in the spaces and asked whether they wanted to take part in the study. They were also required to participate in the short survey about their frequency of use. From the collected data, participants for each focus group were chosen based on their different experiences in the study spaces. In addition, age, gender and ethnicity were also considered when allocating participants to groups. The location of the group discussions were in the investigated spaces under consideration. Although these spaces had some sources of distraction to the participants, it was easier for participant to recall their real experiences at the time of the discussion when located here.

5.3.5.3 Piloting focus group

Although piloting focus group was not applied in this research, the clarity of the topic questions was considered precisely throughout the informal discussion with 2 presentative engineering students. Initially, there were 6 main questions for each focus group, which in total lasted around one hour (Appendix 3a). However, through the discussion with two volunteer engineering students, the format, content and sequence of the question were changed in order

to attract participant interests. This result in the revision of the focus group question and focus group question form was provided to participants (showed in Appendix 3b,3c). Also, images and guidance for each question also added to the participant question sheet to clarify the content of the main topic questions. Some fill in questions placed at the beginning of group discussion to engage participants with the topics. In order to attract the attention of participants, each discussed topic was explained by the researcher as well as in question sheet for participants. These materials helped to engage participants with the topic by allowing time for brainstorming, writing their own notes or scanning the questions before discussion start. Therefore, this helped the researcher conducted in-depth participants' thoughts, opinions and learning references relate to the design quality of social learning spaces. This process also helped to guide the discussion focusing to main points and reduced unrelated information.

5.3.6 Semi-structured interviews

Semi-structured interviews are so-called because the interview is structured around a set of themes which serve as a guide to facilitate interview talk. (Cousin, 2009, p. 73)

The semi-structured interview is a useful tool for the researcher to understand different layers of meaning and complex experiences of the design process. It is suggested that, "semi-structured interviews are best conceptualised as a "third space" where interviewer and interviewee work together to develop understandings" (Cousin, 2009, p. 73). Therefore, the process to conduct the interview is important. This required both "the content of the interview and in the way in which such content is assembled" (Cousin, 2009, p. 74).

In this research, semi-structured interview is employed to gain an insight and understanding of the design intention from the viewpoint of the architects and designers. Designing an architectural project is considered as a complex process, where tangible and intangible aspects are immersed with one another. Therefore, semi-structured interview directly with the designer or person managing the design process is the most powerful method to develop understanding, through open conversation. However, Zeisel (2006, p.260) emphasises that, 'research results are only as valid if the relationship between interview and respondents is open and non-defensive'. Therefore, the process of conducting the semi-structure interview was planned carefully.

In details, the participant recruitment process included direct contact, feasible due to the limited number of participants. The designer of the study spaces was recruited directly by email before the interview. The focus theme of the interview was introduced to attract interviewee attention at the beginning (Appendix 4). In the interview section, the main theme was followed by some enquiry sub-questions, to discover design intentions for each studied space. There was no piloting for the semi-structure interviews test.

5.4 Ethics

The Ethics Committee of the buildings where a case study is carried out approved all process used in the study. The users of the spaces were notified that observation was in progress by the Observation Notice note visible in the spaces. The observation pictures taken in the spaces blur out all faces to ensure all participants remain anonymous. All the volunteer participants that took part in the survey, focus group and interview were given sufficient information about the study and signed the consent form before taking part. Audio recording is used only on the agreement with the participants in the focus group and semi-structure interview. All the processes of data collection are applied in the case study, which is summarised in Table 5.5.

Table 5.5: Data Collection Summary

	Telford Exhibition Hall (UoN)	ESLC Social Learning Spaces (UoN)	Coates Cafeteria (UoN)	Coates Design Studio (UoN)	Pavilion Building NTU	Total
Survey	86	66	43	41	459	695
Observations (session=15 minutes)	15	15	15	10	105	160
Focus group	2				4	6
Semi- structure interview with designer	1				1	2

5.5 Data analysis

As stipulated by the explanatory sequential mixed methods design approach, the results of each method are analysed separately; then researcher uses the quantitative results to plan the follow-up of focus group and interview methods. The section below will discuss how the process of each database was analysed.

5.5.1 Observation data

Qualitative data, in the form of notations, maps and pictures is input to the computer. All the observation notes and maps are transferred to AutoCAD file. The entire symbol set will be differentiated by variety of layers. All the numbers of activities will be counted and input to a Microsoft Excel file and presented in chart and bar chart form. All the notations of transcripts are completed before inputting them into Nvivo for thematic coding. Finally, descriptions and interpretations of the result are presented.

5.5.2 Survey data

All questionnaire data was input into the computer software IBM SPSS Statistic 22. The analysis should include 5 steps, discussed below.

Firstly, information about response rate and sample size is presented by a respondent rate table. Secondly, strategy to examine the respondent bias is presented. Thirdly, descriptive analysis of data is presented in the form of graphs. In this analysis, mean, standard deviation and range score of the dependent and independent variable are discussed and presented graphically. Furthermore, the responses from a group of participants in the different investigated spaces were analysed by descriptive analysis to make the comparison.

Accordingly, the statistical procedure was taken to draw correlations between variables. In details, Spearman Correlation Test was applied to draw the correlation between design quality and user value, such as time spent, activity choice and user satisfaction. In order to obtain a valid result, all the assumptions and conditions of the test were checked and examined carefully. Then participants in each space were divided into different used groups, such as learning, social and both learning and social activities. Then the Kruskal-Wallis H Test was applied to test the differences between group users in the same spaces. Finally, all the results are presented in tables and figures. The researcher interpreted the results from both descriptive and statistical analysis. Then the conclusion drawn from the study are reported and discussed.

5.5.3 Focus group data

Qualitative data, which was in the form of answers in sentences on the transcription and notes, is input into the computer and analysed by thematic coding. The process of analysing focus group data includes 5 stages.

To begin with, writing notes, answer sheets and audio data recorded from the focus group was transcribed into Microsoft Word documents. These raw materials were organized into different files. Then, these were imported to the NViVo software, which prepared data for analysis. Secondly, general information, such as overall meaning, ideas and impressions were extracted from raw data. Thirdly, the coding procedure was carried out. The coding technique was various, dependent on each of project contexts. This study employed the ground theory coding technique, in which coding criteria was based on respondents' words and phrases. A group of common statements generated from all responses of participants was organized and linked together. Accordingly, similar groups were connected to create the main themes. Finally, the interpretations are made base on the themes collected from the data.

5.5.4 Semi-structure interview data

The procedure of analysis for interview data formed a succession of stages similarly to the focus group data analysis process above. Firstly, recording of the discussion was transcribed to a Microsoft Word document. Then the raw material is input and reorganised in N-Vivo software. Secondly, the researcher read through the document to gain key ideas and concepts from the interview. Thirdly, similar ideas and expressions were coded, based on the thematic technique. Finally, the researcher interpreted the results and presented them.

5.5.5 Interpretation of overall findings

In the discussion section of each case study, the different sources of findings from both quantitative and qualitative data were synthesised and interpreted. First, the observation , survey, focus group and interview were reported separately. Then researcher used the qualitative results to explain and consolidate the findings from the quantitative data. This explained and expanded on the survey data by adding further depth from interview data. Furthermore, this also provided a means of examining whether the design intention of each space matched with the user's perception, satisfaction and expectation. This evidence allowed the researcher to build a revised framework and reframed method for the next case study.

5.6 Summary

The preceding discussion justifies the approach and methods selected for this study. This chapter has discussed the pragmatic philosophy forming the undercurrent of the research; it also expanded on the research approach in terms of mixed methods. In the mixed method approach, different methods and their possible weakness have been explored. Also, the process of collecting data of each method was considered. While qualitative methods, such as observation, focus group and interview give in-depth evidence about a small number of opinions, quantitative data, in specific, survey and observation, can generate the tendency of use value, spatial perception and satisfaction about design quality. It also can draw the correlation between use value and perception or satisfaction of design factors. However, in depth effects on complex learning process could not be evaluated by numeric data. Therefore, triangulation is used to compare and correlate findings, as illustrated in Figure 5.5. Furthermore, repeating the research design for different case studies can give more rigorous evidences and improve the accuracy of the critical methods.

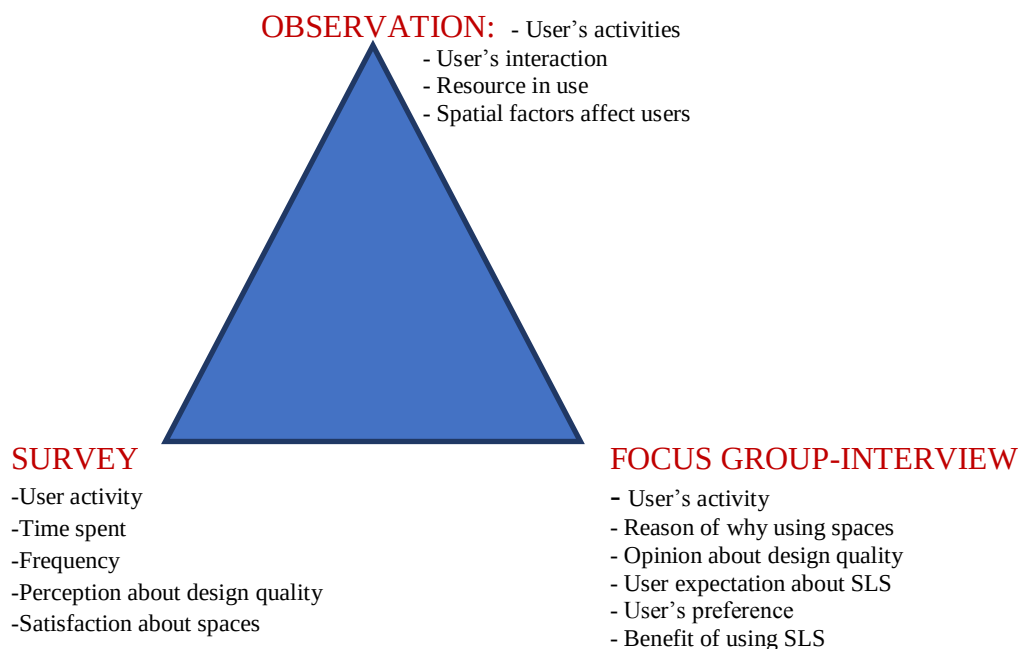


Figure 5.5: Triangulation methods applied in this study

Chapter 6 :

CASE STUDY 1 – SOCIAL LEARNING SPACES IN ENGINEERING FACULTY AT THE UNIVERSITY OF NOTTINGHAM

Chapter 6 will present the first case study, which includes four areas in the Faculty of Engineering at The University of Nottingham. The first case study was selected because these social learning spaces have been important to students in the Engineering Faculty and have contributed to the learning experiences of students. These spaces were chosen as the subject of investigation for a number of reasons. Firstly, these spaces have high use-value; they not only serve as social or meeting places, but also form key informal learning areas for students. These spaces also help to connect different academic buildings, to create an ambient zone and an informal learning environment. Furthermore, these areas contribute to the image of a lively community environment at the university. In terms of their physical design aspects, the four spaces offer a range of different design quality factors, which promote various activities. Therefore, investigation of these social learning spaces has the potential to demonstrate the effect of the design quality on various student-learning experiences. Furthermore, as the four spaces were constructed at different times, they offer a range of examples in terms of how different design approaches and intentions are used in real contexts.

The four spaces will be analysed by comparison, via different methods. This analysis will illuminate the relationship between perception of design quality and student experience. In detail, first, observation data will be analysed in relation to activity, interaction and design quality (Appendix 1a). Second, survey data will allow comparison between four spaces, in term of perception of design quality, self-reporting activity, time spent, and student satisfaction)(Appendix 2b). Third, focus group data will expand on users' experience with regard to the design quality, as well as users' experience in these spaces (Appendix 3a, 3b). Fourthly, semi-structured interview data from the infrastructure manager will illuminate the design objective and process of design for these spaces (Appendix 4). Finally, the discussion will synthesise the main findings arrived upon through the different methods and draw conclusions.

6.1 Site introduction

The Engineering Faculty is known to be the most crowded faculty of The University of Nottingham (UoN); it includes 3, 923 full-time students and 159 part-time students. The teaching space includes many buildings, of which the Telford Exhibition Hall (T.E.H), Engineering Science Learning Centre Social Learning Space (ESLC Social Learning Space), Coates Cafeteria and Coates Design Studio (or C.D.S) are located at the heart (Figure 6.1). These spaces are well used by the student body for both social and learning purposes. However, due to the accessibility of these spaces for other surrounding schools – Pharmacy, Economic, Chemistry and Psychology – a wide range of students make use the space throughout the academic year. Of these four social learning spaces, Coates Design Studio opened in 2015 and is purposely designed for group-work academic activities of engineering students.

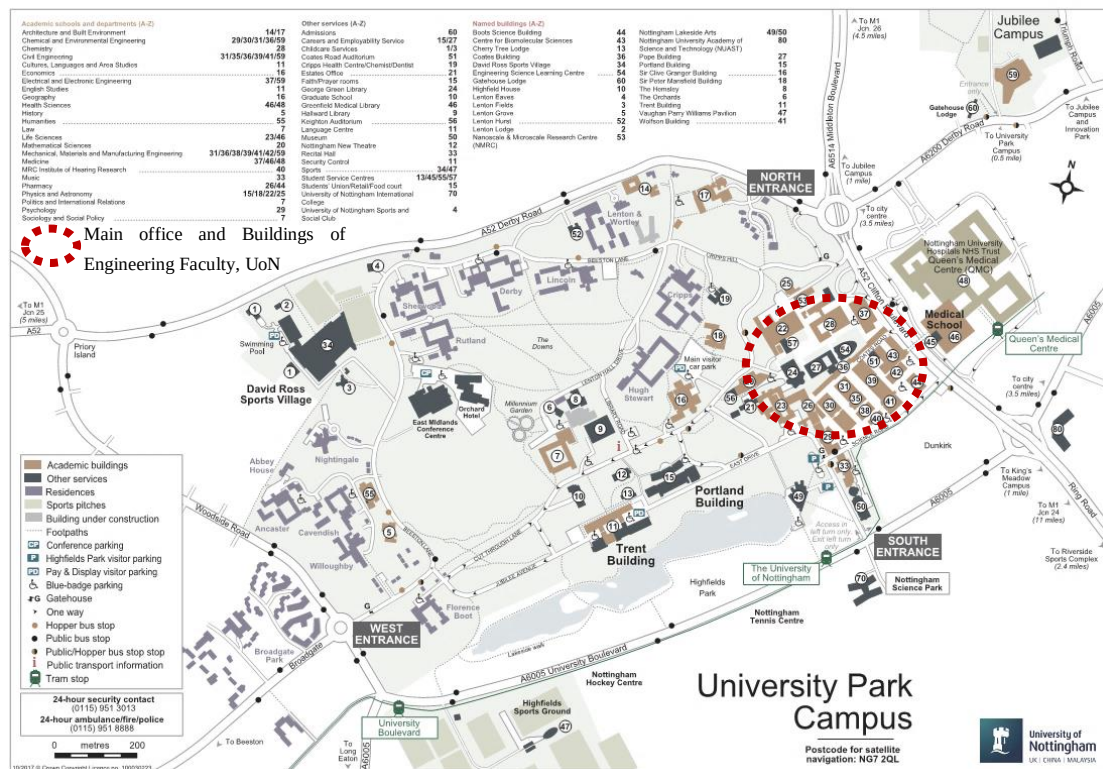


Figure 6.1: The cluster of engineering faculty buildings in the University Park Campus (Source: University of Nottingham Website)

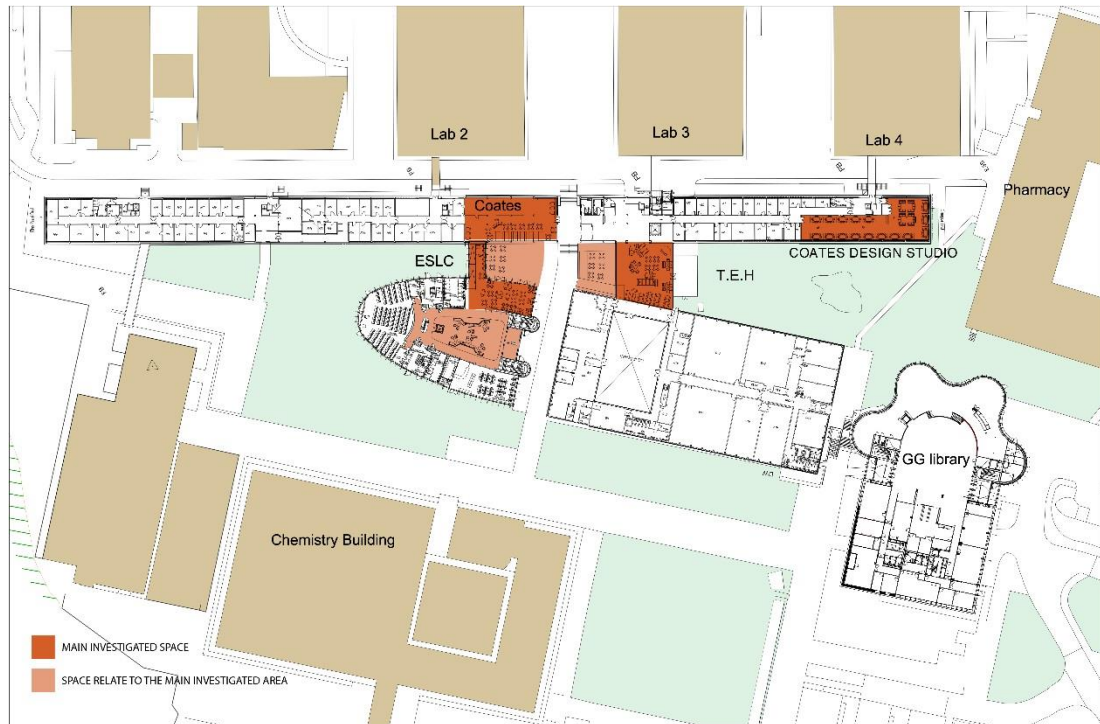


Figure 6.2: Location map and buildings surrounding the investigated spaces (Telford Exhibition Hall, Coates Cafeteria and ESLC Social Learning Space and Coates design Studio) (Source: map from the UoN Estate Office)

6.1.1 Telford Exhibition Hall

Telford Exhibition Hall is located between Coates Building and Pope Building, which are the main buildings of the Faculty of Engineering (Figure 6.2). This space is the newly renovated communal area of 2010. Telford Exhibition Hall opens 24 hours per day, over seven days a week throughout the year. With its location on the connection between Coates Building and Pope Building, Telford Exhibition Hall is a communal learning area where students can study or socialize between lectures. Additionally, the setting can be adapted to the requirement of users, for instance to make exhibition spaces (in summer time or end of the term). The plan of Telford Exhibition Hall includes a diversity of seating options: three linear tables arranged along the Pope corridor, three sofa lounges for a group of four to six users and some single seats, with high chairs around the corner of the snack bar (Figure 6.3). Furthermore, the space also offers two comfortable seating areas with a sofa and low tables for social purposes. The second floor of Telford Exhibition Hall has two tables for group work and three single computer spaces along the Pope corridor. These computers provide quick access to online resources, or alternatively provide individual working places.

In this setting, the observer's primarily position was on the second floor: where one can take in the ground and upper floor, while maintaining an overarching view of the space.

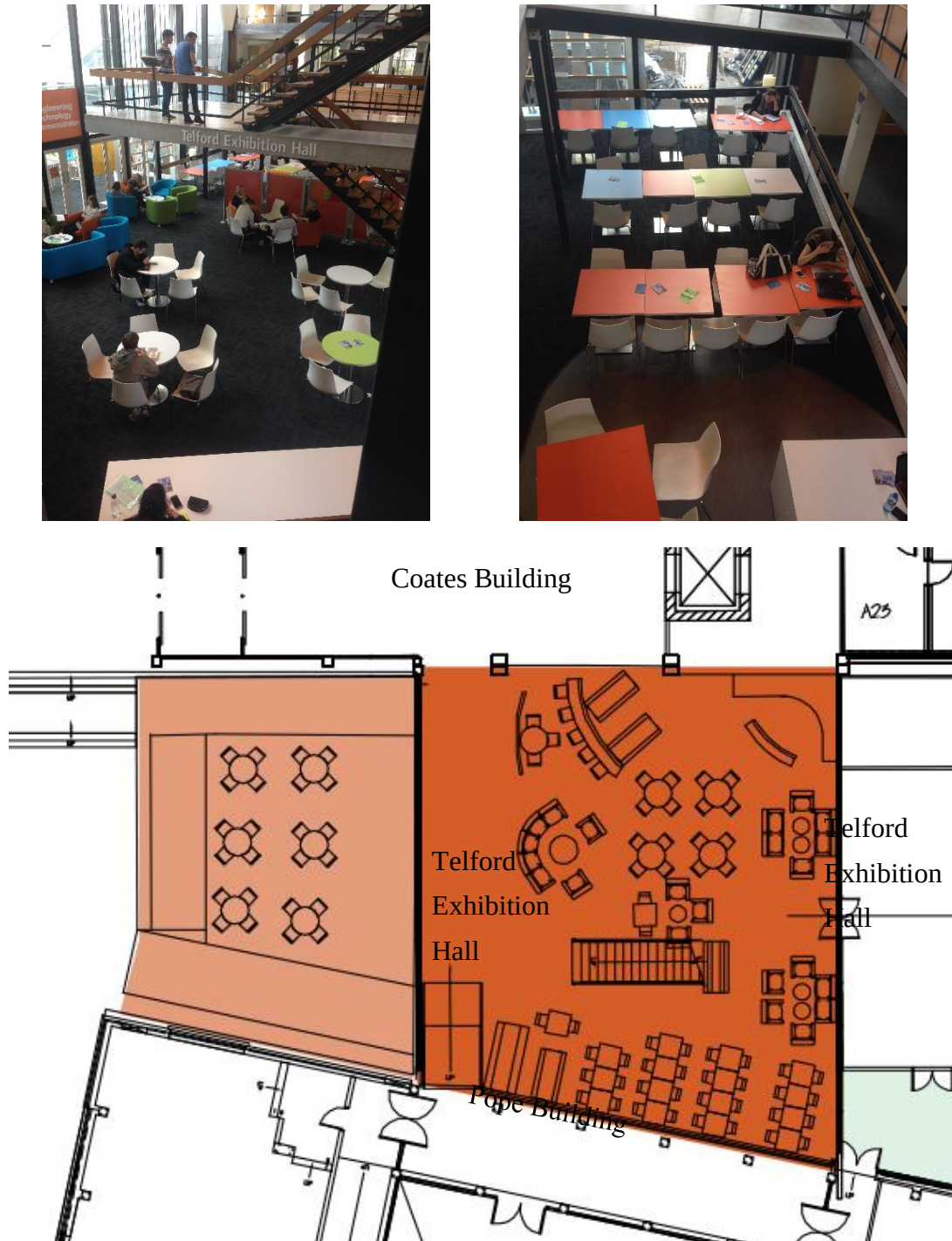


Figure 6.3 Telford Exhibition Hall Plan (Source: Observation picture at 06/10/2015 -10:07)

6.1.2 The Coates Cafeteria

The second studied space is the Coates Cafeteria Figure 6.4, refurbished in 2011. It is considered the core venue in a series of social learning spaces of the Nottingham Engineering Faculty (UoN, website). Located on the ground floor of the Coates Building, Coates Café primarily provides a catering service for students and staff. The seating areas are open 24/7; however, the catering service only opens from 8.30am to 4.00pm, Monday to Friday. Coates Café includes indoor and outdoor tables for students and staff to refresh themselves during the day. It also has a variety of seating arrangements, including some long benches and tables, high chairs and a small sofa area. Coates Cafeteria is especially crowded at peak lunch and tea times. The general impression one gets of Coates Cafeteria is that it is a lively place for student refreshment and socialising.

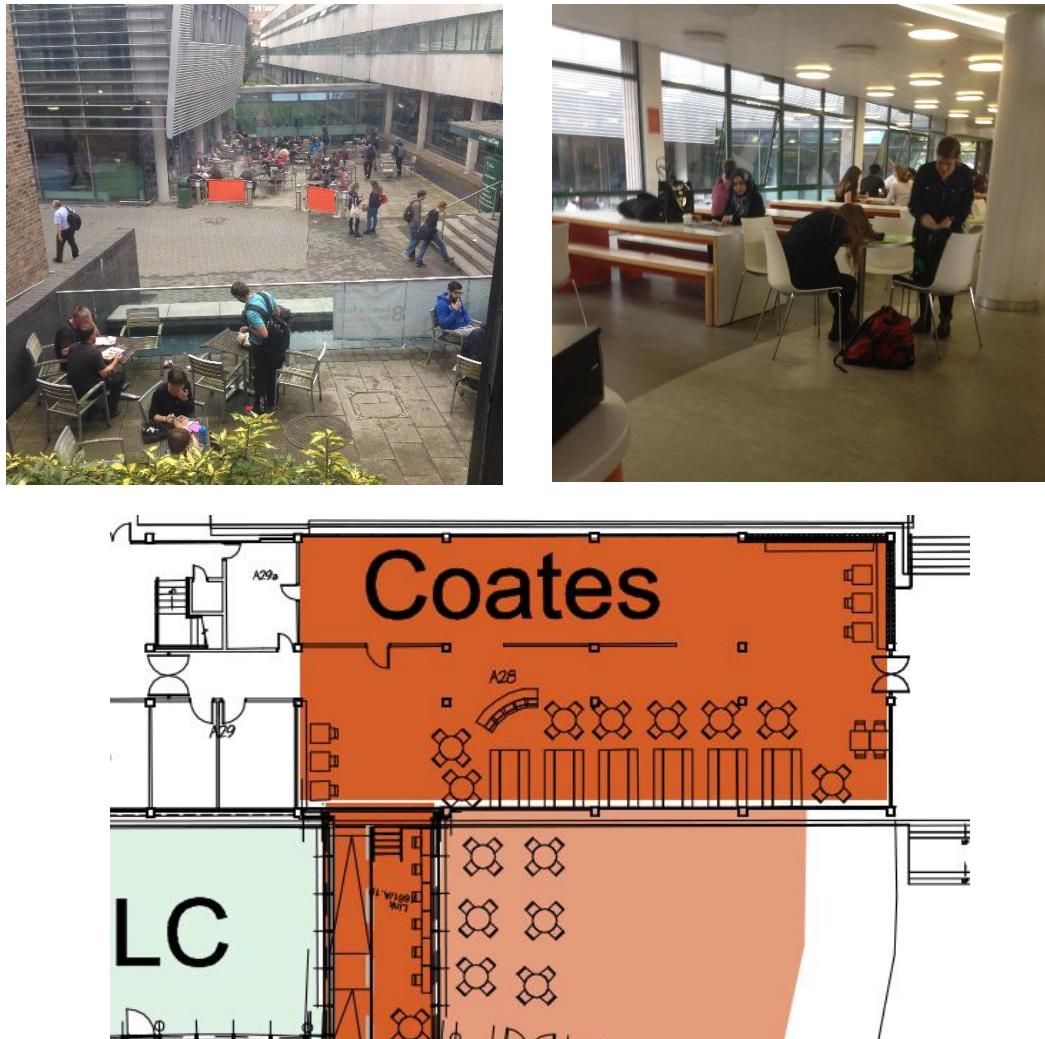


Figure 6.4: Coates Cafeteria outdoor spaces (a) and indoor layout (b) (Source: Observation pictures 06/10/2015-12:17)

6.1.3 The ESLC Social Learning Spaces

The third space in this series is the Engineering Science Learning Centre (ESLC) Social Learning Space, which is a part of ESLC Building, located on the ground floor. The ESLC Social Learning Space is a part of the Engineering and Science Learning Centre building, which is a new building and it has been in use since July 2011. It is located on the ground floor, as the connection point between ESLC Building and Coates Cafeteria. This space is designed to accommodate students' social activities; providing refreshment and meeting areas. In detail, seating in this space is a mix between sofa areas and high tables for working and eating purposes. Additionally, this space connects with the outside café via two exit, glass doors.



(a)

(b)

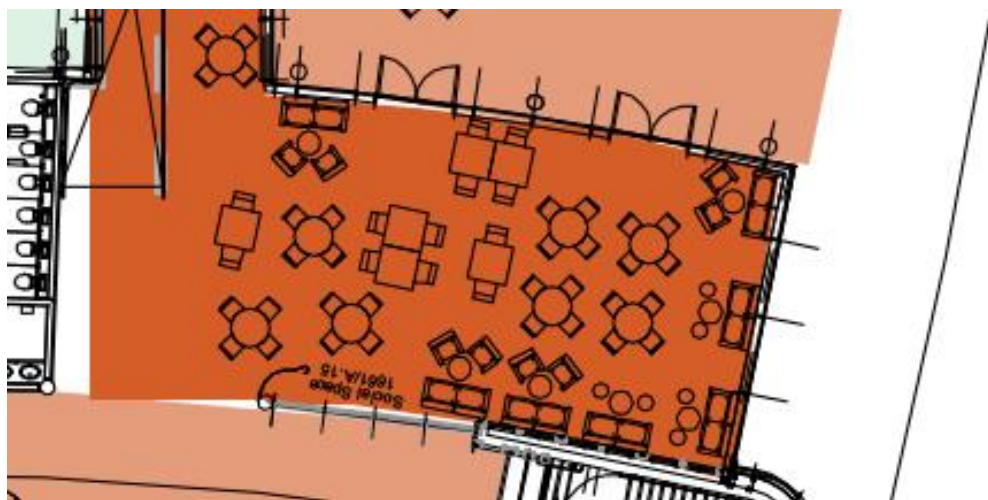


Figure 6.5: Overall views to the ESLC social learning spaces (a) 2 types of furniture in ESLC social learning spaces (b) (Source: Observation pictures on 31.11.2015 at 10:42)

6.1.4 The Coates Design Studio

The last space under investigation in this series is the Coates Design Studio, which opened at the beginning of the academic year 2015. It is located on the ground floor of Coates Building, close to Laboratory 4. Civil and Mechanical students are the most frequent users of this space; the Coates Design Studio offers priority for Civil, Mechanical and Environmental Engineering students. It is open 24 hours a day, over seven days a week. It is primarily for group work activity; however, it also includes a small social area. The group work area includes sixteen group tables in total. Each group area has its own magnetic whiteboard, pin board, and large LCD screen ready to connect with users' laptops (Figure 6.6). A second part of this space forms the social area, which includes four lounges where students engage with social talk and relax between their studies. Moreover, the studio allows for timetabled tutorials, as well as individual study. It opens to all other students at specific times. The main identity of the space is a simple design with high integration of technology; it has limited access to some groups of students only.

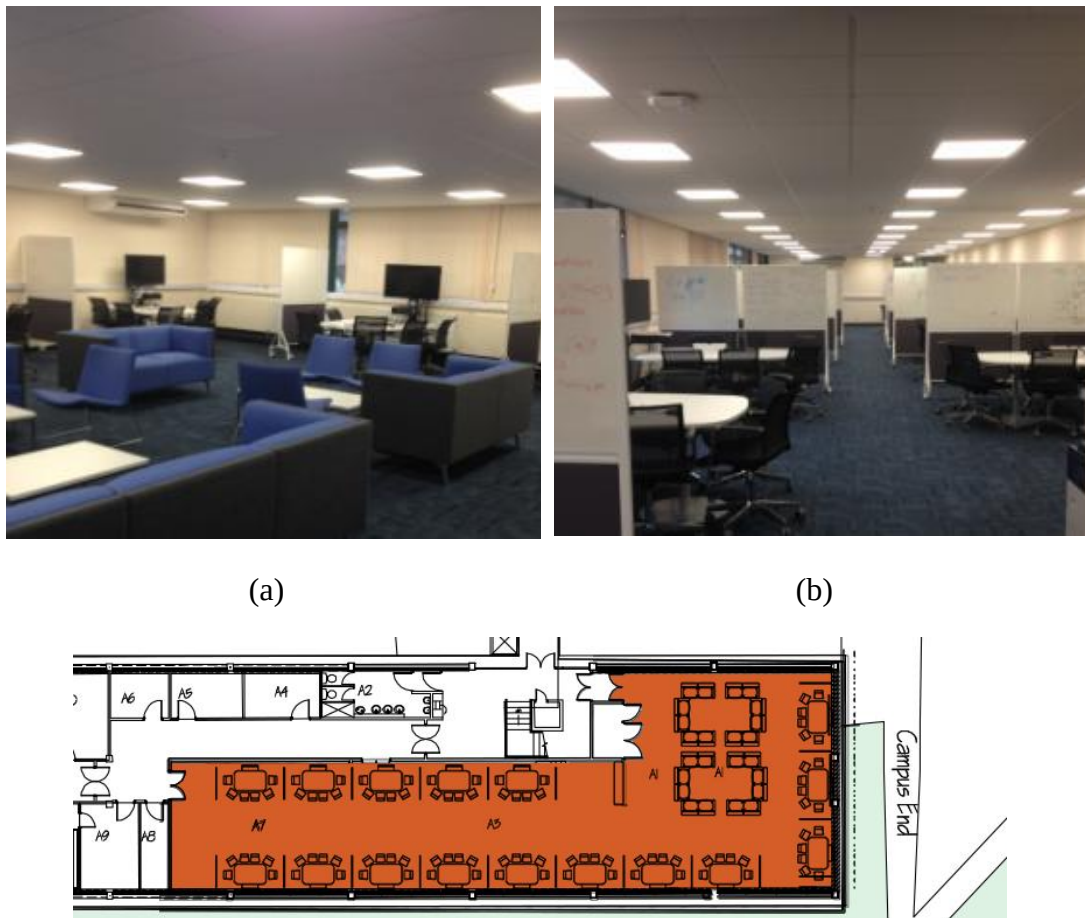


Figure 6.6: Coates Design Studio: social spaces area (a) and group work area (b) (Source: Observation on 22/01/2016- 10:56)

6.1.5 Summary

Overall, the four, typical social learning spaces at UoN provide for a series of different learning experiences, including refreshment (Coates Cafeteria), ambient social relaxation or talking with friends (ESLC Social Learning Space), group work (Coates Design Studio) and mixtures of these (Telford Exhibition Hall), different flow of uses shown in Figure 6.7. These spaces offer chance for students to engage in informal learning activities such as: self-learning; self-learning accompanied by friends; group work, or discussion; group discussion with peers, tutors or staff; and project work with technology and tutor support. Furthermore, these are also used by academic staff, administrator staff and some visitors too.

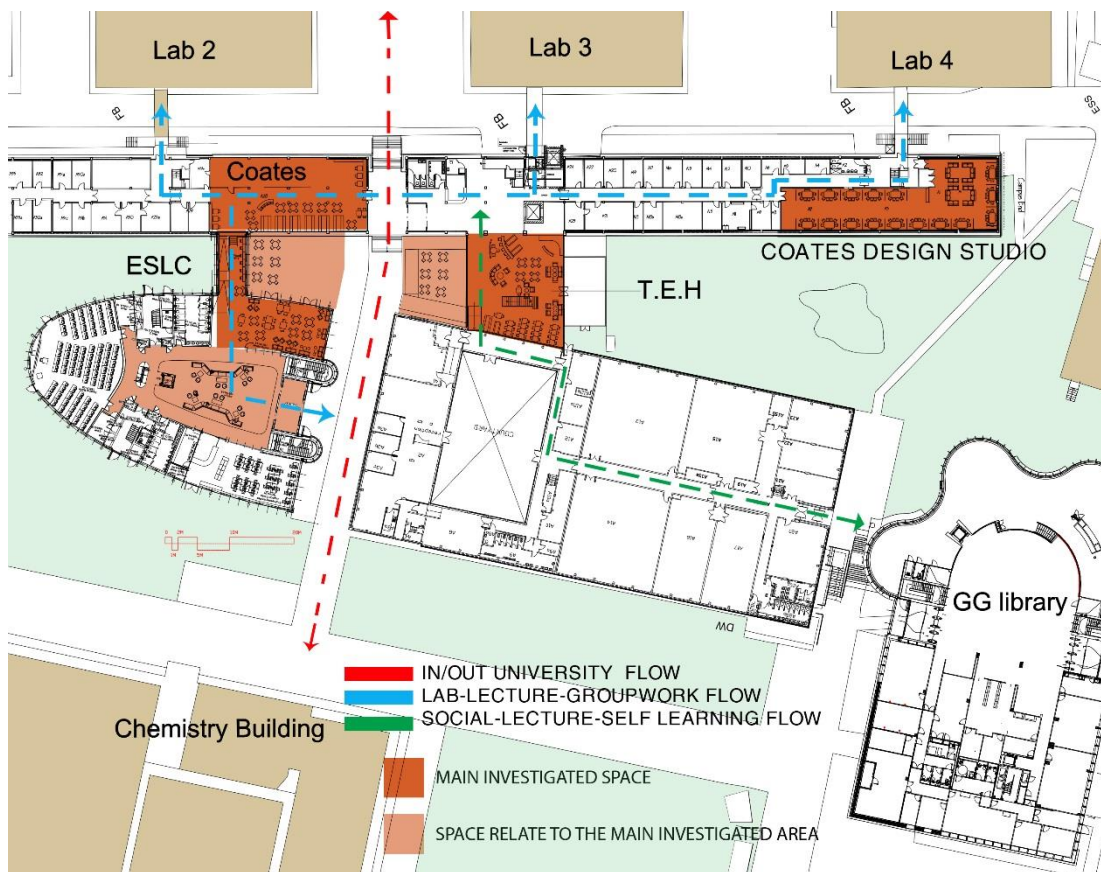


Figure 6.7: Accessibilities and flow of movements between the 4 studied spaces (Source: adapting from the map of the UoN Estate Office)

In term of spatial difference, while Telford Exhibition Hall has a triple storey high concourse with some hanging spaces in the second-floor mezzanine, Coates Cafeteria, ESLC Social Learning Spaces and Coates Design Studio are single storey spaces. In addition, Telford Exhibition Hall, Coates Cafeteria and ESLC Social Learning Spaces

are open spaces and well connected by passage ways. In contrast, Coates Design Studio is an enclosed space with limited access for Engineering students only and priory to some students according to the scheduled timetable. Furthermore, although the four spaces can be accessed via the same floor, Coates Design Studio is not visible or sign-posted from the main entrance of the Engineering Faculty. This explains why many students do not know the location of Coates Design Studio and are more likely to be familiar with the other areas. The four spaces discussed have some similar and some dissimilar features in terms of function, design, form and connectivity; these, therefore, were chosen as the first case study to illustrate the varied effect of physical space as well as design quality on student learning experiences. The following will present the analysis and results derived on these four spaces respectively.

6.2 Observation data analysis

Observing people in the physical setting provides data about “people’s activities and relationships needed to sustain them; about regularities of behavior; about expected uses, new uses, and misuses of a place and about behavioral opportunities and constraints that environments provide” (Zeisel, 2006, p. 191). Specifically, observation was used here to present the activities students do in the spaces by noting their behaviour and materials used. Furthermore, users’ position in the spaces, as well as any interaction was recorded. The researcher collected observational data over three weeks in each term. Observation noted individual or groups of students that used the spaces for more than 15 minutes. Users and their positions but also their activities were marked on printed layouts of each space. Some important behaviours were recorded by taking pictures; for instance, when a student was doing something different from expected behaviour, any reaction to or interactions with the specific conditions of the environment and any special activities or events undertaken in the spaces.

6.2.1 Different spaces accommodate different activities

With regards to the physical environment, observation has shown that the different physical environments influenced the users’ activities. At approximately the same time of observation, different spaces accommodated different activities. For example, Telford Exhibition Hall and Coates Design Studio had more students who engage in learning activities than social activities; ESLC Social Learning Space and Coates Cafeteria had more social and activities than those engaging with study activities (Figure 6.8).

There is a significant pattern: food and drink are the main resource visible near the users. While this may seem expected, when the main function of a social learning space is a place where students can undertake refreshment activities, such as eating, drinking and talking, the majority of students working with materials – such as reading a handout, writing on paper, using a computer or laptop and in-group discussion – also had food and/or drink visible. This pattern indicates that blending between learning, socialising and refreshment activities is common in the study areas under consideration. While some scholars may argue that this may distract the learners, others claim that interaction and social contacts help learners to expand their ideas through communication processes with others (Lave and Wenger, 1991; Illeris, 2007). Furthermore, refreshment was indicated to assist students to maintain their focus when studying (O’Connor, 2005).

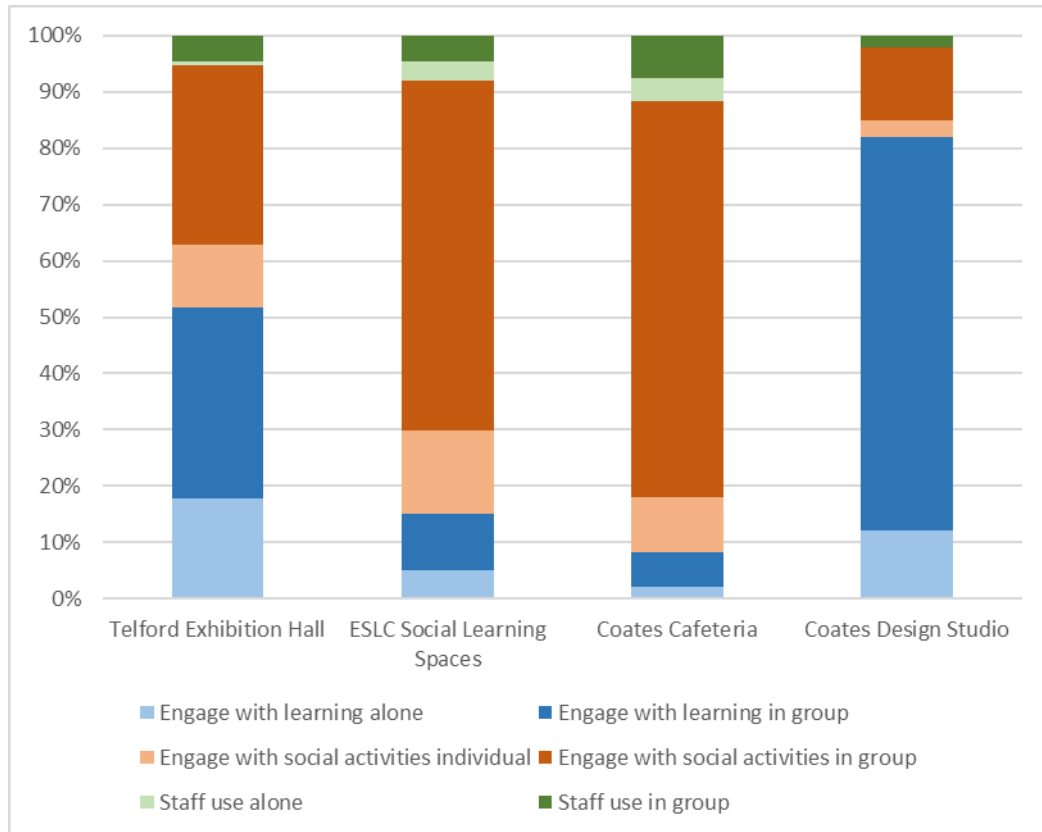


Figure 6.8: Proportion of activities that the students do in the four social learning spaces in Faculty of Engineering, University of Nottingham (Source: observation data case study 1)

6.2.2 Interaction between users

Observation results showed that social interaction and group discussion are the main activities occurring in the study spaces. Literature has emphasised that, social interactions, support and the sense of common purpose play an important role in the success of learning process (Graetz & Goliber, 2006; Lave & Wenger, 1991; Dober, 2000). Similarly, this study demonstrates that social learning space has effectively supported the pattern of collaboration in learning activities: social, in-group or conversation among friends. Also, there is a high level of mixing between learning and social activities in the four studied spaces.

Observation data also indicates that there are a higher number of students that hold interaction with others as opposed to lone students. More than 60% of users in the social learning spaces were in a group or a pair; they have at least one or more interactions with other friends, colleagues or peers (Figure 6.9). Group work or group discussion was the main pattern found in these spaces. Furthermore, there was a tendency for students to study independently but still in the company of friends.

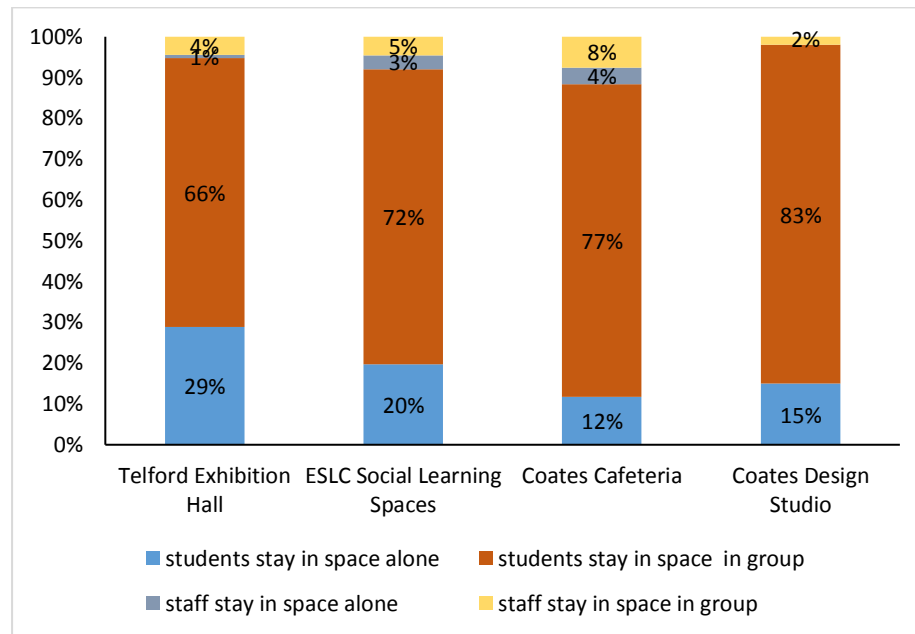


Figure 6.9: Proportion of student working in-group or alone (Source: Observation data case study 1)

6.2.3 Design quality

Lighting, temperature and noise were the main factors influencing student use. For example, direct light affects students in Telford Exhibition Hall, as shown in Figure 6.10. Lighting in Telford Exhibition Hall and ESLC Social Learning Space was limited later in the day, which also affected student-learning activities (Figure 6.11).



Figure 6.10: Direct sunlight affecting students, in Telford Exhibition Hall (Observation 02/12/2015- 10:11)

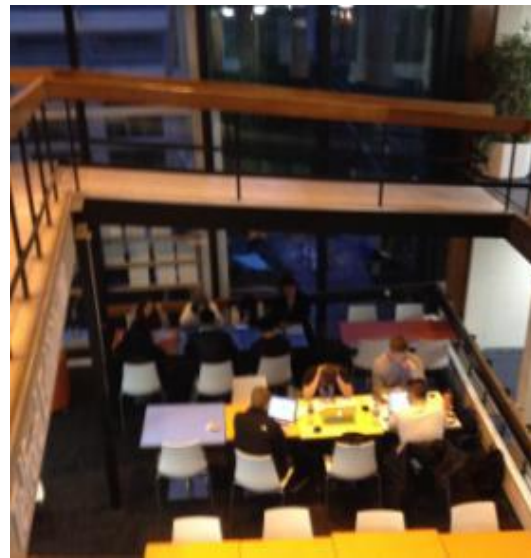


Figure 6.11: Inadequate lighting for late use, in Telford Exhibition Hall (Observation 02/12/2015- 15:11)

6.3 Questionnaires data analysis

Survey methods using questionnaire disseminated in the studied spaces was applied to the first case study. This helped the research to conduct reliable data. After collecting data from the site, the answers of participants were input to the SPSS program to analyse. The discussion below will present the result of the first case study respectively different parts include: demographic and background of participants, perception of design quality, users' activities, relationship between perception of design quality and users' activities, relationship between overall perception of design quality and amount of time spent in the venues, relationship between users' activities and amount of time spent and interaction between users.

6.3.1 Demographic and background of participants

Individuals or groups of students available in the Telford Exhibition Hall, ESLC Social Learning Space, Coates Cafeteria and Coates Design Studio were approached and invited to take part in a survey. Overall, 300 students were approached in the four study spaces and 258 students took part in the study. Of these students, 236 participants gave their permission for the data to be used. Overall, Telford Exhibition Hall has the highest number of participants, totalling 86 respondents. CDS has the lowest response, with 41 students. Figure 6.12 shows that, while the majority of respondents from Telford Exhibition Hall were second year and third year students, most of the respondents in ESLC Social Learning Space and Coates Cafeteria were first year and third year students. In contrast, Coates Design Studio had a high number of third-year students. However, a comparison of mean rank analysis Kruskal-Wallis H Test showed that there was no statistical difference due to year level in terms of either perceptions of design quality or the use of social learning spaces.

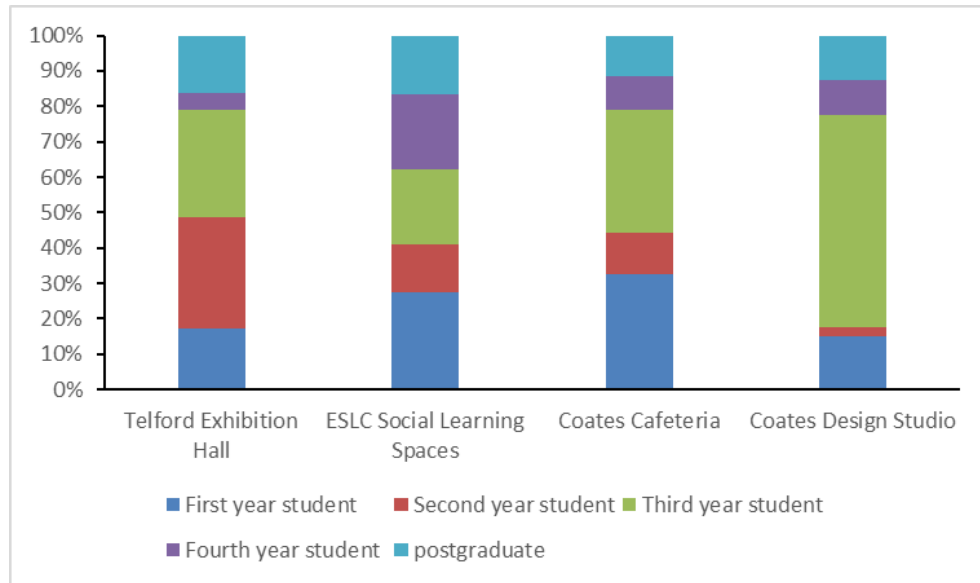


Figure 6.12: Distribution of students according to study year in the four studied spaces (Source: result from the questionnaire of the case study 1)

6.3.2 Perception of design quality of the four studied spaces

The result of the questionnaire indicated that there was a difference in terms of overall satisfaction with design quality as well as perception of each design attribute in the four investigated spaces. First of all, Figure 6.13 shows that, in terms of the satisfaction with design quality, Coates Design Studio exhibits the highest average rating – with 3.3, while Coates Cafeteria had the lowest rating with around 2.6. The Telford Exhibition Hall and ESLC Social Learning Space had approximately equal rating points.

Secondly, the perception of users regarding the design quality over eight design aspects, also showed similar results. For example, Coates Design Studio had the highest rating in term of design character, design quality and appearance, design coherence, legibility, density, diversity and richness and sense of security and safety. In contrast, Coates Cafeteria had the lowest rating in almost all aspects. For example, the mean value of perception of 8 design characters of Coates Design Studio ranges from 2.7 to 3.3 (rating scale from “0”: “not applicable” to “4”: “very high”) compared to that of Coates Cafeteria, which ranges from 2.3 to 2.8.

Overall, the results revealed that there was a difference in overall satisfaction with the design and the perception of design between the four spaces. It also indicated that there should be a correlation between overall satisfaction with design quality and certain design attributes which will be examined below.

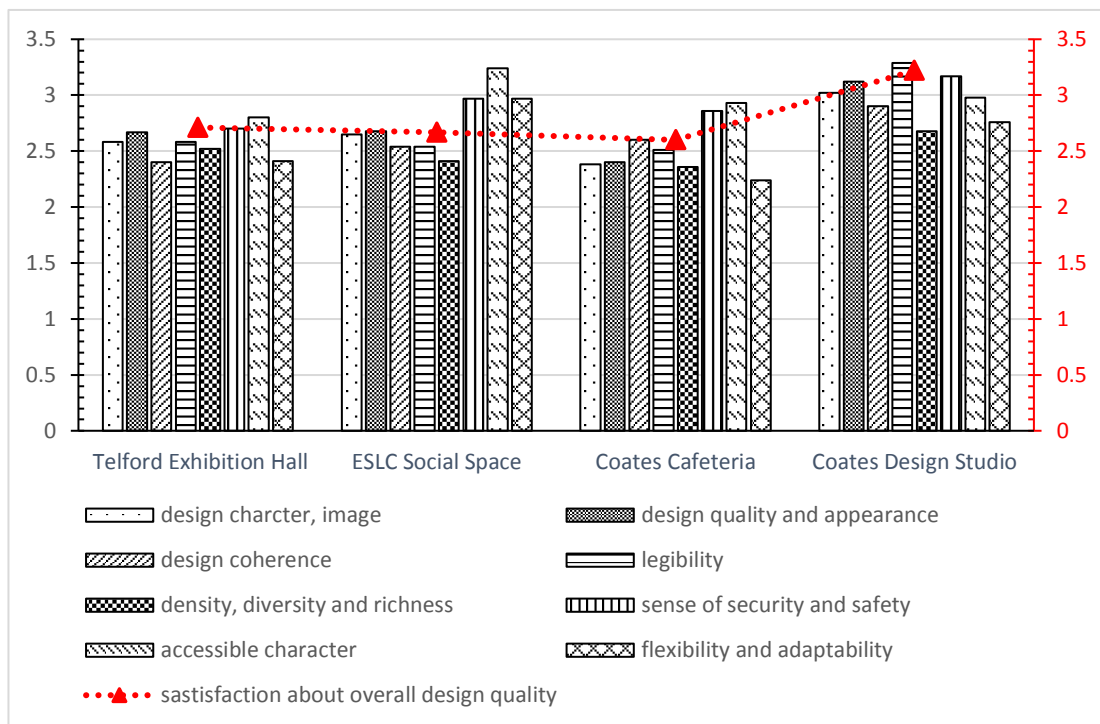


Figure 6.13: The perception of users about the design quality factors of the four social learning spaces in UoN Engineering Faculty (Source: questionnaire data case study 1)

6.3.2.1 Perception of design factors and overall satisfaction with design

A Spearman's rank-order correlation was run to assess the relationship between the overall satisfaction with design and perception of the design characteristics of each space. These characteristics included the eight factors from the design framework. Preliminary analysis showed the relationship to be monotonic, as assessed by visual inspection of a scatter plot. The result of the test showed that there is a positive correlation between satisfaction with the design and perception of some design characteristics. The table below indicates the correlation coefficient r_s and p .

The results of the test show that overall satisfaction with design had a positive correlation with the six design characters: "Design character and image responds to the context", "Design quality and appearance", "Design coherence" and "the sense of safety and security". It does not directly indicate which factor is the cause and which the effect; nevertheless it confirmed that these physical design languages make a difference to users' satisfaction as well as their feelings about their environment.

Table 6.1: Spearman Rank Order Correlation between overall satisfaction of the design and design characters

		Satisfaction of the design of the space			
		Telford Exhibition Hall	ESLC Social Learning Space	Coates Cafeteria	Coates Design Studio
Design character and image respond to the context	Correlation Coefficient	.343	.527	.609	.356
	Sig. (1-tailed)	.001	.000	.000	.013
	N	86	66	43	41
Design quality and appearance	Correlation Coefficient	.447	.536	.693	.287
	Sig. (1-tailed)	.000	.000	.000	.034
	N	86	66	43	41
Design coherence	Correlation Coefficient	.249	.474	.626	.195
	Sig. (1-tailed)	.010	.000	.000	.011
	N	86	66	43	41
Legibility of the space	Correlation Coefficient	.214	.405	.152	.595
	Sig. (1-tailed)	.024	.000	.165	.000
	N	86	66	43	41
Density, diversity and richness	Correlation Coefficient	.283	.382	.505	.144
	Sig. (1-tailed)	.004	.000	.000	.185
	N	86	66	43	41
Sense of security and safety in this space	Correlation Coefficient	.184	.388	.310	.433
	Sig. (1-tailed)	.045	.001	.025	.002
	N	86	66	43	41
Accessible	Correlation Coefficient	.004	.204	.237	.088
	Sig. (1-tailed)	.484	.050	.063	.291
	N	86	66	43	41
Flexibility	Correlation Coefficient	.327	.360	.338	.073
	Sig. (1-tailed)	.001	.001	.013	.325
	N	86	66	43	41

6.3.2.2 Perception of comfort

Comfort is an important aspect, which in the view of the students includes various physical attributes as well as intangible feelings elicited in the occupants. Users' satisfaction with the comfort of the four social learning spaces is shown in Figure 6.14. The users of the Coates Design Studio experienced the highest comfort rate at 17.1% or "very high" and 65.9%, a "high" level. In contrast, Coates Cafeteria had the lowest level of satisfaction; it was regarded as 4.7% and 41.9% respectively. The comfort in Telford Exhibition Hall was perceived to be at 5.8% or "very high" and 48.8% or "high", compared to that in ESLC Social Learning Space, which was 15.2% and 48.5% correspondingly. It showed that Telford Exhibition Hall and ESLC Social Learning Space had moderate ratings in terms of comfort.

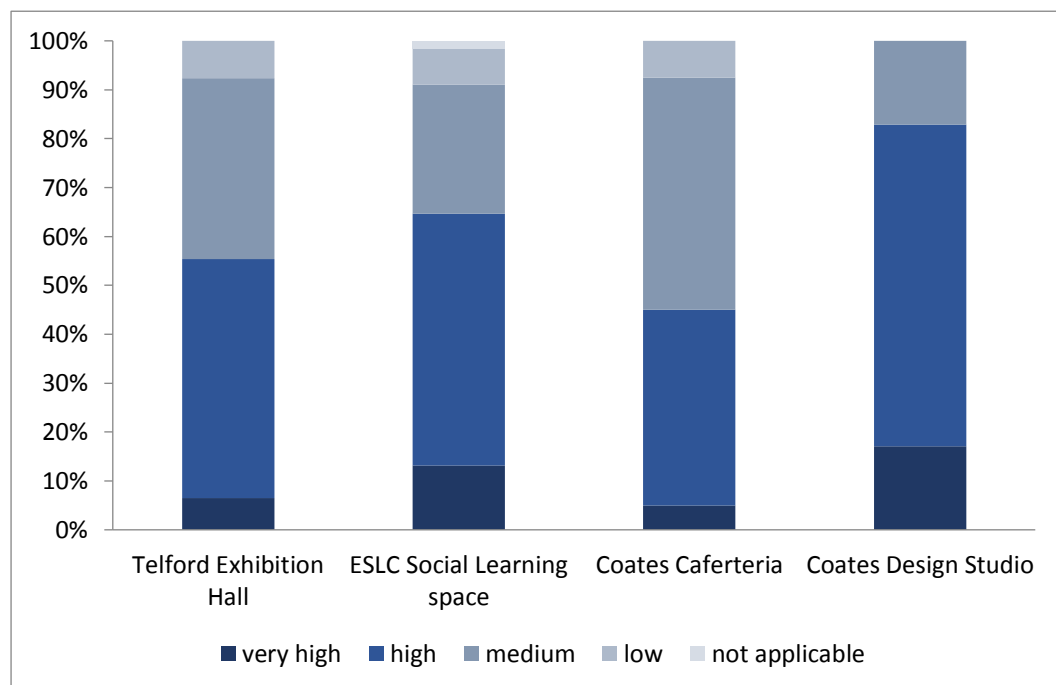


Figure 6.14: Users' satisfaction with the comfort factor of the design in the four studied spaces
(Source: Result from the questionnaire of the case study 1)

6.3.2.3 Convenience location and accessibility

The results from the open question in the survey highlighted the importance of spatial location among the users. Although the responses from the open section reaches just over 40% of total participants Table 6.3, there were some significant trends in terms of convenience of location, such as "close to lecture, seminar" and "close to food facilities".

Table 6.2: Number of responses in the open-end questionnaire (in the four spaces)

	Telford Exhibition Hall		ESLC Social Learning Space		Coates Cafeteria		Coates Design Studio	
	N	Percent	N	Percent	N	Percent	N	Percent
Responses	41	44.6%	35	51.5%	19	45.2%	24	58.5%
Missing	51	55.4%	33	48.5%	23	54.8%	17	41.5%
Total	92	100%	68	100%	62	100%	41	100%

a. Dichotomy group tabulated at value 1.

In detail, the result of the questionnaires collected in the four spaces show that location is an important factor affecting choice of social learning space. For example, 40% of students indicated that they had chosen the space due to proximity to their lecture or seminar – see Table 6.3.

Table 6.3: Self-reported the reasons to use the spaces of students (source: questionnaire data from case study 1)

Comment 23 rd question	Telford Exhibition Hall		ESLC Social Learning Space		Coates Cafeteria		Coates Design Studio	
	N	Percent	N	Percent	N	Percent	N	Percent
Access to food	11	17.5%	7	13.7%	11	34.9%	0	0%
convenient to access, near study area, lecture, exam, seminar room	26	41.3%	23	45.1%	11	37.9%	0	0%
Comfortable environment	16	25.4%	12	23.5%	2	6.9%	8	25%
Meeting/group work	8	12.7%	5	9.8%	4	13.8%	12	37.5%
Other reason	2	3.2%	4	7.8%	2	6.9%	12	37.5%

6.3.3 Users' Activity

Activity is an important contributor to the success of social learning spaces. With regards to student learning process, activities undertaken in informal learning environments are as important as those in formal learning environments (Strange and Banning, 2001). Therefore, understanding which activities students choose to undertake in social learning spaces and how design qualities relate to these activities are a priority in this research.

Similar to the result found in observational methods, the questionnaires show that the activities taking place in the four study spaces were not the same. Specifically, while Coates Design Studio and Telford Exhibition Hall all drew out more learning activities, ESLC Social Learning Space and Coates Cafeteria mostly accommodated social activities. Around 26% of the participants that used Design Studio were there for only learning purposes; meanwhile, less than 5% of respondents used Coates Cafeteria for this same purpose. Overall, over 50% of participants in the Design Studio and Telford Exhibition Hall engaged with learning activities (used for both learning and social activities), while less than 40% of users in ESLC Social Learning Space and Coates Cafeteria were involved with learning. Furthermore, over 70% of users chose Coates Cafeteria for social activities, while less than 10% of students in Design Studio used this space for social activities. These results indicated that different physical features were associated with different activities. In order to deepen understanding of the reasons for these differences, the correlation between activities and perception of design quality will now be examined.

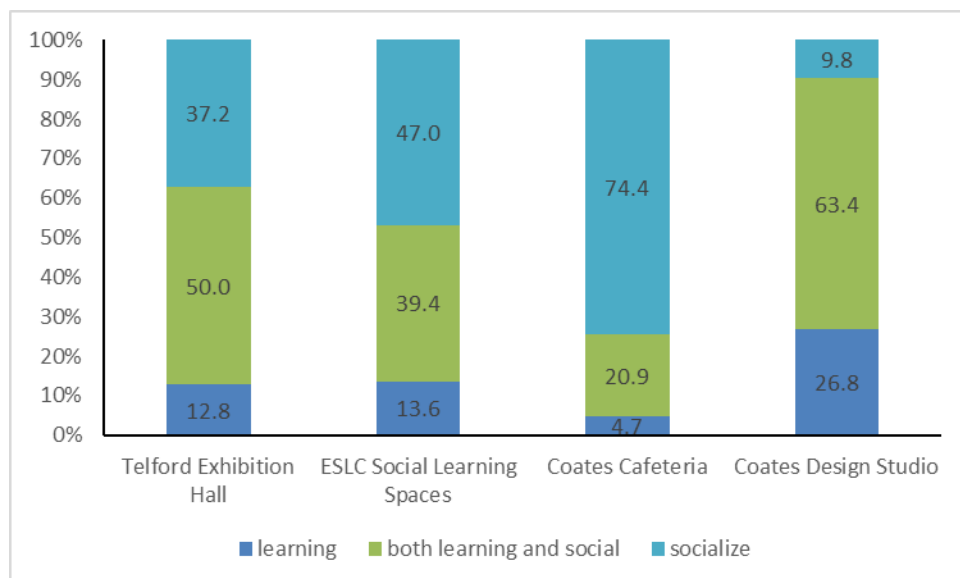


Figure 6.15: Distribution of different activities in the four informal social learning spaces (Source: result from the questionnaire of the case study 1)

6.3.4 Relationship between perception of design quality and users' activities

The above analysis of activities occurring in four social learning spaces showed that different design qualities encouraged different activities. Specifically, Coates Design Studio, with the highest perception from the users, is dominated by activities related to learning (Figure 6.15). In contrast, Coates Cafeteria, with the lowest perception of design quality had the highest rate of social activities of the four social learning spaces

(74.4% in Figure 6.15). This indicates that a social learning space perceived as high quality in its design encouraged proportionally more learning activities.

Supporting this correlation, statistical tests were carried out on the data in the statistical program SPSS. The test was used to examine if, for users, there is a difference in perception of design quality of the four social learning spaces. The design factors tested included: “design character responds to context”, “design quality and appearance”, “coherence”, “legibility”, “density and diversity”, “sense of safety and security”, “accessibility” and “flexibility”. The null hypothesis is that: there is no difference in design quality perception between the users of four spaces; and, the alternative hypothesis is that: there is a difference in design quality perception between users of four spaces. The tests employed the Kruskal-Wallis H analysis to examine the hypotheses and their results are presented as follows.

The test indicated that perception of “design character responds to the context”, “design quality and appearance”, “coherence”, “legibility”, “density and diversity” and “sense of safety and security” were not similar for the four spaces. Statistically, the distribution of perception of users about these characteristics is significantly different between the four study spaces, with the H (2) and *p-value* ($p < 0.005$) shown in Table 6.4

Table 6.4: Difference of Mean Rank between the users of four social learning spaces

Test Statistics ^{a,b}								
	Design character, image and responds to the context	Design quality and appearance of this space	Design coherence of this space	Legibility of this space	Density, diversity, and richness	The sense of security and safety in this space	The accessible character of this space	Flexibility and adaptability of this space
Chi-Square	19.787	21.089	13.173	25.925	8.543	9.791	1.938	7.312
df	3	3	3	3	3	3	3	3
Asymp. Sig.	.000	.000	.004	.000	.036	.020	.585	.063

a. Kruskal-Wallis Test

b. Grouping Variable: Telford Exhibition Hall, ESLC Social Learning Space, Coates Cafeteria and Coates Design Studio

6.3.5 Relationship between overall perception of design quality and amount of time spent in the venues

Following the above analysis of time spent, the results from questionnaires show that users in the four spaces spent different durations of time. Therefore, the relationship between duration spent in the space and satisfaction with the design quality needs to

be examined. In detail, a Spearman's rank order correlation was run to assess the relationship between overall satisfaction with the design and time spent in social learning space. There was a positive correlation between the satisfaction of the design and time spent in the four investigated spaces, $r_{SP1}(86) = .229$, $r_{SP2}(66) = .287$, $r_{SP3}(43) = .266$, $r_{SP4}(41) = .229$, $p < .05$. Additionally, Figure 6.16 shows that an increase in satisfaction with design quality is associated with an increase in time spent in social learning spaces. However, the correlation is not strong at $0.2 < r < 0.39$. Informal discussion with students in UoN Engineering Faculty indicated that students' schedules are busy; therefore, the time spent in social learning spaces may be limited by this factor. It would be worth to investigate the time that students would like to spend in these spaces, as it may show clearly the relation between satisfaction with the design and the time spent in each venue.

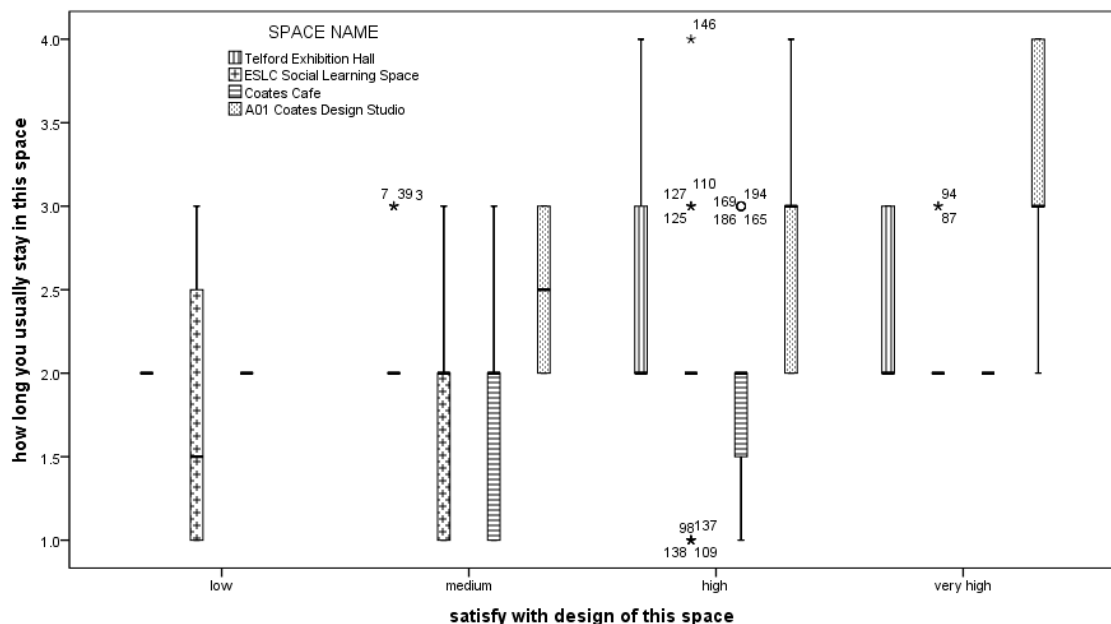


Figure 6.16: Correlation between time spent and satisfaction with the design (Source: result from the questionnaire of the case study 1)

6.3.6 Relationship between users' activities and amount of time spent

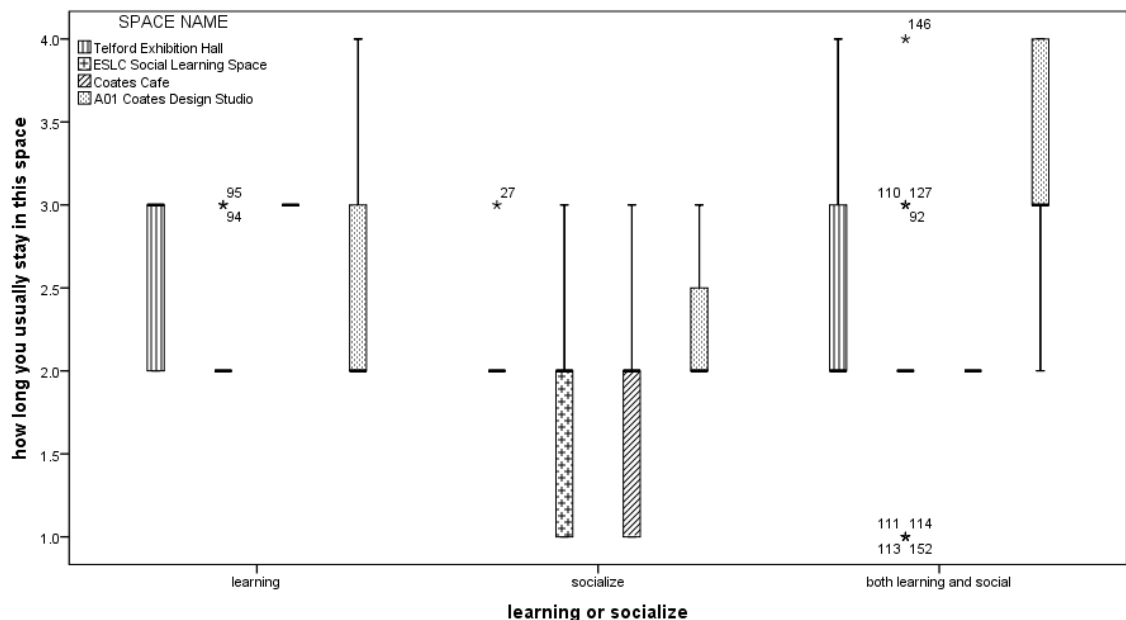
In terms of the relationship between activities and time spent, a Kruskal-Wallis H test was run to determine if there were differences in time spent in studied spaces between three groups of participants according to their activity choice: “social”, “learning” or “both social and learning”. Distribution of time spent was not similar for all groups, as assessed by visual inspection of a boxplot (Figure 6.17). The distribution of time spent was significantly statistically different between groups in the four spaces. The $H(2)$ and p -value are shown Table 6.5 .

Table 6.5: Difference of Means Rank of the time spent between groups of learning, social and both learning and social activities**Test Statistics^{a,b,c}**

	How long you usually stay in space			
	Telford Exhibition Hall	ESLC Social Learning Space	Coates Cafeteria	Coates Design Studio
Chi-Square	13.671	6.521	8.801	6.366
df	2	2	2	2
Asymp. Sig.	.001	.038	.012	.041

- a. Space name = Telford Exhibition Hall, ESLC Social learning space, Coates Cafeteria and Coates Design Studio
 b. Kruskal-Wallis Test.
 c. Grouping variable: learning, socialize and both learning and socialize

Furthermore, a box plot diagram shows that time spent in the learning category was higher than in the social activity group.

**Figure 6.17:** Different time spent for different activity groups (Source: result from the questionnaire of the case study 1)

Overall, social learning spaces play a significant role in students' time on the campus. Students reported that one-third of their university time was spent in social learning spaces (Table 6.6). Some students, who were in their final year, also indicated that most of their time on campus was spent in social learning areas; students might spend up to 50 hours per week in these spaces to work on their final project.

Table 6.6: Descriptive statistics of weekly time spent on campus and in social learning spaces

Questions	N	Minimum	Maximum	Mean	Std. Deviation
How much time spent on the campus?	233	2.0	60.0	25.307	12.9867
How is time spent in social learning spaces?	235	.0	50.0	6.792	7.2585
Valid N (listwise)	233				

Furthermore, results from the questionnaire also show that there is a difference in duration spent in the four different study spaces. It is demonstrated that students spend longer in Coates Design Studio than Telford Exhibition Hall, ESLC Social Learning Space, and Coates Cafeteria (Figure 6.18). Specifically, 43.9% of participants stayed around 3 hours in the Coates Design Studio, while less than 20% of users spent the same amount of time in the other spaces. Similarly, 19.5% of students stayed the whole day in the Coates Design Studio; in contrast, just less than 3% of students spend a long period of time in other spaces. The minimum time users stayed in Coates Design Studio and Telford Exhibition Hall was 1 hour, while over 20% participants in ESLC Social Learning Space and Coates Cafeteria just used the space for 15 minutes. This figure showed that Coates Design Studio and Telford Exhibition Hall attracted longer durations of time spent than the two other spaces. From this data, it showed that there was a positive correlation between the satisfaction of design quality of the users and the time they spent in the social learning spaces.

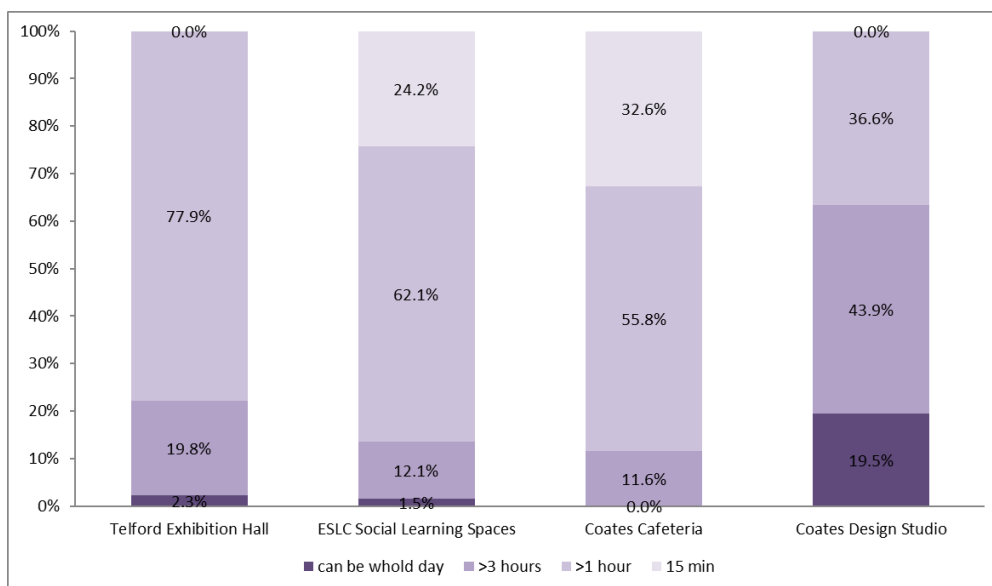


Figure 6.18: Percentage of time usually spent in the four study spaces (Source: result from the questionnaire of the case study 1)

6.3.7 Interaction between the participants

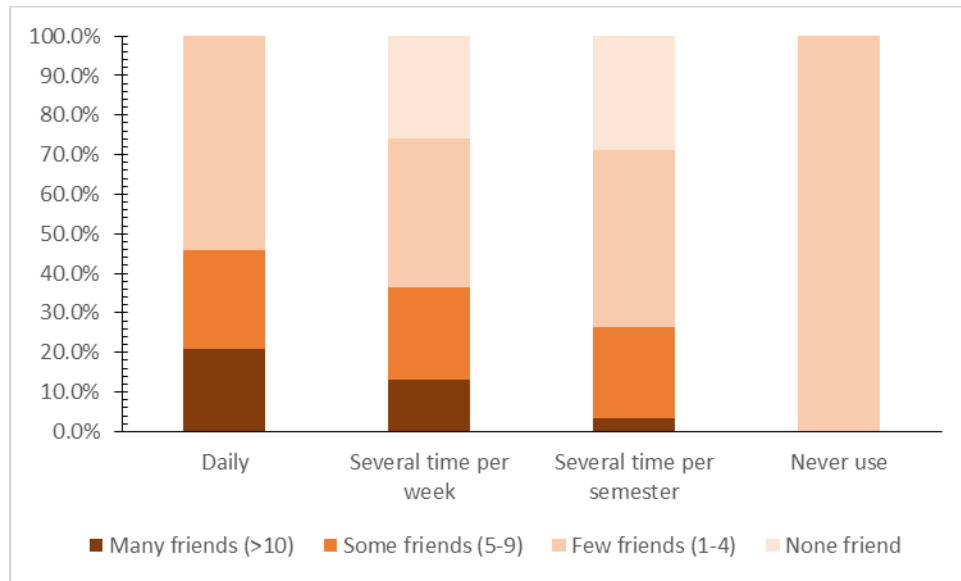


Figure 6.19: Comparing the number of friends of different habits of use groups (Source: result from the questionnaire of the case study 1)

Figure 6.18 shows that students who are a regular users of social learning spaces have more friends who also use the spaces than those who less often use the spaces. Nearly 20% of students who reported that they might use social learning spaces daily knew many friends in these spaces, while this percentage was just around 10%, 5% and 0% for students who used these spaces several time per week, several time per semester and may never use these respectively. Similarly, decreasing patterns were found in the percentage of students who just knew some friends (5 to 9 friends) or few friends (1 to 4 friends) as well.

This indicates that students who use social learning spaces have more possibility of interacting with friends in social learning spaces compared with the less frequent users. While this result may not indicate that all the students interact with friends in social learning spaces, it provides evidence that social learning spaces give more chance and offer potential for interactions for students who use the space often. Strange and Banning (2001) have already noted that the physical environment does not solely determine human behaviours; it just renders some behaviour more likely than others and creates the conditions for some behaviour.

6.3.8 Summary

The results of questionnaire showed that there was a correlation between overall satisfaction with design quality and perception of design quality; such as, design

character, design quality and appearance, design coherence and sense of security and safety. In addition, activities that students chose to do in the four social learning spaces correspond to overall satisfaction with design quality. The data also demonstrates that students with the intention to learn stay longer than students using the spaces for social activities. This emphasizes the role of the design of these spaces – as good design could encourage more learning activities as well as the time students spend in university environments. Furthermore, the data also indicated that the role of social learning spaces in encouraging interaction between students.

6.4 Informal discussion and focus group

The focus group is a useful method to understand the reasons why students are more likely to use some specific spaces rather than the others. It enabled reflection on the users' definition of design quality and their requirements for these spaces. Focus groups were conducted at the end of the academic year 2016. Participants were recruited by direct approach in the four spaces. They were asked to answer a preliminary question about frequency of use. Then participants were sorted on the basis of experiences and frequency of use. Overall, two focus groups included 11 participants. Each discussion lasted for one hour and participants were highly engaged during conversation. The discussion was recorded and then a transcript made of the proceedings.

6.4.1 Character and image of the design

High technological support was the most impressive attribute of the social learning spaces, which led to students giving a high rating for the design character in the Coates Design Studio. Despite the fact that the Coates Design Studio is simple, with a rectangular shape, white walls and standard colour of furniture, it nevertheless creates a strong impact on the users. In particular, one user described how the “big desk and screen” is an advantage of Coates Design Studio. The space gave a strong positive impression because of technology, as one student mentioned:

Here [Coates Design Studio], there are not many rooms with monitors, whiteboard, etc. so we can discuss group projects quite freely without [it] being too crowded; and it is easy to access some useful resources, e.g., computer, HDMI to TV, printer, whiteboard (CS1, Q PP.37, Coates Design Studio).

While ESLC Social Learning Space is thought to have successfully created the feeling of a relaxing environment, the Telford Exhibition Hall is referred to as spacious, with high ceilings, nice lighting and views. Furthermore, some students described the difference between these spaces by the height of the ceiling. It emphasised on the

important of the volume and the perception of volume of spaces in the users views. In addition, the strong positive impression about Telford Exhibition Hall also relates to its convenient location. Indeed, most of the students identified the space by the phrase: “between the Coates and the Pope” (CS1, FC1, BS) or by its purpose: the “eating area” (CS1, FC1, LS).

On contrary, the attractive, appearance and identity of the spaces such as Telford Exhibition Hall or ESLC social learning spaces had low impact on students’ perception. Some students indicated that, though they use Telford Exhibition Hall a lot, they nevertheless did not know the name of the space. This may imply that the design language was not give any strong perception of identity and characteristic to the users. Moreover, one student express that “I think to me this place [Telford Exhibition Hall] is left over place; they just put some seats and tables; it is not designed for anything” (CS1, FC1, Neola). It showed that the design language of the space may not appropriate with the functional that the space aimed to promote. Although the Telford Exhibition Hall includes some supposedly interesting features of the design, for example, a big painting on the wall, students did not recognize this in their comments.

These results point to the fact that, in students’ views, the height of the ceiling, the volume of the space, advanced technology, location and being easily to access lead to a positive perception of the social learning spaces.

6.4.2 Design appearance

In this context, design appearance relates to the attractiveness of the space, regarding material, shape and colour from the users’ perspective. Additionally, students indicated that the volume of space had a significant effect on how they perceived design. Comparing the four spaces regarding design appearance, Design Studio and Telford Exhibition Hall were more highly appreciated by users than ESLC Social Learning Space and Coates Cafeteria. One, second year student, explained:

[With Telford Exhibition Hall] there is a reasonable range of facilities but a large diversity of floor and furniture shape creates interesting aesthetically pleasing space (CS1, FC1, Ang).

Students expressed that they like soft furnishings, which helps them to maintain their concentration on learning activities and makes them want to stay longer in the space. In term of shape, students expressed preference for typical room shapes such as square or rectangle. They strongly emphasized the volume of the space, one commenting, “I prefer spacious spaces, the spaces which do not give a stuffy feeling” (CS1, FC1, LS).

Comparing the different informal learning spaces available, another stated, “It should be spacious because even in the library they have silent spaces but then it is a very small space” (CS1, FC1, Ang). It also impacted upon their group work or interactions: “If you are in a group of people, you will have more exclusive space for each” (CS1, FC1, Gina).

In term of colour, bright and light colours were preferable to randomly vibrant colours. Some students, however, acknowledged the benefit of vibrant colour, “I think people don’t just want to see only black and white, colourful stuff is more pleasing to the mind” (CS1, FC1, SB). However, excessive colour or vibrancy is ill advised; one participant commented: “here is a range of colour: orange green, yellow. It is not nice” (CS1, FC1, Negar). Students also expressed that they would prefer bright spaces in subtle colour pallets.

6.4.3 Coherence

Comparing the four study spaces, Coates Design Studio was evaluated as having a high quality of coherence. In contrast, perception of the Telford Exhibition Hall, ESLC Social Learning Space and Coates Cafeteria were comparatively rather low. Specifically, students indicated that their impression about the design coherence of Telford Exhibition Hall was low due to the space consisting of many mismatched styles of furniture and eclectic structural elements such as the stairs, doors or hanging light shapes. Telford Exhibition Hall especially was thought not to be well arranged, with no clear design intention, “It is an un-arrangement; I do not know where to sit” (CS1, FC1, Negar). One student commented:

[Telford Exhibition Hall,] it’s very mismatched, modern furniture old stairs and corridors and also the “stair causes choke point in here... [It included] random parts to building, built at different times and no main theme” (CS1, Q PP18, Telford Exhibition Hall).

Other weaknesses were that ESLC Social Learning Space was difficult to navigate, “like a maze” or that it was “difficult to navigate between tables when full” (CS1, Q, PP44 ESLC Social Learning Space).

Overall, the perception of coherence was different between the four studied spaces. Coherence affects the overall perception of design quality in user’s view.

6.4.4 Density, diversity and richness

Density, diversity and richness refer to various elements in the scene of the space that attract users to come and stay. It also encourages feelings of interest and stimulation. It is indicated that, “stimulating spaces attract people and spark creative thinking”

(Gee, 2006, p. 4). Diversity and richness also encourage activity and stimulate student interest (Graetz and Goliber, 2002)

However, from the user perspective here, an environment that has a good arrangement, is spacious, has good views and a few innovative features – including technology as well as design features – will make them feel attracted to the space. According to the users, ESLC Social Learning Space and Coates Cafeteria have a low quality of design as these have a traditional arrangement and few innovative features. In contrast, Coates Design Studio is highly appreciated due to the richness of technological support.

Telford Exhibition Hall was also preferred over Coates Cafeteria or ESLC Social Learning Space, due to its spaciousness and the element of variation in the scenery. As it boasts three storey levels, it also provides various views to the outside. As one student described, “Whenever I look out here, I thought the scenery quite nice, it has glasshouse and just for me I think that is good place” (CS1, FC1, Ang). Furthermore, students expected the design of social learning spaces to be functional and have diversity, while being “interesting and innovative” (CS1, FC1, LS) in their design. One participant commented:

Maybe the design of space can be more innovative [...] rather than old kind of arrangement chair and table are around [...] with the fix arrangement, you can have little change. If it can change so, you want to go more (CS1, FC1, LS).

In short, there was a difference here from the theory of design regarding how to stimulate interest in space. In students’ perceptions, good social learning spaces require a good layout arrangement, appropriate volume of space, outside views and some innovative design features.

6.4.5 Convenient location and accessibility

Overall, with regards to location and accessibility, the perception of the users about the four study spaces do not differ widely: high levels of satisfaction with accessibility is the key theme. Convenient location and easy to access were the main reasons that students chose to use the four studied spaces. It indicated by students that Telford Exhibition Hall, ESLC Social Learning Space and Coates Cafeteria have a very high value in terms of accessibility characteristics, since they are located in the middle of the Coates Building. Students indicated that these spaces were easy to access with a student card and were open late. In contrast, while not all students knew the location of the Coates Design Studio, users of this space evaluated the space as having a high level of accessibility. In fact, the Coates Design Studio applied the scheduling priority

for Mechanical Engineering and Civil Engineering, as well as Environmental Engineering students. It has close connection to the Laboratory 4, mainly used for laboratory working. Therefore, the participants who already knew and used the space indicated that it was easy to access.

However, others had no idea about this space, as one student mentions:

I think the location effect on the use. For example, I have lecture in these areas, so I just come surrounding here [Telford Exhibition Hall, ESLC Social Learning Space or Coates Cafeteria]. [The other spaces] like she said Language Centre or other spaces I don't know. So, I think [location] effects on our choice of using the space (CS1, FC2, PC).

According to student, convenient location is an initial reason influencing their choice of social learning spaces as it could save them time. For example, although students may not appreciate the design quality of Telford Exhibition Hall, they still used it regularly for this reason. One comment was that: "This hall is surrounded by Science and Engineering faculties, so it is easy to meet my friends (CS1, Q, PP62 Telford Exhibition Hall).

In the focus group, students expressed they used the social learning space when they have a lecture or class around the vicinity. One comment was that:

I like to use social learning space to do group work or eating and I usually pick one closet to where I am. We have used [Telford Exhibition Hall] a lot because of the group project before and after the lecture. After lunch, we come back here and have a short discussion before the next lecture because it is very convenient [...] If we go to the library then come back here it will take time so after the lecture we come here and then come to the lecture again (CS1, FC1, Gina and Neola).

The location was also a reason for *not* using some social learning spaces. Students expressed a need for a centralised location for social learning spaces. One comments:

That is the only problem that I found, the location of some social learning spaces is a little bit too far. So I rarely go there. I think if we have social learning spaces located in between learning spaces, in the middle of the campus, that will be helpful for students to use (CS1, FC1, LS).

Also, students emphasised that indoor connection to the social learning spaces were important to their frequency of use. They indicated that the effect of the weather would discourage them from these spaces, especially if they had limited time for study.

Additionally, working and eating has become a major pattern in recent social learning space. Therefore, catering services spread across the campus is important. From the students' perspective, they tend to want to save time and to do multiple tasks

at once. Students also expected to be well-supplied and maintained in terms of food and drink, in order to assist their stay in the common learning spaces. One concluded:

If we stay for the whole day we would like to stay in the same pod that we can eat our lunch as well rather than going out to the second place to eat, it saves time and is convenient (CS1, FC1, LS).

The convenient location and accessibility can be seen as one of the key aspects that affect student involvement in their communities (Strange and Banning, 2001). The perception of users about the convenience, accessibility and centrality of the social learning spaces directly affect use. The importance of locality is also highlighted in the report of 'Project Transform' of University Nottingham (Project of Transforming, 2010, UoN), addressing the fact that students require facility support and nearby assistance with their queries and needs. The result of the first case study found that an easy to access and convenient location are important to the decision of whether to use social learning spaces. Students are busy and are likely to do multiple tasks at the same time; therefore, a convenient location and accessibility effect the success of the social learning spaces. Therefore, the new social learning space design needs to carefully consider the location of social learning space, especially in relation to other formal functions.

6.4.6 Flexibility

Flexibility and adaptability attributes refer to the degree that the setting arrangement can be changed and the ease of doing so. The four studied spaces have a moderate level of flexibility (according to the result of questionnaire). Specifically, Coates Cafeteria has the lowest level of flexibility, as the seating arrangement is fixed to its refreshment function and it is unable to change to fit with other requirements of the students. While observation showed that some students still used Coates Cafeteria to do some studying, students indicated that they found it difficult to study in Coates Cafeteria because of this fixed arrangement. Although students used these spaces regularly – as they have a limited options, the strong sense was of not being satisfied by the furniture and setting arrangement. Most of activities in Coates Cafeteria are social, based on the result from questionnaire as well as focus group discussion.

In contrast, the Design Studio has a high level of flexibility, which allows for moving of the chairs and whiteboards. Students also indicated that if the computer is moveable it aids group work. Furthermore, many comments on the theme of flexibility are related to whether spaces would allow for adding more members to group meetings. It was

commented that: “[In Telford Exhibition Hall] there is a large array of seating choices”, or “chairs and tables [are] easily moved so group work could be happen easily” (CS1, FC1, Neola). In students’ views flexibility also refers to whether the space allows them to do different activities at the same time. For example, one participant mentioned:

Sometimes I get food and I am with my laptop as well. Then I want to eat at the same time and continue to work at the same place. So, I don’t want to stay in place that I could have my food and then no studying in there. I don’t like the library because sometimes I am hungry, I have to take my laptop and I come here to eat then come back. It should be convenient, do more than just one thing (CS1, FC1, Gina)

6.4.7 Comfort

Lighting and temperature are among the first things that humans notice about their environment (Gee, 2006). However, these aspects are, “relatively homogeneous across the campuses and are probably not as carefully scrutinized by classroom designers as other features of [a] learning environment” (Graetz & Goliber, 2006, p. 16). While the degree of comfort is hard to capture by the observational method, it can be captured by open questionnaire questions and focus group data. The Coates Design Studio has a high rate of comfort, expressed in the figure 17.1% or “very high” and 65.9% at a “high level”. In contrast, Coates Café has a low level of satisfaction in terms of comfort, only reaching 47.5% at a “medium” grading. Moreover, the students expressed that their choice of space also depends on the level of comfort; a need for, “comfort, enough tables and seats, relaxing and cosy areas or less depressing light compared with the computer room” (CS1, Q, PP72 Telford Exhibition Hall). Similarly, the focus group indicates that the comfort is strongly associated with temperature, noise and lighting, as illustrated below.

- **Temperature**

It has been indicated that temperature has an impact on student behaviour in a normal classroom environment (Graetz & Goliber, 2006). Furthermore, effects might be particularly prominent in a collaborative setting: overheat causes, “hostile thoughts, feelings and behaviours in some individuals” (Graetz & Goliber, 2006, p. 16). Therefore, it is suggested that temperature should be reduced for collaborative classrooms (Graetz & Goliber, 2006). It was observed that students tend to gather together, often around the computer – which is an additional source of heat. However, in the UK context, bad weather and cold temperatures was also a barrier to users in the social learning spaces.

It was pointed out that some social learning spaces are not always optimal environments for users. A significant number of students reported that Coates Cafeteria and Telford Exhibition Hall are too cold for long stays. One clarified that “I don’t like [Telford Exhibition Hall] because it is really cold because the door is always open and people keep passing there” (CS1, FC1, Ang). The temperature was an important factor that affected students’ choice of social learning space. The users preferred warmer spaces; they mentioned:

I like [Coates Design Studio], it is warm, but sometimes it is too warm, when there are too many people inside it and the ceiling is low it can get very warm (CS1, FC2, PC).

According to users, the temperature appropriate for them should be: “the right temperature; between 20-24 degree personally” (CS1, FC2, PC), while some assumed that: “warm and cosy” was preferable (CS1, FC2, PC, Neola). This feature affects not only the duration of stay but also influences type of activity undertaken. One student concluded: “Temperature neither too cold nor too hot will be good for study” (CS1, FC1, LS).

- **Quality of lighting**

One significant aspect that affects the choice of social learning space is lighting. There is some evidence that arousal in students is higher if the space applies traditional fluorescent lighting (Graetz & Goliber, 2006). Conversely, it is also noted that the traditional fluorescent lighting can decrease sociability among the students (Kuller & Lindsten, 1992). However, this uncertainty does not extend to whether dim light is appropriate for the social collaborative learning spaces; it is not (Graetz & Goliber, 2006). Research has found that there is a loss of self-awareness among users in an environment that uses the dim light (Prentice-dunn & Rogers, 1980). Furthermore, there is strong evidence that daylight has a benefit in terms of improving learning in the classroom, as it reduces stress and elevates mood (Gee, 2006). Although a mix of lighting types is suggested, in order to change the mood and increase the stimulation level, there is no data that exists to quantify such impacts on learning (Gee, 2006). In this study, users argued that, while dim light can make space look relaxing, it may not be suitable for accommodating a variety of activities. Furthermore, users preferred daylight rather than indirect lighting sources.

It is reported that the Telford Exhibition Hall and Coates Design Studio have a good quality of natural lighting. However, some students expressed dissatisfaction with the colour of the artificial bulbs in the Telford Exhibition Hall. It is suggested that warm

lighting is not preferable; students said, “the lighting in Telford is not good, it is too warm, it is too orange, it makes it difficult to concentrate in that orange light; you cannot read” (CS1, FC2, PC). It is emphasised that the current status of lighting in social learning spaces is not suitable for function. It was explained:

I think it should be switched with the Coates cafeteria because the Coates cafeteria is for eating [...] you don't need it for studying, so the yellow light should be better in Coates Cafeteria (CS1, FC2, PC).

Natural lighting was preferable, with many students indicating that it helps their mind relax. It was commented that: “With respect to the lighting, personality, I find that I like natural light more than artificial lighting” (CS1, FC2, LS). Furthermore, daylight was an important factor affecting students’ choice of space. One participant stated: “[in Telford Exhibition Hall] sometimes when the computer is not necessary, the daylight here makes me more comfortable than the computer rooms” (CS1, Q PP2, Telford Exhibition Hall). One caveat was made, however, that although natural light is preferred, it needs to be controlled, as it will affect the comfort of users. One student expressed that: “Natural lighting should be controlled since the sun sometimes is very strong and you feel very hot when sitting down” (CS1, FC2, PC). The user also indicated that the artificial lighting in Telford Exhibition Hall and ESLC Social Learning Space is not adequate for studying when they want to stay late in the spaces.

- **Noise level and distraction**

The users expressed concern about the noise level and subsequent distraction for their study, both in the social learning spaces as well as group work learning spaces. It is indicated that noise level affects their choice of social learning space: “If it is quite noisy I probably can't concentrate on learning, so this also affects whether I chose the space or not” (CS1, FC2, Geoffrey). One student explained that the, “Intention is to do work and study or eat together in Telford Exhibition Hall but sometimes [we] cannot focus as it may be noisy or [we] meet other friends passing by” (CS1, FC2, HY). The expectation is that there should be a mixture of quiet and noisy areas in ideal social learning spaces. As concluded by one student:

I prefer a place that it could mix between silent area and social area such as eating or cafeteria. Everything should be together. I want to stay in the silent area to work; whenever I want to eat, I come there [social area] for just eating and drink as well. Spaces should include different functions located next to each other (CS1, FC1, Negar).

- **Enclosure and Privacy**

One of the more unexpected findings is that the students would like a space with a degree of privacy. Most of the social learning spaces are open spaces and have a high degree of access. However, students expressed preference for an alternative. It was commented that “The Design Studio, it is an enclosed space with big tables and white board; and I found it private but it should not too private at the same time” (CS1, FC2, PC).

This factor also explains why students refrain from staying in social learning spaces for long periods of time. It was explained that “the layout is more open to the public, there are many people walking around and, like our school, it affects my concentration” (CS1, FC1, Ang). Furthermore, the sense of enclosure could be a reason for students preferring one space over another, “I think the social space need some privacy but it not too much privacy, I can do what I want and it helps us to focus on my study” (CS1, FC1, LS).

- **Safety and security**

Safety is also an important factor of a social learning space, as student comments reflect: “it is never quiet and this always feels safe, not lonely” (CS1, FC1, Gina). Concerning safety and security issues, students seem to feel safer in space with enclosed features, and when there is the presence of more people. The safety quality is reflected in the higher rating of the Coates Design Studio, as it has limited access by the public. It was stated “In here we can see security around or at night you can still see them and the door locks automatically once you come in so without your card you can’t get in so, it is safe” (CS1, FC2, Geofry).

In contrast, the safety and security of Telford Exhibition Hall is lower than the other buildings. One participant relayed:

I would not leave my laptop [in Telford Exhibition Hall] and go to the toilet. But if I was in Design Studio, because we have to place to put our card to go in, so I think it is more secure in Design Studio (CS1, FC2, PC).

Another agreed on the importance of this: “You don’t want to be anywhere that people feel not safe” (CS1, FC1, Gina). Students consider this as an important issue for their retention in specific spaces. Students also expressed that they would move to spaces where they know that there are more people around, such as to the library. However, the overcrowding would be one reason that students may prefer spaces other than the library.

6.4.8 Computers, printers and support for laptop use

There is a significant expectation of hi-tech facilities in social learning spaces. Although the social learning spaces are designed mainly to accommodate social activities, such as refreshment, eating and discussion, in practice, a large number of users use these spaces to engage with study. Therefore, many students are concerned about the number of computers and printers available in the social learning spaces. One student comments:

Because there are not many the computers here and they usually are occupied by people. It is not enough. If you work here, for example, you have to submit coursework. and you have to print it, you have to go all the way to computer room. It is not convenient. It should have more printers around [Telford Exhibition Hall] (CS1, FC1, Gina).

Some students express that their study heavily relies on computer use and they prefer to stay in the place where computers and printers are available for use. It was stated ‘We go everywhere to find computers available for use. For the seating area, we have enough sitting areas we just need more computers to use’ (CS1, FC1, Gina).

Although students do not always require computers in a social learning space, the presence of computers affects their satisfaction levels. When students were asked to describe their favourite social learning spaces, the computer regularly surfaced as a theme. A typical comment was:

My favourite social learning space is the Language Centre, which is in the Trent Building. It has computers around and printers as well. Different from here, I don’t find a printer here. It is inconvenient (CS1, FC2, Joey).

Users also mentioned that the space should support use of laptops. One commented that: “the only thing that I don’t like much is there is not many sockets here. So wherever I need to use my laptop I could not charge it” (Ang, FC1). Students also indicated that the size and height of the tables were often not conducive for laptops:

“I don’t think this [table and chair in sofa area in ESLC Social Learning Space] is useful [...] because it is too low and too small to put a laptop” (CS1, FC1, Gina).

6.5 Semi-structured interview with designers

In this study, the Infrastructure Manager of the Engineering Faculty was chosen to be interviewed about the design process and intention of the four social learning spaces. This choice was made because the four spaces were developed, constructed and renovated at different times. Therefore, the architects and designers were hard to

contact. However, the Manager of Faculty Infrastructure was involved in the development of all spaces under consideration.

The interview was conducted on March 21st, 2016 and lasted around 30 minutes. The interview was documented by audio-recorder; it was then transcribed and input to Nvivo for analysis. Data analysis was based on the thematic coding technique. Findings will be discussed below.

The results from the interview indicated that there was a difference in design approach to the four spaces. While the initial concept of Design Studio was developed due to the demand of faculty academics, other spaces were projects at the university level. Therefore, the design intention of these spaces were different from one another in both objective and design process.

6.5.1 Design objective

It was emphasised that the design of Coates Design Studio aimed to create a comfortable and welcoming environment for engineering students to work on group work project, as it was mentioned: “the other part of the proposal is related to Coates Design Suite which was to give an area where students could use as a kind of home” (Faculty Infrastructure Manager). Furthermore, this design also aimed to offer a local place for group interaction, discussion and academic support. Safety and security were also a concern of this project. It also focused on the degree of privacy and ownership and aspired to create a cosy environment for students:

[Students] they want their own spaces, they also want an area locally in the department when they are working on the project, they can work in set of area and academics can drop in and they can mingle with the students (Head of Faculty Infrastructure, Faculty of Engineering).

6.5.2 Design process

According to the manager, the design of Coates Design Studio followed theories and guides to gain inspiration. It was emphasised that the “space requirement” was taken into consideration – ergonomic, legal requirements and university standards were the main source of design guideline for this project. It was noted that the budget also impacted on the design concept. Furthermore, other successful examples were a source of inspiration for the design concept:

When we design, we look for some examples such as in Sheffield University; they have a very good example. There are some good examples, we try to understand them and applied in our design (Head of Faculty Infrastructure, Faculty of Engineering).

The example referenced is the new 81 million project, named the Diamond Building, which opened at Sheffield University in September 2015. This building is, “home for engineering undergraduates” and has six storeys used for teaching, including lecture halls, seminar rooms, a library and IT service and designated space for informal learning with the cafeteria area (University of Sheffield, 2015). This example underscored the important role of informal learning space and the impact of its design on student experiences. It also reflected the growing trend of developing high quality informal learning spaces. As the Sheffield strategy for the future mentions:

The building offers them a unique learning experience and exemplifies the University’s commitment to see engineering and high value manufacturing at the heart of the region’s economic future. We believe the Diamond will offer the best multidisciplinary engineering teaching space in the UK, it is truly a world class university building (Professor Mike Hounslow, 2015).

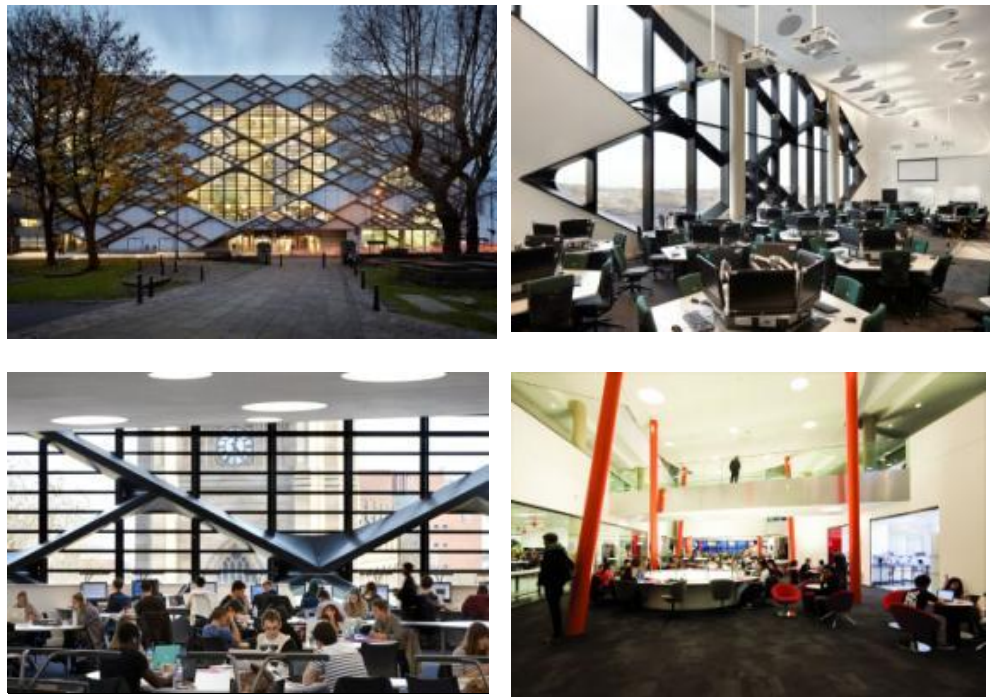


Figure 6.20: University of Sheffield’s Diamond building (Source: University of Sheffield, 2015)

Also, according to the Head of Faculty Infrastructure, one key element that makes the project a success was the consistent involvement of students. There was high involvement of the academic department and prospective students in the design process. It was explained that the initial concept was to respond to academic requirements. Therefore, the design process considered user feedback in decision-making. It was further explained:

We are going back to talk to the academic department mechanical, environmental and civil engineering [...] Then we talked to the students and represented student groups. We get the plan out to the students give the feedback, what is good and what is not good. Because, at the end of the day, they are the people who use it. So we don't want the design that we may think it is a very good idea but it will be rubbish to them [students], they [students] don't use it. We want some feedback, so we went to the learning group form and ask the feedback from students. From that we were able to get the basic custom of the design. When we design a project we want everybody to get involved (Head of Faculty Infrastructure, Faculty of Engineering).

He also emphasised that understanding users' needs is the key to the success of a project. He stated:

We do care about students, we normally do not do any project without the feedback from the student coming in [...] If we are going to assume what they will want so there is 50/50 that will correct or not so I think it should be better to talk to the user. Understanding is the most important (Head of Faculty Infrastructure, Faculty of Engineering).

In conclusion, throughout the interview it is demonstrated that the difference in the design approach would be the one factor affecting the satisfaction among the users. Coates Design Studio is an example. More concern about user requirements, and good communication with users in the design process are seen to be essential factors that lead to a high level of appreciation among the users.

6.6 Discussion

6.6.1 Findings from the Case Study 1

Generally, through the case study analysis, it is clear that social learning spaces are being used, not only for social activities but also for learning purposes, such as individual study and group-work discussion. While observation, questionnaire and focus group data indicate that multiple activities are undertaken in the four studied spaces, some spaces accommodated more learning activities or social activities than the others. The possibility for interaction in groups, with friends and peers, was seen as the greatest benefit of these social learning spaces. The frequency of use is quite high among the group of students, which heightened the intensity of contact. Therefore, social learning spaces play an important role in the student experience. This is underlined in the theory:

Interaction among community members is fostered by the availability of indoor spaces where people can come together without much effort. Institutions should consider whether their campuses have adequate places that encourage spontaneous, informal interaction among students (Kuh et al., 1991, p. 309).

Moreover, the time students spend in the social learning spaces corresponds to the time spent on the campus for lectures and seminars.

The results here showed that the main attributes of social learning, which attracted the users, kept them longer and had a positive effect on their learning are: design quality, comfort, hi-tech facilities and location. In term of design quality, the theories of an ideal design framework were evaluated in the four studied spaces to examine its effect on the user activities, time spent and their satisfaction. There were five design quality aspects considered to have an effect: “design character”, “design appearance”, “coherence”, “legibility” and “density, diversity and richness”. All of these impacted upon on the choice of activity, time spent and satisfaction.

In detail, a high perception of these design factors promoted learning activities among the students. The result of the survey shows that higher perception tended to be found in learning group students as opposed to social group students. Furthermore, the results demonstrate that high perception of these qualities also encouraged users to stay longer in the spaces, helping them to engage more with learning activities. Additionally, the time spent in social learning spaces was correspondent to the satisfaction with these design quality characters. Therefore, the design framework for social learning spaces should carefully consider these five design aspects.

It was indicated that the spaces’ appearance, with regards to soft furniture and seating arrangement, is a big concern among the users. Moreover, a “spacious feeling” is a significant preference. The safety and security aspects, which are attached to the presence of people surrounding, also affect students’ decision to stay in the space or not. Also, the users mention legibility – which refers to the ease of navigation and the seating available, as well as an easy to use space. Users also indicate the need for mixed-use space that holds diverse opportunity and purpose. Students have expressed that, instead of only large group work-settings, space should have single study spaces. Lastly, the findings of this case indicated that the social learning space should be a place for interaction and public involvement, it also need to have a degree of enclosure, where users could have some privacy as well. Students indicate that they might not want the same extent of privacy as they would do at “home”, but still, they require privacy with a public frontage; this would give them motivation to work but also freedom from the public eye to focus on their work or study.

Users indicate that comfort in terms of temperature, lighting and noise level are important issues in their selection of space. Moreover, the demand for technological

support for study is quite high, since they would like to access their work whenever they can. Therefore, the availability of a high-speed wi-fi router, computers, printers and sockets for laptop use are the main requirements for students in social learning spaces. The location is a final significant factor, which refers to easy accessibility from formal learning areas and easy access to food and drink.

6.6.2 First case study evaluation

The multiple case study model can assist the researcher in terms of strengthening the findings. Yin (2014, p. 164) emphasises that, “Cross case study syntheses can be performed whether the individual case study has previously been conducted as independent research studies or as a predesigned part of the same study”. The first case study is one of a typical mix of renovated social spaces, located in and in-between buildings. These spaces have many limitations with regards to the building structure; therefore, the designer would have found it difficult to apply new, innovative concepts. It seems that little attention was given to encouraging student-learning experience in the design of these spaces. Furthermore, the social learning spaces were not designed to promote both social and learning activities as the main intention at the beginning. To have the full view of the research problem, a second case study is proposed, which is a new innovative design in terms of social learning spaces and therefore is necessary for this study.

Moreover, the initial result of the first case study produced participant views about how design quality affects student-learning experience in term of activities, time spent and user satisfaction. However, any direct relationship between design factors and learning process is unclear. Nevertheless, design characteristics do have a clear effect on the degree of engagement with learning experience, such as time devoted for study, activities involved learning and motivation for learning. Therefore, the survey needs to be revised to enable precise clarification of relationships.

In term of method, results from the first case study show some limitations in the questionnaire structure. The results from the focus group and informal discussion with the users suggested some aspects, such as volume of the spaces, lighting, noise, temperature, and comfort of furniture, plus the view outside should be added. In addition, it also showed that, although the researcher tried to explain the measurement criteria to users, some respondents still missed the question meaning. Therefore, the survey was revised and expanded in specific areas, to more accurately measure perception of users regarding design quality.

6.7 Conclusion

The first case study gave evidence that the social learning spaces, such as Telford Exhibition Hall and ESLC Social Learning Space Social Learning, Coates Café and Coates Design Studio have played an important role in student learning experience at the Engineering Faculty of Nottingham University. These social spaces support learning activities (such as coursework, group-work or writing and reading), alongside social activities (such as eating, drinking and talking between or after lectures). A “meeting place” is the primary description of these spaces among the users. However, students also stated that these spaces are useful for studying, as they can work on coursework between lectures or conduct group meetings. Furthermore, interaction is the key point to the learning process. It is clear that the presence of the social learning spaces has encouraged a high level of interaction, peer-to-peer. It can also encourage the development of the students’ learning community, as it allows for accidental meetings and interactions between students on campus.

In term of the relationship between the design quality of social learning space and user experiences, the analysis showed a clear correlation between five design qualities: user time spent, activities and satisfaction. The data of the focus group not only supported this claim but also expanded in detail upon how these factors have an effect on use. Furthermore, it is also suggested that the degree of privacy, technology and comfort have an impact.

Through the interview with the Head of Faculty Infrastructure, it is apparent that there has been a deep involvement of the students in the design process of new Coates Design Studio. Correspondingly, users do express high appreciation of Coates Design Studio. Although the intention of the designers has not been made available at the moment (as the designer of some spaces could not be identified), it is clear that when the design process directly consults users to ascertain their needs, the results will lead to more satisfaction.

Chapter 7 :

CASE STUDY 2 – THE PAVILION BUILDING, CLIFTON CAMPUS – NOTTINGHAM TRENT UNIVERSITY

In Chapter 7, Pavilion at Nottingham Trent University's Clifton Campus is selected as the second case study, based on the proposed framework design qualities of a "social learning space" with features of "inspiring study" and "social areas". The building is a new design project, at "the heart of the campus", providing social spaces and informal learning spaces for students. In particular, the design promotes student learning engagement by providing a variety of, social study space, enclosed learning spaces called Pods, collaborative booths, a Barista cafeteria (NTU, 2016). Although, at the beginning the project had an unclear brief (Robert, 2017), taking an open approach in dialogue with the clients, architects and estates team, the final building has been highly recognised for its architectural value and impact on the image of NTU. The design has been recognised by awards, such as the Royal Institute of British Architects (RIBA) East Midlands Awards (Client of the Year Award), Royal Institution of Chartered Surveyors (RICS) East Midlands (Regeneration Award), the East Midlands Celebrating Construction Awards (Integration and Collaborative Working Award), and the Considerate Constructors Scheme National Award (. It has also become a key contributor to the overall image of the NTU Clifton Campus; a cornerstone in the process of transforming the campus into a 'excellent learning and teaching environment' (NTU, 2016). It is worth, therefore, investigating the difference between the older design approaches that are widely in use, and this new highly recognised approach.

7.1 Introduction to the Pavilion Clifton Campus

To begin with, the Clifton Campus is one of the four Nottinghamshire campuses of Nottingham Trent University (NTU, 2016). It is the second largest; therefore, it has been invested in and transformed in line with the concept that “student life is about so much more than lectures” (NTU, 2016). The website states that:

NTU is one of the UK’s most environmentally friendly universities – our commitment to creating a sustainable campus shines through in our recent transformations. In fact, our brand-new Pavilion building generates more energy than it consumes [...] Clifton Campus provide environments to live and learn alongside 8000 students, in a place where buzzing social venues, ultra-modern learning spaces and cosy accommodation combine to create a thriving student community (NTU, 2016).

Clifton campus

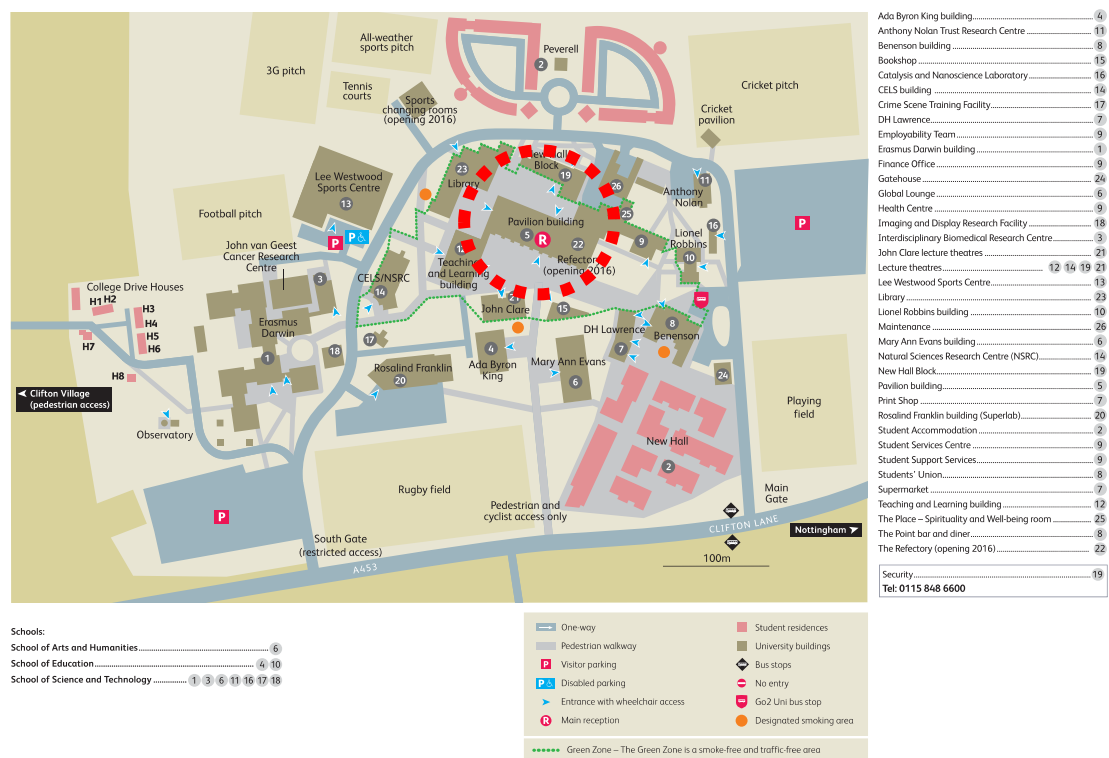


Figure 7.1: Clifton campus map, with the Pavilion highlighted in red (source: adapted from NTU Campus Map downloaded from http://www4.ntu.ac.uk/map_files/Clifton_2D.pdf)

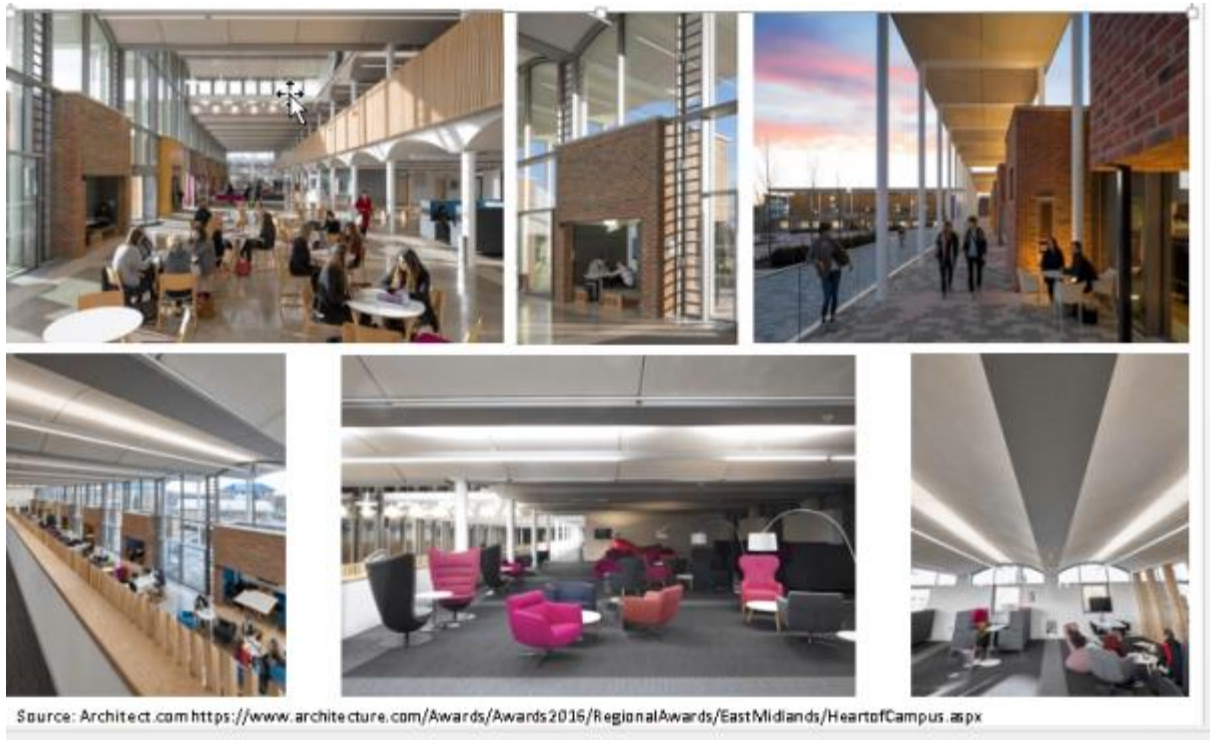


Figure 7.2: Left to right: Pavilion building exterior; view of the main concourse as seen from the mezzanine; view of the mezzanine open area (Source: Architect.com, [https://www.architect.com/awards2016/regionalawards/HeartCampus.aspx](https://www.architect.com/awards/Awards2016/RegionalAwards/EastMidlands/HeartofCampus.aspx))

In the overall campus plan, the Pavilion building has plays a central focal point and is the gate to welcome all students, as well as the visitors. The first floor of the building comprises a variety of different types of learning spaces, which include classrooms, self-learning spaces, social spaces, exhibition space, employability desk and cafeteria refreshment spaces. There is a blend of different social learning spaces, including booths for group work, with a big screens and laptop connections, two seminar rooms, sofa and cafeteria areas with charger boxes. In addition, there are two classrooms, which can be converted into one large class room via a movable partition to make it adaptable for different uses, as shown in Figure 7.3.

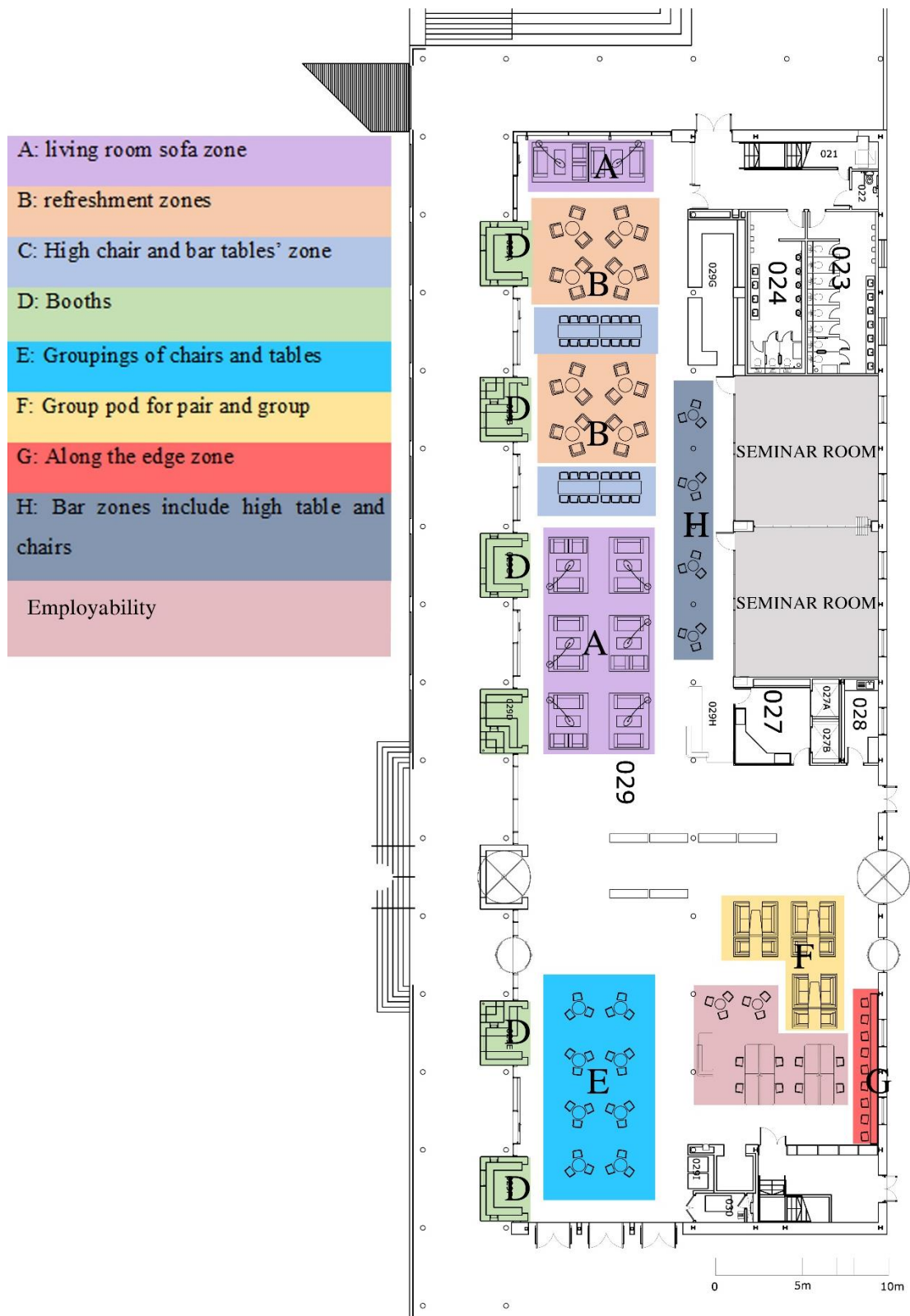


Figure 7.3: The Pavilion layout: first floor plan (source: adapted from original construction plans provided courtesy of NTU estate office)

The mezzanine floor includes informal gathering areas and three seminar rooms, with computer screens, support for discussion in a group; compared with the four separate spaces from the first case study. There are also three seminar rooms, with large screens as well as flexible furniture and movable walls to fit different purposes.

The Pavilion Building is a compact model, that mixes functions in one large structure. It has received many awards, including the Royal Institute of British Architects (RIBA), East Midlands Awards (Client of the Year Award), Royal Institution of Chartered Surveyors (RICS) East Midlands (Regeneration Award), the East Midlands Celebrating Construction Awards (Integration and Collaborative Working Award), and the Considerate Constructors Scheme National Award (NTU, 2016).

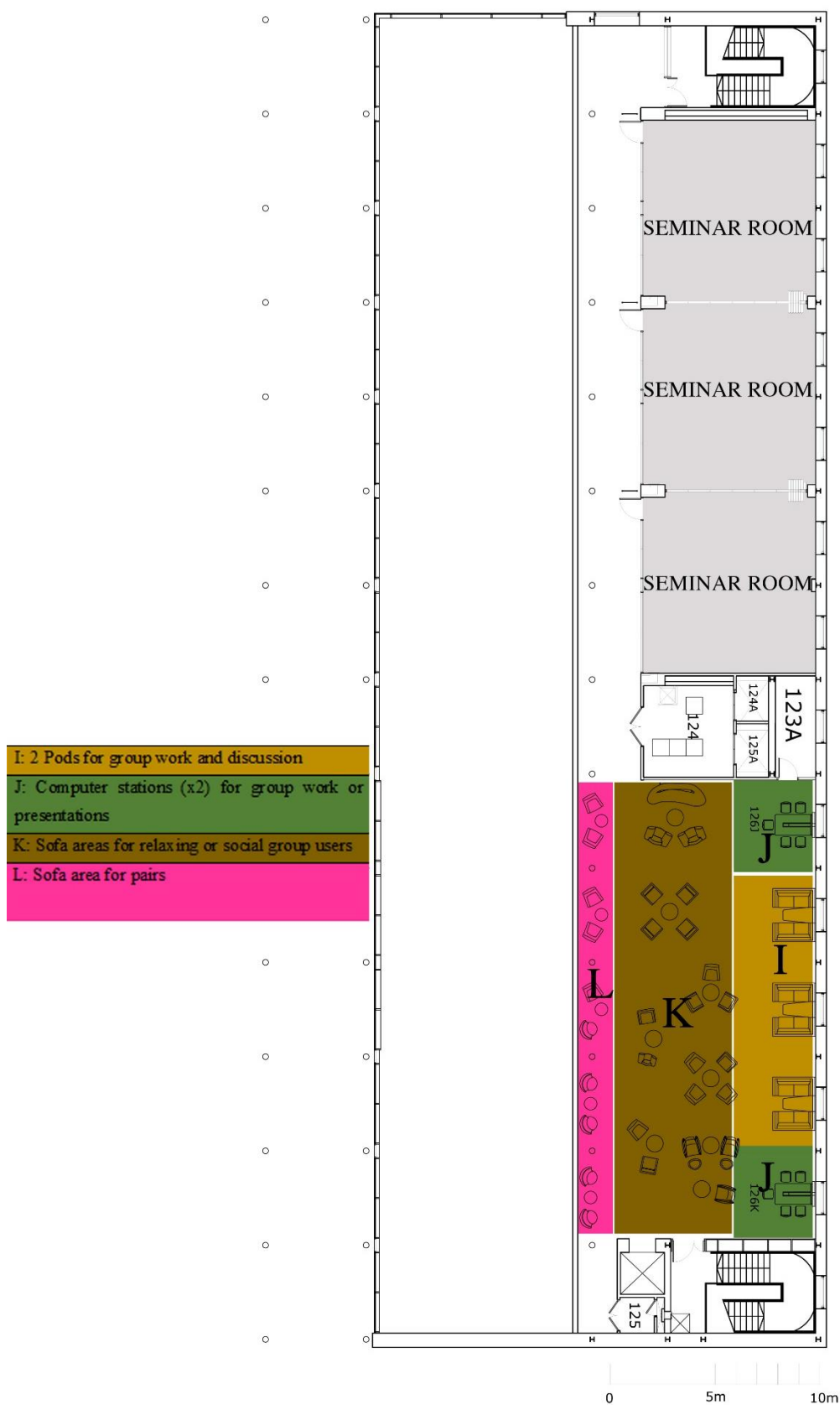


Figure 7.4: The Pavilion layout: mezzanine plan (above- source: adapted from original construction plans provided courtesy of NTU estate office)

7.2 Method and process of conducting data

The case study methodology has been adapted from the first case study. More specifically, the process of observation, survey, focus group and interview will be similar. However, there will be some improvements, based on the findings of the former study.

Firstly, the second case study will employ revised questionnaires to measure all the design factors mentioned in the first study. In detail, each of the eight design factors was expanded in a more detailed parameter, which is the synthetic result from the first case study (see Appendix 2c). Adapted from different frameworks; mainly from psychology and place making views, the questionnaire was also designed with four sections to cover the research focus – using value, satisfaction with the design, perception about architecture parameters and how these have different affects on social and learning purposes and student engagement level.

For an instance, it has been indicated that the environmental condition of lighting, temperature and noise have impact on student behaviour in a normal classroom environment (Graetz and Goliber, 2002). In addition, the findings from Perception of legibility, coherence, mystery and complexity were important aspects when it came to choice, time spent and satisfaction of users. In regards to the Education perspective, location, resources such as a laptop, computer, printer and charger were found to influence the choice of social learning spaces (Harrop and Turbin, 2013). In contrast, place making framework emphasized the importance of aesthetic appreciation, such as qualities of being attractive, the identity, welcoming, privacy, easy to control, enclosure, safety/security and flexibility.

In order to capture all the different layers of user perception, these aspects were integrated in the questionnaires. The relationship between each design parameter and the social or learning use of participants was also investigated. The revision to the criterion will allow the researcher to draw direct correlations between different design factors and different informal learning activities. Furthermore, the relation between design factors and overall satisfaction with the design and comfort will be demonstrated. The correlation between time spent in study spaces and design factors of these spaces can be illustrated through the statistical analysis. Finally, the overall perception of design quality of social learning spaces on campus can also be correlated with Student Engagement Survey.

Firstly, the questionnaire used a mix of different measurement scales for different sets of questionnaires. There were three different scales applied. Firstly, the perception of design parameters was measured by the semantic scale, which is indicated to be most appropriate when measuring subjective views of respondents (Zeisel, 2006). Secondly, the satisfaction category applied the five-point ranking scale. Thirdly, the student engagement level questions were adapted from the United Kingdom Engagement Survey questionnaire, measured in 5 points and 4 points linker scales (see Appendix 2c). Secondly, as this is a new building, the researcher will have the opportunity to approach the architect and estate manager directly, to identify the design objectives of the project. This data will allow the researcher to examine whether the design intention complies with the users' experience/needs. Thirdly, the focus group adds more questions to examine, in-depth, the relationship between the design quality and the degree of learning engagement.

7.3 Observation data analysis

Adapting to the observation process of the first case study, the researcher collected data over 7 weeks (time shown in the Table 7.1) in the academic year 2016-2017. Observation used mapping techniques to record what activities, materials, position and interaction users had while in the space (example see in appendix 1b). The data reflects a real picture of how space was used in actual conditions. Although there are estimates and assumptions when determining student activities and whether these constituted a learning task or not, the observation nevertheless helped the researcher "the most about the relationship between settings and what people do to them" (Zeisel, 2006, p. 195).

Table 7.1: Observation date and time

Term/sequence of observation week	Start Date	End Date
Autumn / 1 st	31/10/2016	04/11/2016
Autumn/ 2 nd	28/11/2016	2/12/2016
Spring/ 3 rd	16/01/2017	20/01/2017
Spring/4 th	6/02/2017	10/02/2017
Spring/5 th	6/03/2017	10/03/2017
Summer/6 th	24/04/2017	28/04/2017
Summer/7 th	22/05/2017	26/05/2017

Mapping observation data was used to produce the frequency of use, the tendency of user activities, the type of interaction with design features throughout the different times of day and different times of the academic year. Overall, 105 observation sessions were conducted over 7 non-consecutive weeks. In each observation week, observation sessions were conducted from Monday to Friday at 10 am, 12pm and 3pm, with each sessions lasting from 15 minutes.

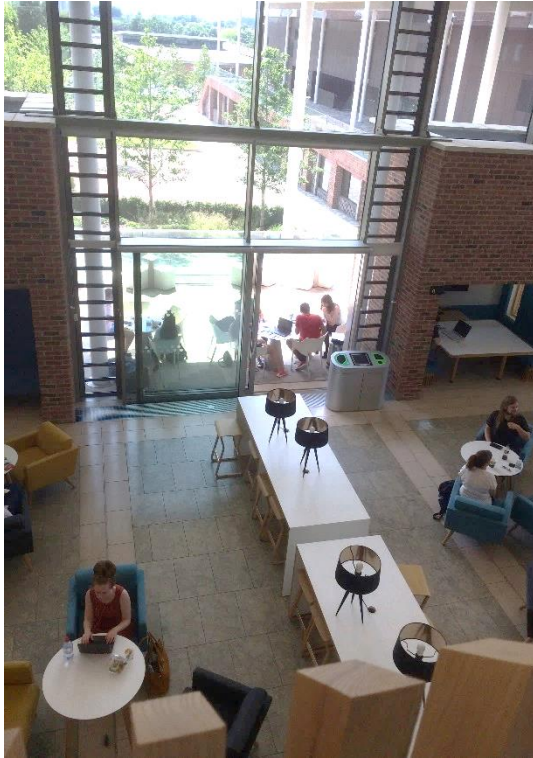


Figure 7.5: The design allows users can use canopy space when the weather is good (Observation on 25/05/2017 at 15:11)



Figure 7.6: Students enjoyed the canopy social learning spaces for both learning and social activities (Observation on 25/05/2017 at 10:32)

7.3.1 Different spaces accompany different activities

The result of the observation indicated that the Pavilion is used for different social as well as learning activities. Furthermore, it showed that the proportion of learning versus social activities occurred in Pavilion building depended on the coursework that students needed to do (Figure 6). Learning activities occurred more frequently at the end of each term, while observation closer to exam and submission times revealed a 20% increase in learning activities compared to the beginning of the term. Furthermore, the building also attracts use by staff, especially in groups (over 20%), for both academic and social purposes.

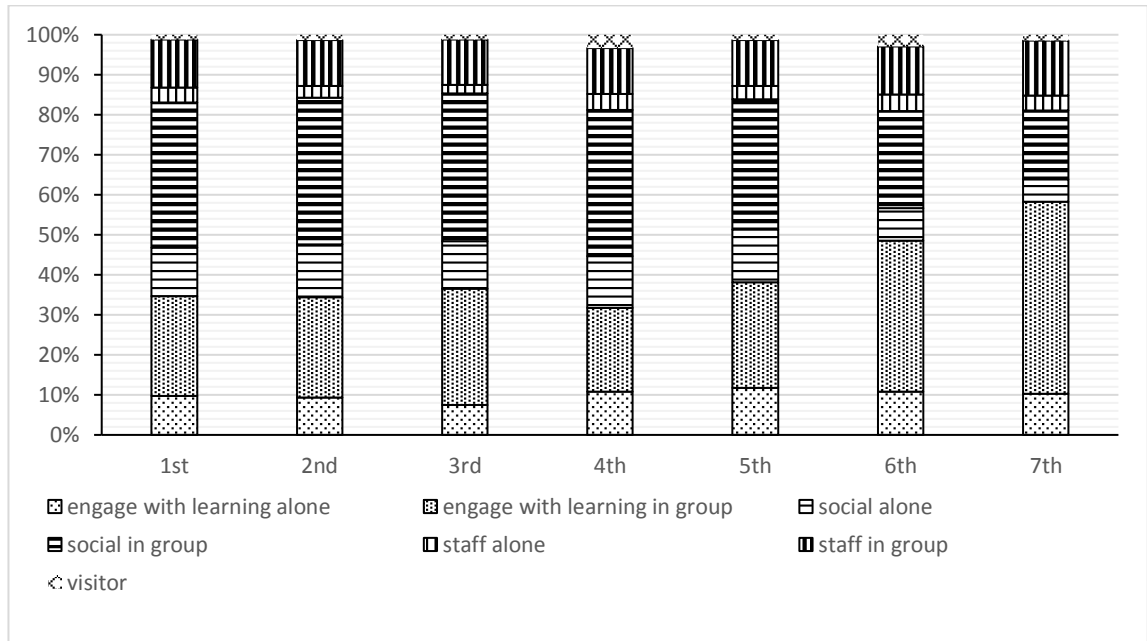


Figure 7.7: Proportion of activities that users undertake in the Pavilion during the academic year (from observation data)

This finding corresponds to the result of the survey, discussed above. Specifically, activities were not only for socializing purposes, such as a drink of coffee, eating, talk with friends, checking phone or use of phone for entertainment; there was evidence of coursework, group-work, practising presentations, laptop use for learning purposes and discussion with staff as part of tutorials. In short, there was a high level of engagement with learning activities at the Pavilion. Observation data suggested 40% of users stay in groups for discussion or working with learning materials.

According to the longitudinal data, observation showed that different spaces accommodated different activities. The figure showed that, for example, in the booths, over 65% of users in these areas engaged with learning material and learning activities in a group or individually. Similarly, the three pods and two computer stations on the mezzanine were also dominated by 60% and 85% of learning activities such as reading handouts, books, notes, working with laptops, writing notes; discussing in a group with learning materials surrounding, practising presentations in a group or with friends before seminars.

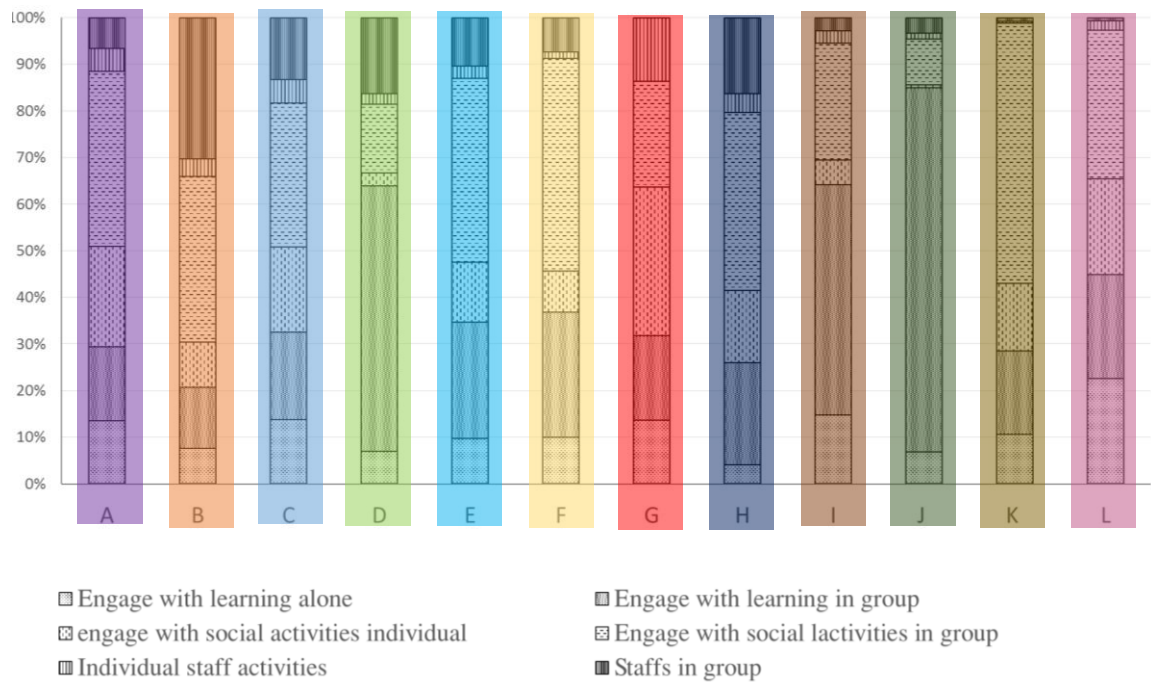


Figure 7.8: Proportion of user activities in different areas of Pavilion Building (from observation data). Refer to Figure 2 to cross reference the location of each space (A – L) on the building plan.

7.3.2 Interactions between users

Observation showed that the main interactions between students were working in groups or socializing in groups/pairs. Observation indicated 40% of users stay in a group and interact with friends or colleagues; higher than users who stay alone.

While observation occurred open days, career exhibitions and some charity events happened in the building, see Figure 7.9, Figure 7.10, Figure 7.11. During academic year, there were various activities held in the spaces; therefore, a variety of interactions occurred in the study space such as: between students who come to work in groups, new students who come to view the campus on an open day, interaction between student and their peers, students with the employment service, students with staff for academic purposes, staff meetings and socialising.



Figure 7.9: Open Day Event (Observation on 24/04/2017 at 12:26)

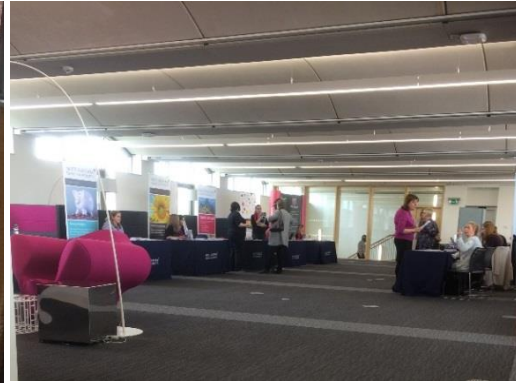


Figure 7.10: Open day event on the magazine floor (Observation on 24/04/2017 at 12:26)



Figure 7.11: Cake sale-charity event (Observation on 07/03/2017 at 10:42)

In addition, the design of the physical space can accommodate different activities that students and staff need. According to observation, there was an especially high level of use by staff, with around 20% of total users being staff, not students (as inferred by appearance, such as dress code, age, visible staff card, posture and activities). There were a large number of meetings and discussions held between staff members, especially on Wednesday when students may not use the space much as they often have no class schedule (Figure 7.9, Figure 7.10 and Figure 7.11). It showed that the Pavilion has high value in term of utilization.



Figure 7.12: The booths can accommodate large to a small group of students, working as well as socialising (OS: 28/04/2017 at 12:00pm)



Figure 7.13: The booths used for a group of students in a tutorial with staff member (OS: 24/04/2017 at 15:00)

Notably, there was a high level of interaction between staff and students who used this space for tutorials with groups or individuals. In addition, some staff also use the spaces as their personal working space, especially the upstairs area. Students also interacted with staff in a group or individually. During coffee break time and lunch time, staff used the spaces for a breaks and relaxation purposes – with colleges or visitors. Observation showed that there were both formal and informal interactions of staff at Pavilion.

7.3.3 Design quality

Subjective comfort relates to high perception of the comfortable and welcoming atmosphere as well as safety and security of the environment. It also relates to the degree of privacy, enabling the students easy control of their personal space. It has been indicated by the literature that the perception of the environment would support some of user's behaviour more often than the other. The empirical data from observation in the Pavilion building case study indicated that claims. The design aimed to promote the subjective comfort perception among the users- It was noticed by observation that some students sit comfortably on the floor or put laptops on armchairs or on their laps to work for a considerable time (Figure 7.16 and Figure 7.17).

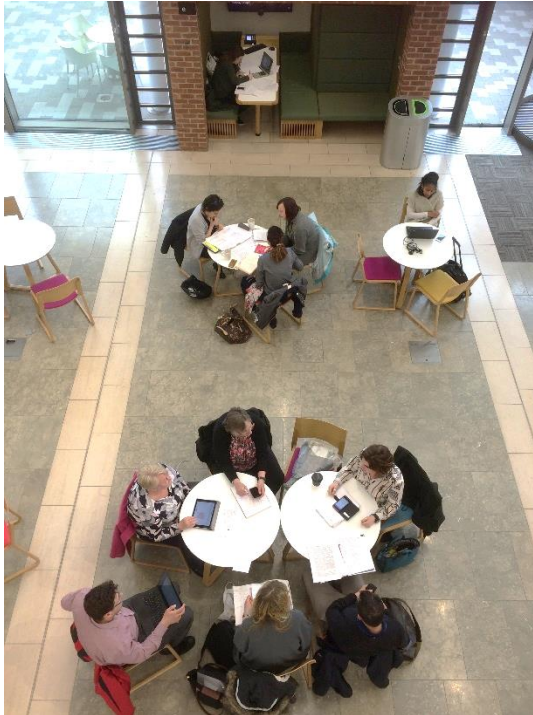


Figure 7.14: Staff meeting; student work with laptop; students work in pairs in the booth
(Observation on 07/03/2017 at 15:15)

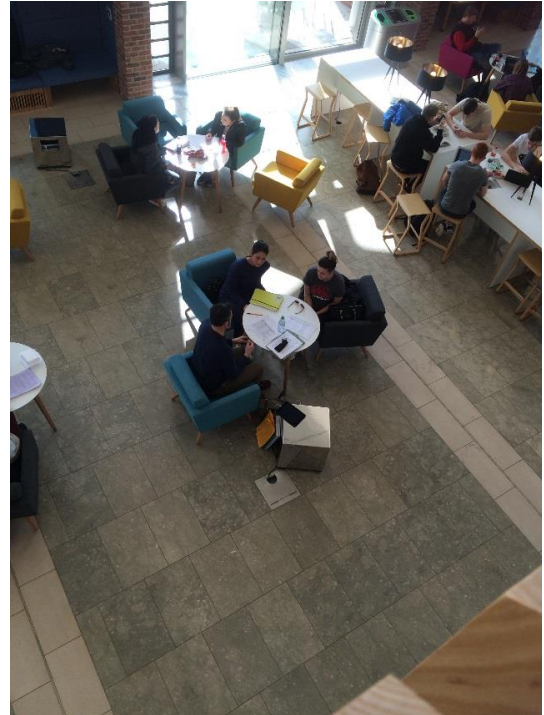


Figure 7.15: Small tutorial discussion
(Observation on 07/03/2017 at 15:15)

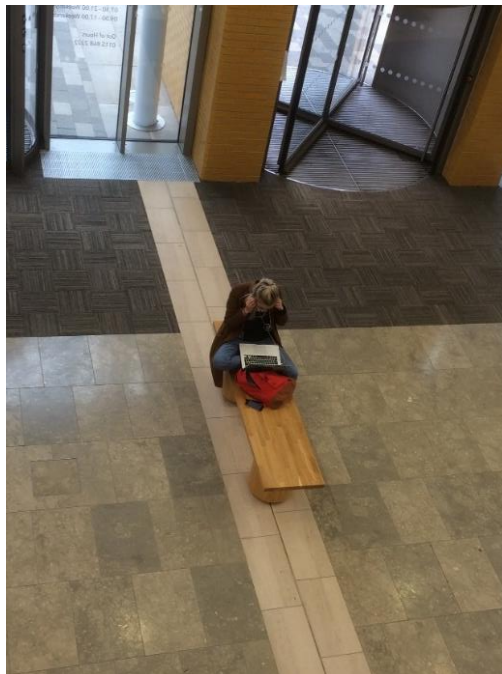


Figure 7.16: Student using the bench for laptop purposes (Observation on 1/11/2016 at 12:27)

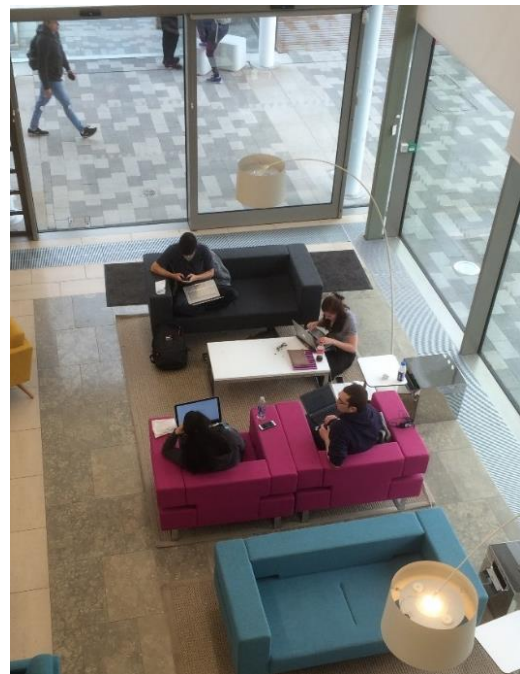


Figure 7.17: Students users at Pavilion building
(Observation on 1/11/2016 at 14:59)

When the weather was good, students also enjoyed the canopy spaces outside the buildings. Lighting, especially, natural light was an attractive feature of the spaces (Figure 7.17 and 7.18). The building always looked bright and full of lighting during the winter as well as summer.

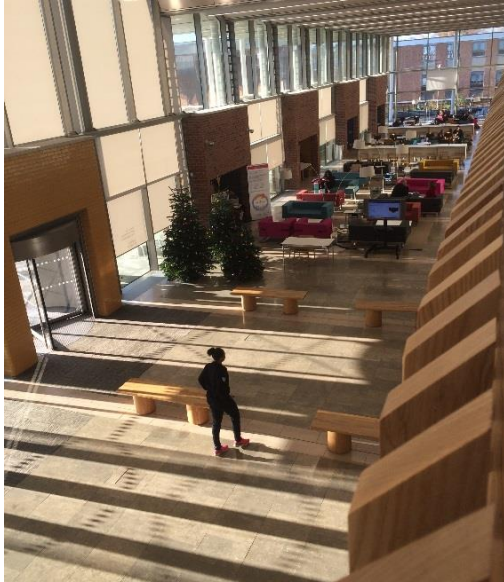


Figure 7.17: Lighting and architecture solution for the impact of lighting in winter morning (Observation: 29/11/2016 at 10:18)

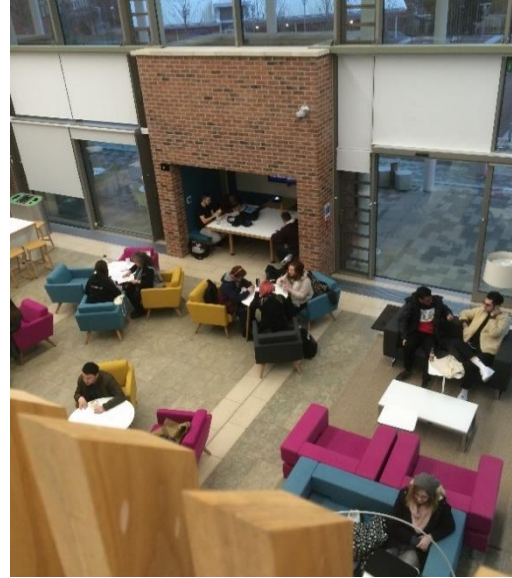


Figure 7.18: Lighting in the Pavilion in winter time (Observation: 01/12/2016 at 15:35)

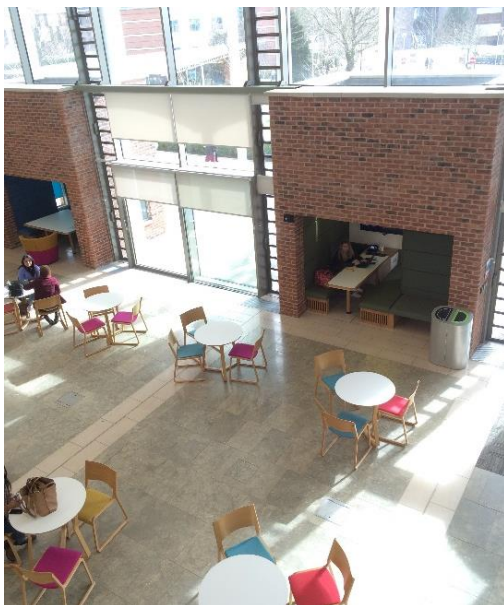


Figure 7.19: High level of natural day light (Observation: 06/03/2017 at 12:00)

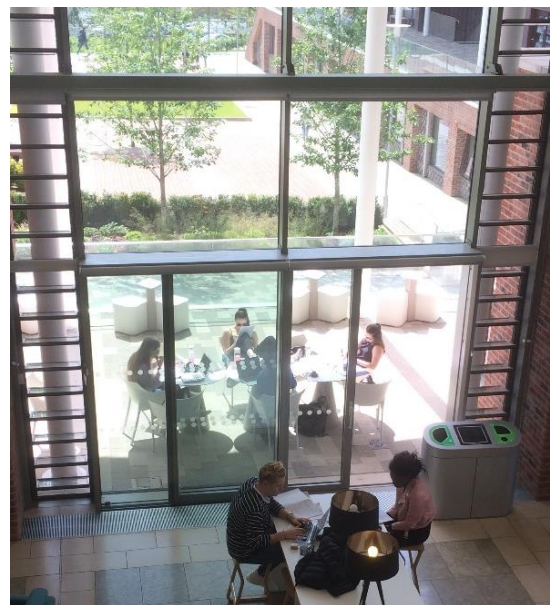


Figure 7.20: Students use canopy as learning space when the weather is good (Observation: 25/05/2017 at 12:12)

7.4 Questionnaires data analysis

Adapting from the first case study survey, the second case study questionnaire was changed and expanded in order to collect accurate data and capture direct correlation between perception of design quality and students' experience. Similarly, the process of input and analyse the data by SPSS program was applied in the second case study. Although the questionnaire was constructed to collect variety of variables, the discussion below will only present the significant result correspondent to the research question. The below part will discuss the finding from the questionnaire of the second case study including: demographic and background of participants, Perception of the design quality of the Pavilion, the relationship between the overall perception of the social learning space design in the Clifton campus and the student engagement criteria, the relationship between satisfaction with the design quality and time spent, the relationship between time spent and activities at the Pavilion, Interaction between the users.

7.4.1 Demographic and background of participants

Individual or groups of students in the Pavilion were approached and invited to take part in a survey. In the first term of 2016-2017, 350 students were approached in the building and 290 students took part in the study. Of these students, 241 participants finished the survey and gave ethical permission for the data to be used. In the second semester, 350 students were approached; 190 students agreed to take part in the study. However, due to the limited time in terms of the break between their lectures, only 168 students returned the finished survey to the researcher.

With regards to demographic information of participants, Figure 7.21 showed that the majority of respondents in both semesters in the Pavilion Building were undergraduates (first, second and third year of study). Furthermore, participants were from several of the courses located in the Clifton Campus, such as sports science, education, media, computer and bioscience.

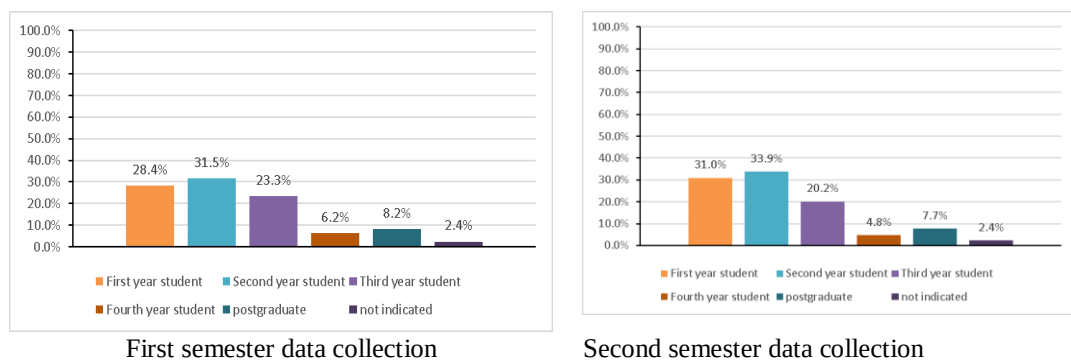


Figure 7.21: Distribution of students according to study year in the Pavilion Building

Regarding participants' gender, there was a reasonably balanced number of male participants and female participants: 51% were female students and 41% male (Figure 7.22). Only 4% to 8% of participants refused to indicate gender.

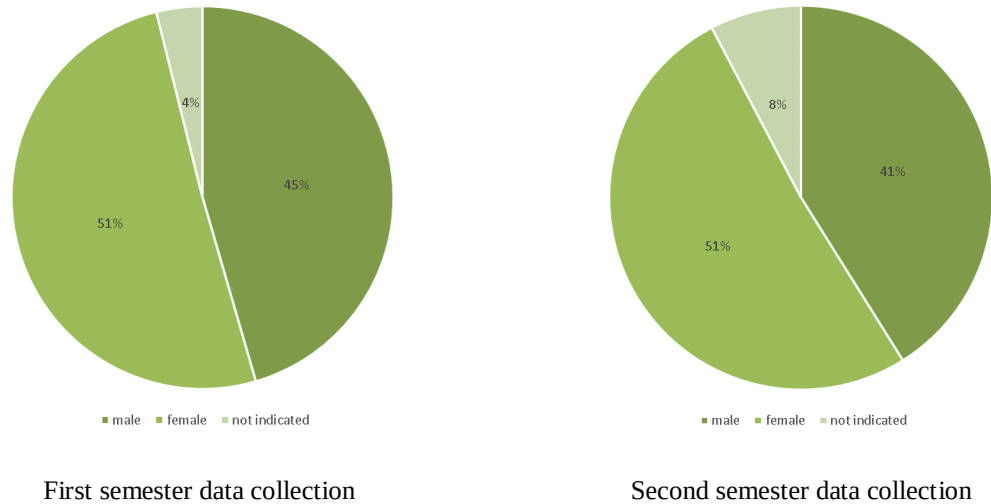


Figure 7.22: Distribution of gender of participation in the survey

In addition, Figure 7.23 shows that most of participants were in the age range of 18 to 20, which accounted for over 50%. After this, students were aged from 21 to 25, which accounted for just over 30%. A small number of participants were under 18 years old, around 1.2%. However, overall, the majority of students had an age range from 18 to 25. A statistical test (Kruskal Wallis H test) was applied to see whether the age factor will influence the perception of the design, as well as the engagement level and use value. However, there was no statically significant difference between different age groups for the examined aspects. Therefore, it is reasonable to accept that participants in the Pavilion were relatively homogenous.



Figure 7.23: Distribution of age of the participants in the survey

Overall, Figure 7.24 show that there is a large number of participants unclassified in terms of learning background. Among students who indicated their background, the majority of them were “home students” which account for over 80%. Similarly, a statistical test (Kruskal Wallis H test) was applied to determine the effect of background on design perception, use value and engagement level. Between the international and home student groups, there was no statistically significant difference in term of the three main examined variables.

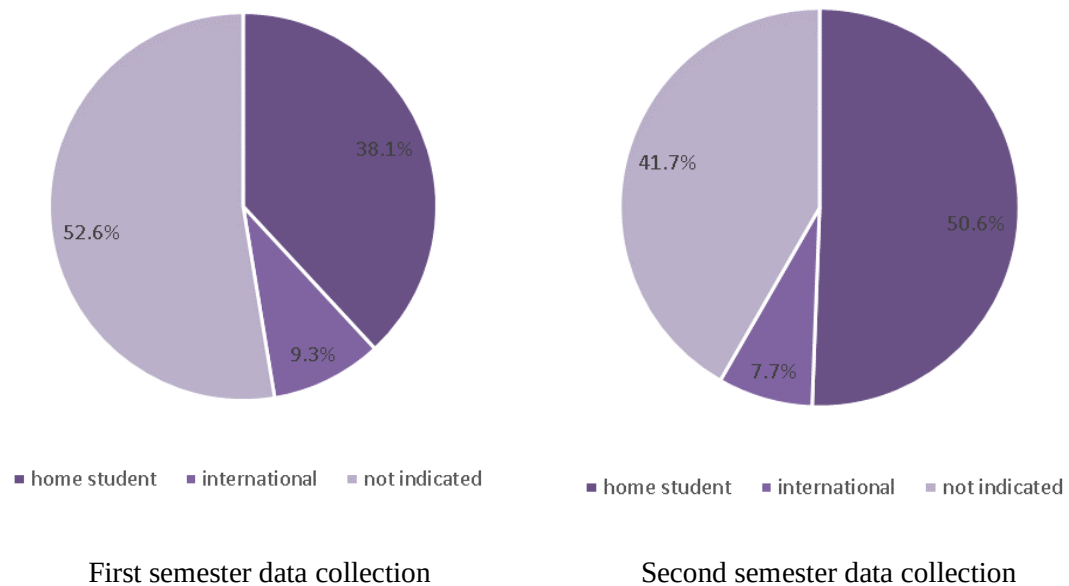


Figure 7.24: Distribution of student background

With respect to the student residence location, the results of the survey showed that the majority of participants at the Pavilion were off campus students, which accounted for approximately 80% in both semesters (Figure 7.25).

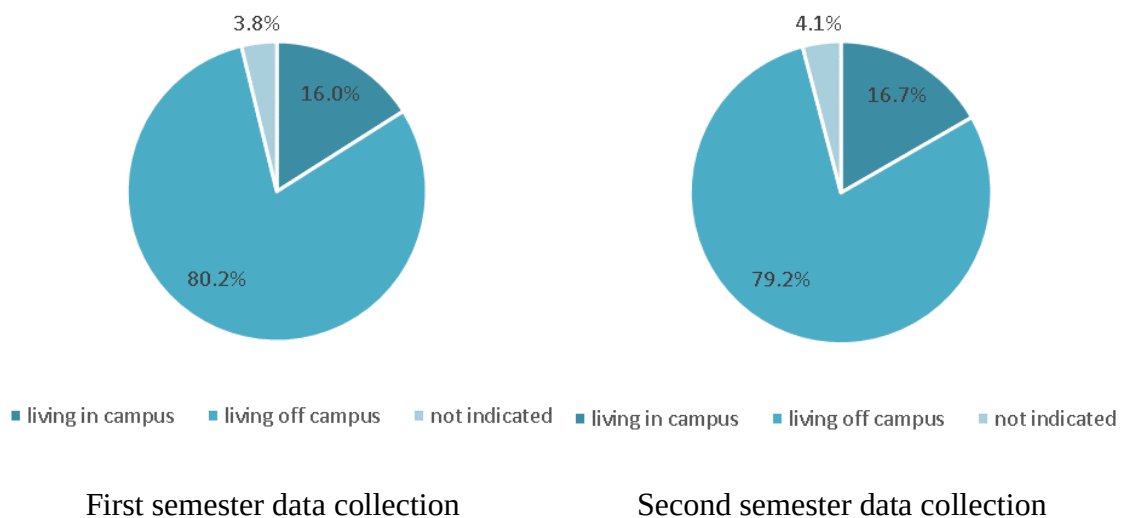


Figure 7.25: Distribution of user living location

Overall, statistical analysis was used to test whether there was any demographic effect for these factors, such as age, gender, year of study and student background on perception of the social learning space, time used and student engagement level. The results indicated very little difference between the examined factors and the demographic information collected in the questionnaire.

7.4.2 Perception of the design quality of the Pavilion

It indicated in the questionnaires that the perception of the design of Pavilion was significantly high overall (Figure 7.26). Especially with regards to appearance aspects: factors such as volume, shape, height, colour and views; as well as position aspects, such as location and accessibility. Furthermore, the intangible aspects: attractiveness, identity, welcoming, cohesive, interesting, visually appropriate, safe/security and flexibility were also well regarded by the students. These results are shown in Figure 7.26.

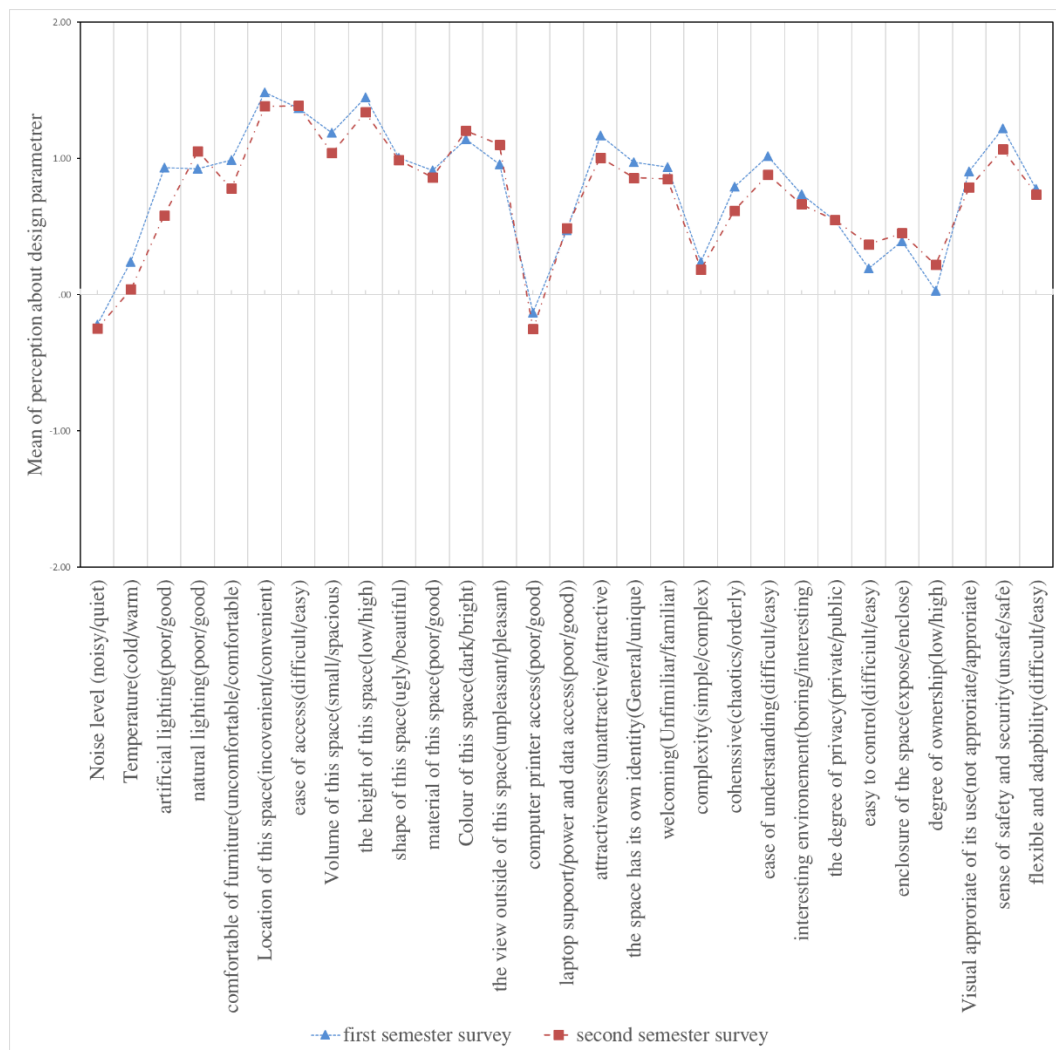


Figure 7.26: The perception of design characteristics of the Pavilion Building

Table 7.2: The perception of users about 29 designed parameters

	Mean 1 st ground survey		Mean 2 nd ground survey		Sig
	Mean	Std Deviation	Mean	Std Deviation	
Noise level	.219	.884	.248	.744	.733
Temperature	-.241	.947	-.040	.759	0.022**
Artificial lighting	.931	.947	.581	.957	0.000**
Natural lighting	.926	.961	1.054	.848	.116
Comfortable of furniture	.989	.972	.780	.958	.031**
Location of this space	1.485	.838	1.384	.826	.227
Ease of access	1.367	.898	1.388	.854	.818
Volume of this space	1.189	.928	1.039	1.017	.119
The height of this space	1.450	.785	1.340	.847	.178
Shape of this space	1.003	.836	.988	.790	.850
Material of this space	.914	.836	.863	.794	.531
Colour of this space	1.142	.815	1.203	.768	.441
The view outside of this space	.956	.989	1.101	.868	.124
Computer printer access	-.1289	1.151	-.251	1.055	.277
Laptop support/power and data access	.472	1.055	.489	1.092	.875
Attractiveness	1.170	.819	1.006	.836	.050
The space has its own identity	.972	.929	.858	.956	.232
Welcoming	.937	.893	.849	.867	.329
Complexity	.242	1.027	.186	1.105	.602
Cohesive	.794	.906	.590	.883	.027**
Ease of understanding	1.017	.924	.881	.894	.142
Interesting environment	.737	.877	.663	.923	.414
The degree of privacy	.545	.758	.548	.828	.977
Easy to control	.192	1.122	.371	1.117	.116
Enclosure of the space	.391	.925	.452	.904	.516
Degree of ownership	.028	1.749	.220	1.066	.213
Visual appropriate of its use	.904	.834	.788	.883	.185
Sense of safety and security	1.222	.831	1.069	.880	.075
Flexible and adaptability	.777	.946	.737	.912	.670

Variable: group 1: participants in the first ground survey

group 2: participants in the second ground survey

The result of questionnaires also showed that the Pavilion Building was appreciated very highly in in term of location, ease of access, and safety and security. It was also assessed highly in terms of the volume, colour, views, attractiveness, identity,

welcoming, easy to understand, visual appropriateness and flexibility. Users indicated a comparatively lower appreciation in terms of noise and computer and printer access.

Comparing the two rounds of collecting, there was a very small difference in perception of design quality across 29 attributes, except for the perception of temperature, artificial lighting, comfortable furniture and cohesive perception. A mean test (one-way ANOVA test) was used to ascertain the difference between the participants in the two collection times and results are shown in Table 7.2. It is shown that the perception of the design of the Pavilion building (except the perception of artificial lighting, comfortable furniture, temperature and cohesiveness) was not affected by the different time of the survey in the academic year (1st survey from 5th to 9th December 2016 and the second survey from 13th to 17th March 2017). It was noted that the first-floor furniture had been changed slightly between the first survey taken place and the second one (group of chairs which marked as F zone in Figure 7.3: had been removed from the plan).

Overall, in terms of the physical environment, aspects such as noise, temperature, artificial lighting, natural lighting and comfort were important to the use of social learning space for both socializing and studying purposes. Meanwhile, location and accessibility were also recognised as a key factor in the choice of using the social learning spaces. Intangible aspects, such as ‘perception of welcoming, easy to understand, interesting environment, a high degree of privacy, easy to control enclosure, good sense of safety and security and flexibility and easy to adapt were important to the use of spaces as a social areas and learning venues Figure 7.27.

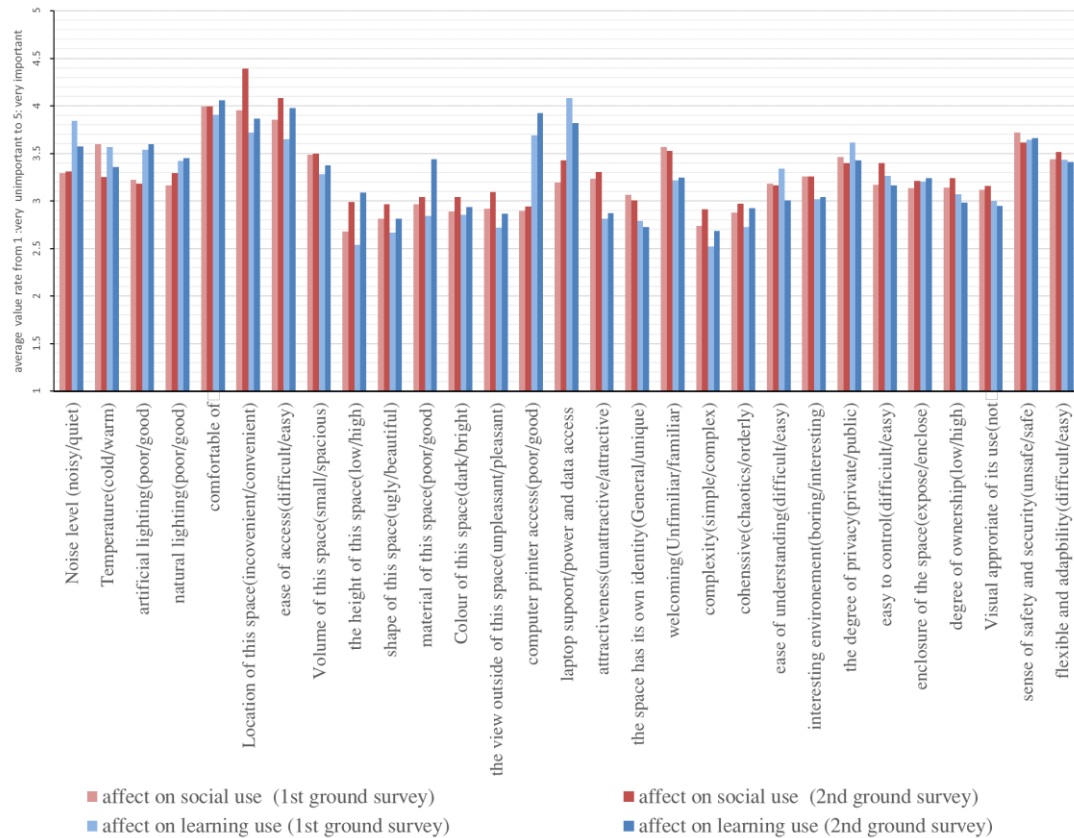


Figure 7.27: How design parametres affect social and learning activities (source: result from questionnaire of the Case study 2)

In addition, users also showed that design parameters differently affected their social and learning activities. Specifically, students indicated that noise, artificial lighting, natural lighting, computer and printer, laptop, power and data support and a degree of privacy were more important for learning use than social activities. In contrast, location, easy to access, attractiveness, identity, welcoming, complexity, interesting environment degree of ownership, visually appropriate were more important for social than learning use.

7.4.3 The relationship between the overall perception of the social learning space design in the Clifton campus and the student engagement criteria

To investigate the relationship between the overall perception of the design of social learning spaces on the campus and the level of student engagement, statistical analysis was applied. First, the Spearman test was applied to the social learning space design perception and the Student Engagement criteria (Table 7.3). Furthermore, a box plot graph shows the tendency of the perception of social learning space design to affect each criterion of student engagement.

The result shows that there is a moderate correlation between perceptions of social learning space design with 14 assessment questions as showed in the Table 7.3. Therefore, it is suggested that perception of the design of social learning spaces influences student engagement level except for the level of “Working with students outside class” and “Discussing ideas from course with staff”. Furthermore, the box plot also illustrates that the high level of perception of design corresponds to a high level of student learning engagement. This result contributed to the knowledge of design social learning spaces and emphasize on the significant role of the social learning spaces in student learning process. The previous study done by (Matthews, Andrews and Adams, 2011) which already illustrated that if the student who has used social learning spaces, they will have higher level of engagement.

Table 7.3: Relationship between overall perception of social learning spaces of Clifton campus and the level of engagement (questions adopted from Student Engagement in UK and Australia)

		Correlation Coefficient	Sig.
1	Overall, I am satisfied with my experience in this degree program	.382**	.000
2	I found my studies intellectually stimulating	.285**	.000
3	I feel part of a group of students and staff committed to learning	.286**	.000
4	I have learned to explore ideas confidently with other people	.250**	.000
5	I feel I belong to the university community	.401**	.000
6	I can explore academic interests with staff and students	.371**	.000
7	I have not considered discontinuing my studies on this degree	.218**	.000
8	I feel I made the right decision in choosing to study for this degree	.223**	.000
9	I am confident of passing all my units of study this semester	.209**	.000
10	Working students outside class	.054	.135
11	Working with student inside of class	.142**	.002
12	Discuss ideas from class with other students	.115**	.009
13	Discuss ideas from course with staff	-.002	.480
14	Provide support in socialising	.318**	.000
15	Help to cope with no-academic responsibilities	.286**	.000
16	Provide support to succeed academically	.295**	.000
**. Correlation is significant at the 0.01 level (1-tailed). *. Correlation is significant at the 0.05 level (1-tailed). N: 414			

Furthermore, when comparing the mean rank between different satisfaction with the design quality group, it showed that there was a statically significant dissimilar (shown in Table 7.4 on 14 /16 category of student engagement). This illustrated that higher design satisfaction correspondent to higher level of engagement.

Table 7.4: Comparing the ranking mean of Student Engagement level between the different perception of design quality groups

		Chi-Square	df	Asymp Sig.
1	Overall, I am satisfied with my experience in this degree program	64.425	3	.000
2	I found my studies intellectually stimulating	37.103	3	.000
3	I feel part of a group of students and staff committed to learning	37.356	3	.000
4	I have learned to explore ideas confidently with other people	26.057	3	.000
5	I feel I belong to the university community	69.233	3	.000
6	I can explore academic interests with staff and students	58.376	3	.000
7	I have not considered discontinuing my studies on this degree	22.958	3	.000
8	I feel I made the right decision in choosing to study for this degree	21.228	3	.000
9	I am confident of passing all my units of study this semester	21.401	3	.000
10	Working students outside class	1.705	3	.636
11	Working with a student inside of class	8.743	3	.033
12	Discuss ideas from class with other students	8.366	3	.039
13	Discuss ideas from course with staff	1.120	3	.772
14	Provide support in socialising	46.137	3	.000
15	Help to cope with no-academic responsibilities	36.138	3	.000
16	Provide support to succeed academically	41.442	3	.000
a. Kruskal Wallis Test				
b. Grouping Variable: perception about social learning space ('Bad', 'neutral', 'good' and 'very good')				
N: 414				

7.4.4 The relationship between satisfaction with the design quality and time spent

Descriptive analysis was applied to investigate the relationship between the satisfaction with design and time spent in the space. The graph showed there was an association with overall satisfaction with the design quality and time spent (Figure 7.28). It also indicated that students with high and very high satisfaction levels stayed longer than who had medium satisfaction levels.

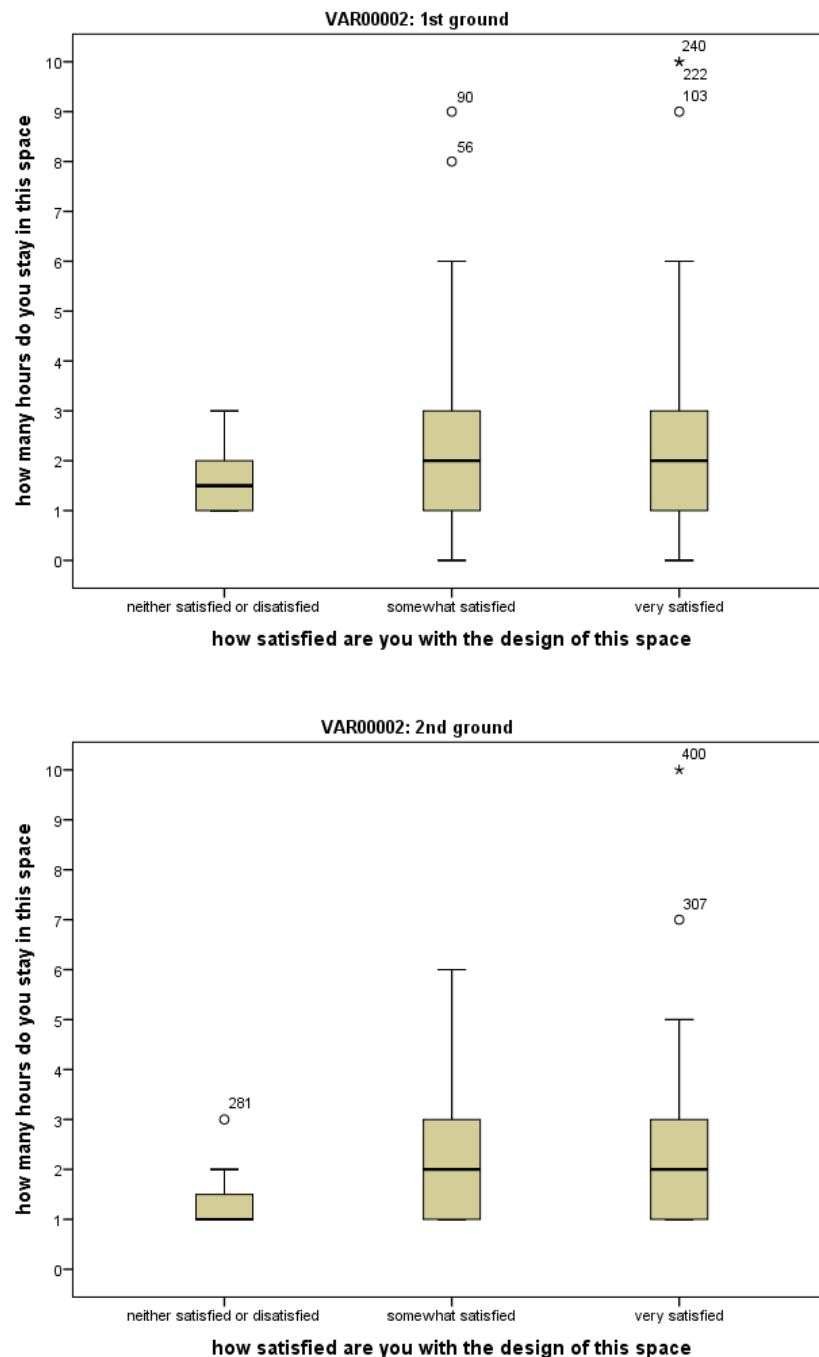


Figure 7.28: The correlation between satisfaction with the design of social learning space and the time spent in these spaces

However, students indicated that the time they stayed in the spaces was not only dependent on appreciation; it was, according to them, depended on the schedules of their lectures and the break times they were allocated. Therefore, an additional question was added, to find out if there was any difference between different satisfaction levels and time that ‘they would like to stay’ in the studied space. The graph below (Figure 7.29) showed that different group levels of satisfaction did also

indicate time they would like to stay in the space. It indicated that “somewhat satisfied” and “high satisfaction” groups spent a much higher amount of time than the “neither or either satisfaction” group.

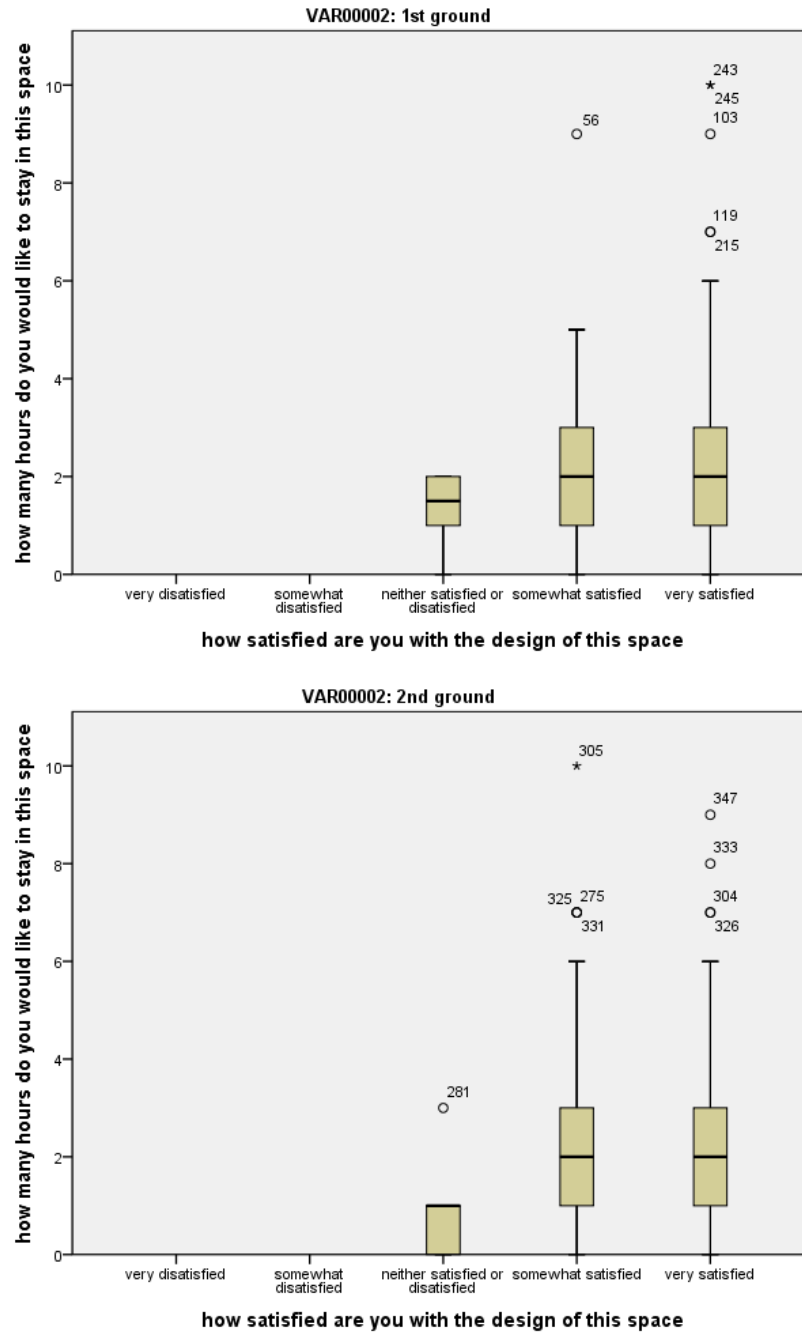


Figure 7.29: The effect of satisfaction on the time student would like to spend in these spaces

The nonparametric test (Kruskal Wallis H) was applied to examine the difference between the “very satisfied”, “somewhat satisfied”/“neither satisfied nor dissatisfied” groups. The results showed that there was a significant difference between these groups in term of time they would like to spend in the physical spaces. It appeared that

users who had high satisfaction with the design of the space tend to stay longer in the space even if they have no schedule or compulsory timetable. This finding confirmed what was found in the first case study about the positive relationship between satisfaction with design and time users spend in the venues.

7.4.5 The relationship between time spent and activities at the Pavilion

Activity is an important factor in the success of social learning spaces. In general, it has been assumed that social learning spaces are just used for eating, talking or relaxing. However, the results of the survey showed that over 60% of users used the space for learning or social and learning purposes (Figure 7.30). Specifically, users who used the space for both social and learning activities also indicated that they conducted a similar proportion of learning activities and social activities in the Pavilion building.

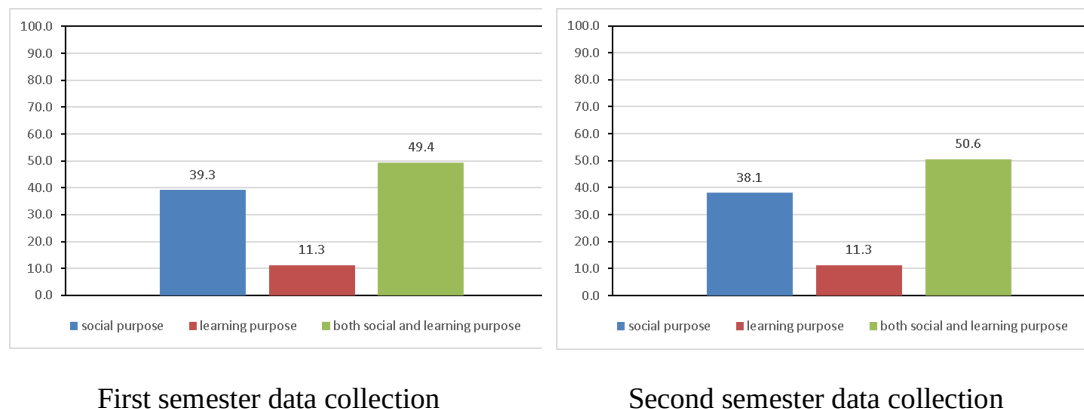


Figure 7.30: The percentage of activities users do in the Pavilion (source: questionnaire)

The ANOVA Test was applied to determine if there was any difference between the three activity groups (social, learning and both social and learning) in term of time spent in the venue. The result demonstrated that there was a significant difference between the three groups (Table 7.5). This concluded that different activities require a different amount of time spent in social learning spaces.

Furthermore, the box plot graph shows that users involved with learning activities would stay longer than users with social intention (Figure 7.31). This implies that space should have good design qualities to keep users longer and involve them in learning activities, instead of being a place which they stay short time periods and socialize only. This is because it has been indicated by the theory of learning engagement, that the amount of time and effort students give to their study, especially in social interaction with peers, is associated with learning performance and attainment

(Astin, 1984). Therefore, the design quality of social learning spaces needs to be considered a key factor for improving student performance.

Table 7.5: Comparing the mean of the time student used and would like to use to Pavilion between groups with different intent

ANOVA ^a						
		Sum of				
		Squares	df	Mean Square	F	Sig.
how many hours do you stay in this space?	Between Groups	70.666	2	35.333	16.976	.000
	Groups	528.661	254	2.081		
	Total	599.327	256			
how many hours do you would like to stay in this space?	Between Groups	39.944	2	19.972	7.382	.001
	Groups	687.169	254	2.705		
	Total	727.113	256			

a. Applied ANOVA test for the variable (VAR00002 = 1st ground of the survey)

ANOVA ^a						
		Sum of				
		Squares	df	Mean Square	F	Sig.
how many hours do you stay in this space?	Between Groups	24.201	2	12.101	6.317	.002
	Groups	316.084	165	1.916		
	Total	340.286	167			
how many hours do you would like to stay in this space?	Between Groups	36.223	2	18.112	4.840	.009
	Groups	617.437	165	3.742		
	Total	653.661	167			

a. Applied ANOVA test for the variable (VAR00002 = 2nd ground of the survey))

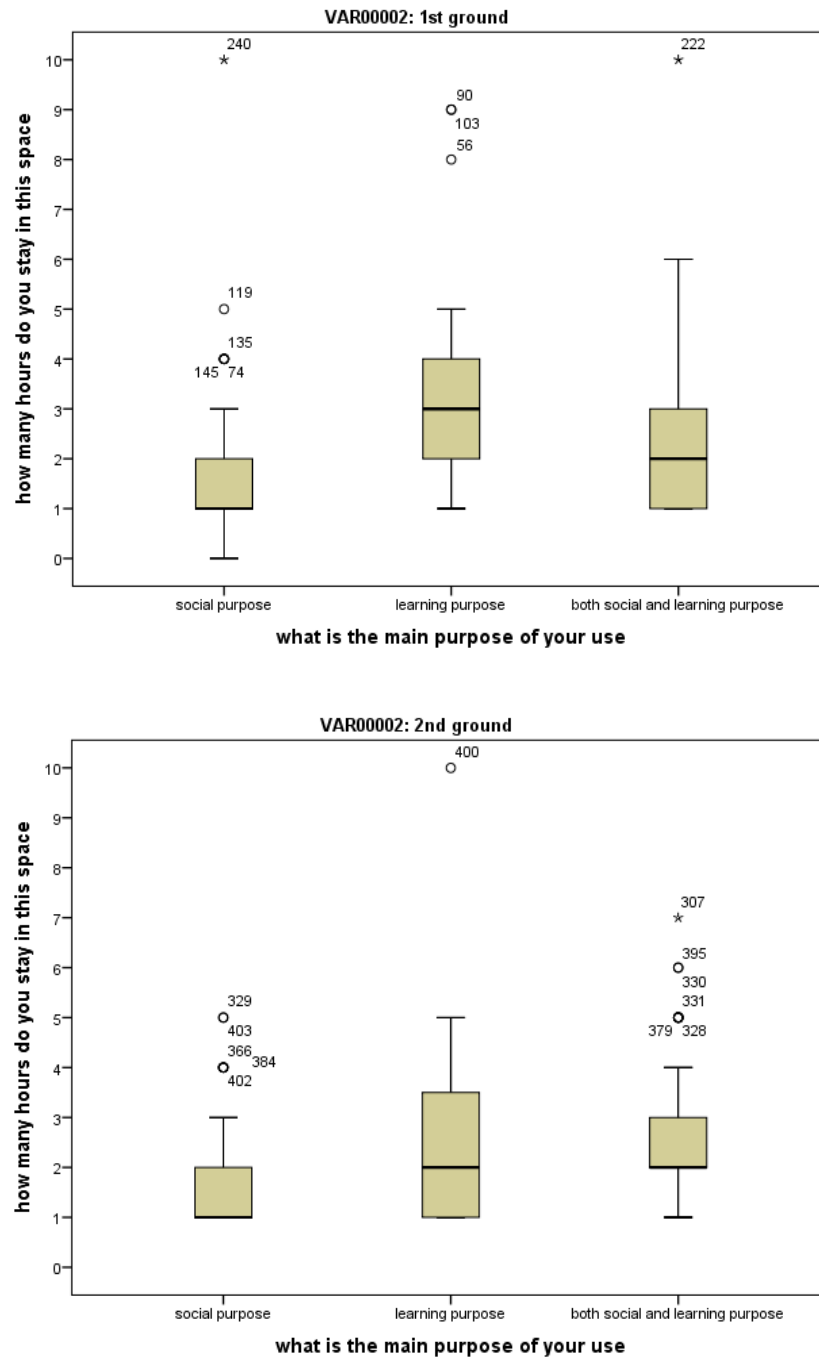


Figure 7.31: Box plots show the relation between activities and time use in the Pavilion

7.4.6 Interaction between the users

The result of the questionnaire showed that students who used the Pavilion frequently have a greater chance of interacting with friends in the spaces compared with those who used the space less often. Nearly 10% of students who reported that they might use social learning spaces daily or several times per week knew many friends in these spaces; this percentage was around 1% and 0% for students who used these spaces

several time per semester, several times per year and may never use them, respectively. Similarly, a decreasing pattern was found in the percentage of students who knew just some friends (5 to 9 friends) or few friends (1 to 4 friends) as well (Figure 7.32).

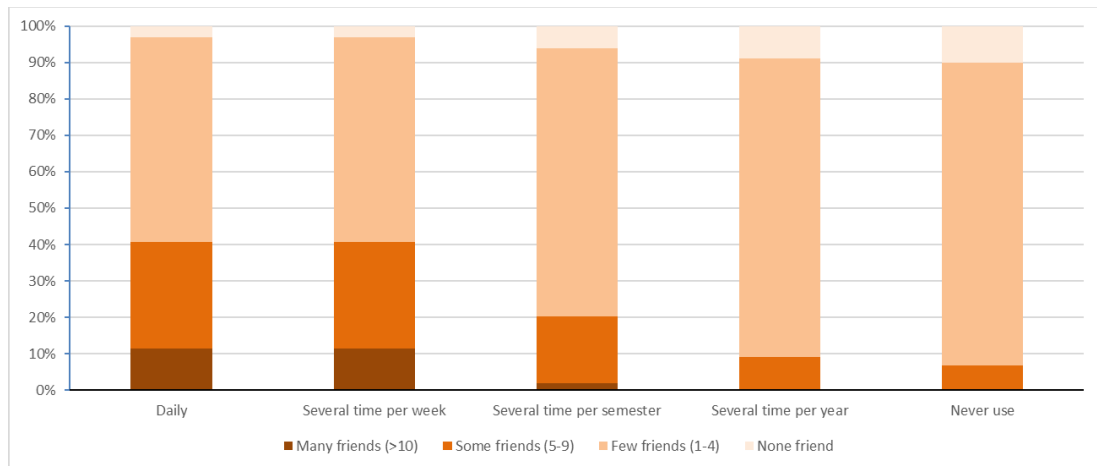


Figure 7.32: Comparing the number of friends of different habits of use groups (Source: result from the questionnaire of the case study 2)

This result may not indicate that all the students interact with their friends in the same pattern, however it provides evidence that social learning spaces encourage and create the opportunity for students to interact with others, therefore potentially increasing levels of engagement in the learning community. The similar result was found in the results from the observation methods discussed above. This lends strength to the argument that the use of social learning spaces will benefit student experience in terms of interaction and connection with the learning community.

7.5 Informal discussion and focus group

Focus groups were conducted in March and April in the academic year 2017. Participants were recruited by direct approach in the four studied spaces. They were asked to answer the preliminary question about frequency of use. Then participants were grouped, based on experiences and frequency of use. Overall, four focus groups were conducted which included 13 participants in total. Each discussion lasted 45 minutes and participants were highly engaged during the conversation. The discussion was recorded and then a transcript made of the proceedings.

7.5.1 Design quality from the student viewpoint

7.5.1.1 Attractiveness

It was confirmed through the focus group discussion that the Pavilion Building was perceived as having very good quality of design and provided various facilities for students. It yielded the strong impressions of a “nice building” in many aspects. For instance, a student comments that:

I think this building is nice. I think if you call it as the library I can work here but I don't know; It sounds ridiculous but it means the library to me, I will use it for work, and here I used for relaxing (CS2, FC2, P2).

Students also expressed appreciation of the design style: “it could be the design aspect as well as here is modern compare to the Point or SUST there. If I have to choose for the break we never go there we always come here don't we” (CS2, FC2, P3).

Particularly recognized where the criteria “bright and open place” and “attractive design with good style, fresh and welcome atmosphere” (CS2, FC2, P2 and P3). “Nice view, good location and “easy to access” were also advantageous points that students recognized. However, students appreciate the availability of charger boxes and laptop borrowing services in these types of spaces; the few computers and lack of printers were a disadvantage in terms of using the space for learning activities.

With regards to users' choice of whether to conduct learning and socializing activities, it was demonstrated that the most important factors were the “noise” and “the feel of privacy”. A second year student mentioned that: “I find it is good for work, when it has no one in here. As we used to live in the hall just over there, in the evening around 4pm to 5pm it really quiet so it is good for work” (CS2, FC2, P3).

Overall, it is indicated that the design quality of the Pavilion was important when it came to the decision of whether to use it. Although the design aspects were not immediate or conscious, it was confirmed by users that they would not use a space with low design quality. During the discussion it was demonstrated that design had an effect on users, although they might not be aware of these effects. As a third year student expressed:

Like me at the first sign I did not think about how the building looks like as I just want to do work in here, but now as we discussed, it really makes me think as the building is nice and bright, so it really attracts me to come here (CS2, FC4, P1).

7.5.1.2 Comfort

It was evidenced that the comfort of furniture was a significant factor that affects the use of the social learning spaces for both learning and social activities. However, the feeling of comfort indicated here was a combination of objective and subjective comfort. Objective comfort referred to furniture attributes, materials, and ease of access to different needs such as food, drink, computers or printers. One student commented:

In here, you have comfy stuff: sofas and chairs, people of employability are placed here so you got placement people to come in as well. They offer opportunity for jobs search and then they have a class of technology as well. That is all good things about this place. Sometimes, I walk in here, before you may don't know what going on in University but when you walk through it so you can see stands and see what happen. Or you can try to avoid it if you want (CS2, FC2, P2).

Although the spaces allow for social interaction, users still can feel free to do what they want.

In the focus group discussion, students expressed their high level of comfort in the space, related to furniture, atmosphere, volume and appropriate density:

The Pavilion is really nice, when actually you think about this, it is a really nice building. I think they really put an effort. They may have done a research what would be work like study areas, I think you guys have to talk about the material, colour and layout and stuff. And it is work pretty well, it got the balance of you are going to do your work, you feel you sit comfortably here and do work, you don't have to be quiet and do work only, it is alright to just talk and do work here. (CS2, FC4, P2)

Although the building is double storey in height, which gives users a perception of spaciousness (result from the questionnaires), the design of the space still creates a welcoming and “cosy” feel. As a third-year student indicated:

If you don't really fancy doing the work in the silent space in the library, you may like to do the stuff in here. It may be nicely contrasted comparison to the library. It is just a bit more relaxes, slow down of the work (CS2, FC4, P1).

7.5.1.3 Convenience

Furthermore, location and accessibility were also indicated as highly effecting both social and learning activities. It was indicated that an important reason they use Pavilion is to meet their friends or peers as the location of the building is at the centre of the campus. These interactions help them to discuss ideas for coursework, tackle exams or motivated them because they see others work:

This building is a central meeting place, you can go and do everything and then come back to here. It is a start place for the other types of learning taking place elsewhere (CS2, FC2, P2).

Some students also established a habit of seeing their friends before lectures, meeting at Pavilion beforehand so they could travel together to their study rooms. Some students called it the meeting place:

It is placed to meet as well. I like to meet people here in the morning before I go to my lecture at New Hall Block and just to start walking together. I probably meet people here the most rather than the Point as this is the centre of campus so it is easy to get to everywhere, really, wherever you are in lecture or seminar it is a lot easier to get here than other places (CS2, FC4, P3).

According to student views, the Clifton campus really needed a central point such as the Pavilion building, to connect the buildings together. Therefore, this building became an important node in the campus's overall plan. It is "the Heart of Campus", as one second year students recognised:

When I came for my first visit around the campus [...] the Pavilion – this place had not been built. I did notice that when I was looking around there were not many places, and all the building on the campus were really old, as they, not all modern and they are not open like this. There was not really a centralized place just small building scattered everywhere. Now, this is a source of other giant building gathering spaces inside. It has included everything in it (CS2, FC3, P1).

The centralised location also affected users' choice of whether to use the space. Students indicated that the building has become their favourite place to gather between lectures. One student commented:

If I have a break there are a few places I can go but the Pavilion always is the choice because of its located where central of the campus is. It is quite big, sitting down here or you can go canteen as it very centralised (CS2, FC4, P2).

According to the users, location, connection/connectivity and accessibility were key factors to the success of social learning spaces. Although students had come to know some other informal learning spaces around the campus, the Pavilion was still very well used:

There are a few spaces surround but you don't know where to go. They have the same sort of setting there such as cushions, sofas and other stuff down the in-M. Darwin, just down there, but it is like an a maze. You have to know where you have to go. If you go to these places there is no one there, because no one knows where it is (CS2, FC3, P1).

Students also noted that are made aware of university activities by coming to the building. Being well-connected and having a flowing plan was recognised as highly attractive to users:

One thing I do like. It sounds a bit strange, but I like how many exits there are. Obviously, you got that one there and that one there and one at each end and it makes a lot more convenient as you walk around campus. Because when I lived in Hall in the first year, so when I need to get to Mary Ann Evans, I have to walk all the way around that way, now I just need to cut through, it sounds a bit strange, but it makes it more convenient. That does make a difference (CS2, FC4, P2).

7.5.1.4 Flexibility and adaptability

Flexibility and adaptability relate to how the building can be used for many different purposes as well as the ability of the design to adapt to changing outside environmental conditions. With regards to this, one student commented:

I think all the area downstairs here very useful, they have an open plan, because I could see that changing over time, because I remember there are the seats over there, I have used it to work few times. And they are changing a lot through the year (CS2, FC4, P2).

The flexibility of the spaces is also expressed through the design layout, which allows users easy control; to an extent they can modify or change the layout for their needs. Observation also showed that space can easily change, depending on the requirements of each event. A student mentioned that:

There are a lot of comfortable seats in this space. You could get more chairs. Like if there are not enough chairs for you group so we can move easily the other chairs to join our group (CS2, FC2, P1).

Moreover, in the focus group, students expressed their fascination with the seminar rooms, which can change size by dividing or combining areas to make different volumes. This enables these rooms to be used for a variety of purposes: lectures, seminar room, tutorial discussion or presentations, as well as group work and other social events. One student said: “I have one seminar in the room upstairs. It really nice it is quite big a lot of people can fit in there” (CS2, FC3, P2)” and continued:

These rooms have the walls which can fold back or open up. So, you can extent them out and that is really useful because some of the lectures that we have around 150 people. So, you can extent to the big room back through three rooms and can fit everyone in. If you just need small space, you can just close it off and have a small room with 60 people in there (CS2, FC3, P1).

Moreover, students showed their interest in the flexibility of the design and expressed their thoughts about what each design element could mean and do. From their discussion, it was evidenced that users not only required satisfaction about the flexibility of design, they also expressed curiosity and enjoyment regarding the way flexibility was expressed via architecture languages:

This building has a lot of windows so in summer it is quite nice because you can open everything off and get quite cool in here. Whereas in the winter you can close these and put the blinds, but because it is quite a big space, so it is difficult to heat this space in the winter. It can be a little bit cold because I believe the radiator is put on the roof if I remember it correctly and that can mean it can get a bit cold. It has a big window as well, so it uses a lot of heat through the window. I know as they want to keep all the natural light in so they put the blind it means in winter they can pull the blind, so it can be a bit of warmer and have natural light in so it a bit of compromise (CS2, FC3, P3).

Overall, attractiveness, well-connected location, comfort, flexibility and adaptability of design were key to the success of the Pavilion building from the students' perspective. The design allowed students both to engage in learning activities as well as do what they required to fulfil their needs on the campus. One third year student expressed thoughts about the Pavilion's design in the following way:

The design of the Pavilion is really nice. They actually thought about what it is used for and who will use it rather than just [make] the shape of the building, this building got all that you need, does it (P2, CS2, FC4).

Furthermore, it is also the place where students meet their peers and observe what other students are doing. Therefore, it not only increases the exchange of information between students, it also inspires and encourages students in their study. Such as interacting with staffs was not some common activities among students result from the survey. However, some students indicated that meeting with staff in this space helped them reduce the stress level when discussing work with their tutors. Furthermore, observation result also showed that there was a high level of interaction between students and staff in Pavilion.

7.5.2 The relationship between the design of social learning spaces and student experience

Social learning spaces accommodated a variety of activities in both categories of learning and socializing. However, besides general social activities such as refreshing oneself by eating, drinking and relaxing, these spaces housed interaction for learning purposes, such as discussion about the exams and exchange of information about module courses. These activities blend social activities and informal learning activities and were quite different from everyday socializing activities. Discussion was not only about university lives but also about courses and assignments. One student commented:

The activities in this space are helpful to study, but it is not for the difficult work, for example, my assessments are coming up soon. I don't use this space to work on them but I use this space for group assessment discussion for an hour, for just talking to friends about what the ideas are and how to tackle the assessment (CS2, FC2, P1).

While it is obvious that students may have very different learning styles, here; some students indicated that the experience conducted in Pavilion was essential to their study. For example:

If I have a paper to write I will do it in the library. If I have a piece of work I have done this afternoon, and I have done it. I could sit here and go over through it. But if I have not done the work I can't do it in here because I can't focus. So [work in here] more like following job that after the main work [done in library], or get start with the group discussion and have a chat about it [paper/essay](CS2, FC2, P2).

It was indicated, moreover, that experience in the social learning space was important to learning experience. It did not only help them to know what was going on in university, it also helped them to feel a part of the university. For example:

Last year, at the same time, when I don't think this is a really nice building, I don't really want to go in here. But now, in the new building, although that I did not think about how the building looks like. I feel that I just want to do the stuff here. And now, I realise that the building is nice and bright, so it really makes me come here. One thing I notice that the building is cool, it is never too hot here. Like the library it gets really hot, to be honest, I don't like to be in the library sometimes, but here it does not get too hot it always gets a nice temperature (CS2, FC4, P1.).

The Pavilion also encouraged peer to peer interaction and students-to-staff dialogue. Students indicated that Pavilion was a daily meeting point before lectures or seminars.

7.6 Semi-structured interview with designer

7.6.1 Design Objective

The design objective was not defined at the beginning of the project. It was indicated that the initial intention of the client, NTU, was to improve the “poor maintenance” “un-looked” and “utilisation” (Evan 2016). Furthermore, the project also aimed to advance the image of the campus overall; to attract more students in the marketplace.

It is clear that building design, utilisation for learning spaces and campus image were the focus and central vision of the clients. The architect mentioned:

The project is called the Heart of the Campus. And the original college buildings which were built back in 1961. These are very run down, they were very thirsty with energy consumption, un-looked, poorly maintained, and contain too many classrooms, lots, lots of classrooms were under used so utilisation was low as well. They will be coming to a liveability of these buildings. Because they located in the middle of the campus. So they create a poor impression for prospective students and also for the student who is there. They felt unimpressive as they correlation to the city campus which is the huge investment. So all of those things resulted in the estate department who run the whole property of the university building in asking the question: what you do?” (Evan, 2016).

It was also noted that, unlike to the other university project which had a clear brief and exact function and size, the architect had a significant role in consulting with the client and negotiating the function aims of the project. He comments:

So their initial idea is just to replace its (some of the old buildings) with a park in the middle and just put a little small Pavilion over the one side for the students to have some social spaces. And we thought that creating a big park right at the middle of the campus like create a big hole in the medieval campus. Because it already has much green spaces, so we say it will be better to try back some density and make a proper front door for the university which didn't have on the campus. I think when we start to the drawing, they agree with that because we are able to demonstrate on the plan that we could put something back on the plan rather than just have a huge of swing wet landscape area in the middle (Evan, 2016).

Furthermore, it was indicated that the design objective was defined after a long time in discussion with the client. In addition, the architect had a significant contribution to the decision regarding the main purpose of the project. It was also emphasized that many different staff were involved. Evan comments:

The point is the brief is unclear when it started and the process lasting probably in two years maybe in three years, the dialogue and diagram like this; siting in the meeting discussing things and get more people to involve in it and it gradually improve to a lot of discussion on this sort

of drawing thing, it is a process of refinement and honing which is essential to how the scheme end it up (Evan, 2016).

The data of interview with the designer indicated the process of design social learning space project was a long discussion between various of people and long-time discussions. The success of the project is also based on the communication, consideration and patient of the architect.

7.6.2 Design concept

The aims of the design, to foster social learning activities, was determined belatedly. However, there was an emphasis on study, especially studies with interaction between friend and peers over individual study. The architect comments:

We practiced it is social learning space. In the brief, it is space for the student to meet to study. So effectively this space here and that space there, we call that the living room [...] and deliverables we use the words “living room” (Evan, 2016).

7.6.2.1 Attractive and as comfortable as a ‘living room’

The spaces were designed to provide a mixed function: social activities such as refreshment and informal learning activities such as group work, discussion or presentations. It was stated that:

So we start with the student social area involve with refreshment, so catering department commits with the bar bistro in there and here you also can buy some chips if you want a piece or whatever, and sandwich and things. So, a lot of different option that pulls people in, pull student in, and you know the busy time, it does seem quite busy. I think it also works well because this space here which is, particular, it got a lot of quite nice seating on it, and it very close to the lecture theatre, so student gather here, before they go the lecture or after finishing the lecture again they go there to get a cup of coffee. So, I think that the link between big teaching spaces and it work quite successful (Evan, 2016).

Furthermore, the design also aimed to create a comfortable place for students. The design concept was defined as a “living room”:

We want this to be built a little bit cosier, rather than the huge space, we did not want to be a big airport terminal, which it could be easy to become. So we got carpet in it. We got soft chairs, so the place is where you can feel a bit of intimate space in it as well as big space as you know more to space here which is a bit of quieter away from all the hubbub. But I am surprised that how many students like there, and the up-stair spaces as well because it is not busy so they can be in the living room which looks down at the living room (Evan, 2016).

With reference to specific activities, the designer not only created a nice place but also a comfortable place for a student to gather before, in-between and after the lectures.

The design process showed that the concept of design was expressed from the big structure: form, the shape of the spaces, to the small detail of interior structure.

7.6.2.2 Centralised place and movement research in the design process

The location of the building is defined as an important aspect of the design concept. The building has been defined as the result of the different axis where the library, lecture rooms and the existing canteen building meet together. The architect used students' movement to orient the building and its structure. Furthermore, it was inspired by the link between the new building and existing building:

And one of the things I got to mention is that it is outside social space as well as inside social place. To be honestly, you got table and chairs under colonnade. And around the theatre. When the weather is nice student use it as well and finally, we put the new entrance on the library which means that you can go straight from there to there now. Under the cover, but not internal link. That is the final zig of the jiggle that backs to what we thought of the day one (Evan, 2016).

From the architect's perspective, the concept of flow through space was significant. Evans (2016) indicated that one of the initial observations to understand the site of the campus was the students' movement. He emphasized the importance of the two main flows of students, from the bus stop to lecture or teaching spaces and from residential hall to lecture rooms or library. Therefore, the idea was to locate the Pavilion as the centralised building; the "Heart of the Campus", aligned with high density traffic (Evans, 2016).

2.1.4.1 Flexibility in the design

The design was committed to flexibility from the beginning. The architect's idea was to create space for different functions. He mentioned:

This space here more flexible because they use it for the open day, exhibition and stuff like that. And some time it has a lot of different use sometimes it has not been used at all. So they move the furniture around here, but the living room they don't (Evan, 2016).

Furthermore, the space was also designed to adapt to the environment. The architects expressed significant concern about the long-term use and how the building should change to fit with new technology in education. He showed his interest on the long-term development of the building to accommodate new learning styles of the students. This became a key concept in the project. The architect explains his interest:

For this project, automatically it is a big space, you can take it, change the IT and furniture and replace it, I remember one as I was a student I think, I read a very good book, that is "how

building learn”, from a bit of classic and a lot of architects don’t like it because it says anti-architecture, but it has good lesson about adaptability and longevity (Evan, 2016).

7.7 Discussion

It is evident that the Pavilion is a social learning space that has successfully contributed to the improvement of student experience at Nottingham Trent University Clifton campus. The presence of this building has changed the perception of the campus among the students. It not only influenced students’ habits in terms of coming to and using campus more, it also a source of motivation and encouragement to students to sit down and engage more with learning material.

It is obvious that different students have different learning styles and requirements from their learning environment ((Strange and Banning, 2001); however, this research has pinpointed significant factors when it comes to choice of learning activities and where these activities are conducted. First, the key factor of a successful social learning space in this study is attractiveness of the design. It is evident that the contemporary design style: bright and full of natural and/or artificial lighting, open plan and a large number of spaces is key to making ‘nice’ social learning spaces. This corresponds to the previous studies, which suggest that lighting and the volume of space influence study in collaborative learning spaces(Graetz and Goliber, 2002). Second, a centralised location, as well as being well-connected, also significantly increase the use of social learning spaces. This finding is supported by research conducted by Harop and Turpin (2014) on informal social learning spaces in library buildings. Third, comfort plays a key role, which is influenced by furniture and materials as well as the perception of a welcoming design, appropriate privacy, ease of control of personal space and the feeling of safety. Some studies, such as Webb et al. (2008) and Matthew et al. (2011) support this finding. Interestingly, the high level of flexibility is appreciated highly among students as key to successful social learning spaces. Similarly, the ease with which the building can be changed for different use, and the ability to control and change the setting are a source of flexibility, also found by Melhuish’s (2011) study of informal learning space.

Although these factors may not be obvious to students at first sight, it may subconsciously lead to the use or non-use of the space. Furthermore, ‘social learning space’, as a label may come as a new definition for students, however, students express that they find the varieties of function that space provides, for both social and learning activities, favourable, without calling it ‘social learning’ per se. Although the

preference for “heavy study work”, such as essay or report writing may remain within conventional study spaces (some student may prefer home, some may prefer library or computer rooms where tools and programs are available), social learning space such as the Pavilion are commonly held as ideal for collaborative group work, presentations, and discussing ideas for exams and assignments. It has become a key node in student’s daily use and gives a strong impression of the university to current as well as new students.

The design of the social learning space should be a process of discussion and cooperation between different bodies, including architects, education managers, academic staff, IT staff and representative students. In this case, the architect has played an important role in connecting these ideas and reflecting on all the requirements through design concept diagrams, sketches and drawings. Hand drawing, where the sense of space will be more effectively communication and discussion is recommended. Furthermore, consistency of the design concept is required to create a successful social learning environment.

7.8 Conclusion

The second case study showed that social learning spaces such as Pavilion have played a key in NTU student learning experience. The design quality of the Pavilion has a large impact not only on student level of engagement but also the activities students undertake in the university environment. This confirms what has been found in the first case study and also illuminates, in further detail, which design qualities benefit student experience. Although this is a view from a single social learning space on a specific campus, via multiple layers of analysis, this study provides a depth of understanding about the positive correlation between design qualities such as attractiveness, comfort, convenience and flexibility and students’ activities and student engagement level; as well as learning activities, time spent and feelings of support. Besides this, through analysis of different viewpoints, such as designers and users, the findings suggest that careful analysis and long-term, involved discussion between users, clients and designers are significant in the success of social learning spaces. It has also emphasized the important role of the architect in both defining the project and designing it, from master plan to detail interiors. This will lead to consistency between aim, design concept and finished product.

Chapter 8 :

DISCUSSION – A COMPARISON OF THE CASE STUDIES: ENGINEERING FACULTY UON AND THE PAVILION – CLIFTON CAMPUS NTU

This discussion chapter compares the two case studies to illuminate and reconfirm noteworthy findings, as well as make methodological adjustment and explain why. The multiple case study model method is used to strengthening the findings.

This chapter will also discuss the cross-case study comparison and draw the findings from both quantitative and qualitative data of the two case studies: University of Nottingham (UoN) and Nottingham Trent University (NTU). Moreover, it relates this study's findings back to the theories identified by the Literature Review material across Chapter 2, 3 and 4, to underline the interventions of this research. This chapter will compare and contrast the two case studies in term of background, student experience in social learning spaces, design quality for social learning spaces and design approach. Finally, the conclusion will overview all the findings throughout two case studies.

8.1 Background

The learning environment is a complex structure which involves the social context; it is important to clarify the differences in the case studies and the basis upon which the comparison can be made. The similarity and differences are explained in Table 8.1.

Table 8.1: Comparison between the first and second case study

	First case study: social learning spaces in Engineering Faculty of Nottingham University	Second case study: social learning spaces in the Clifton Campus of Nottingham Trent University
Difference	-Refurbished – design based on existing space	-New design approach – present new design invention
	-Well-used spaces.	- Well recognised by the establishment, received design award based on architecture and well appreciate by students.
	- Includes four small discrete spaces; located surrounding three main buildings.	- Includes a series small spaces in one large structure; located at the centre of the Clifton campus.
	- The intention of promoting social learning is not clearly construed in the design approach	- The intention of promoting social learning is set up in the initial design
	-The budget for these spaces was limited. Each space had a small budget (estimated budget £10,000)	- Big investment to promote the university strategy and image (Cost: £13, 227, 500)
	-Construction at different times (2011-2015)	- Constructed at the same time and put into use in 2015
Similarity	Based on similar regional culture, environmental condition (weather, season, location) and user background.	

In further detail, while the first case study is one of a typical mix of renovated social spaces, located in and in-between buildings, the second case study is a newly designed building. Therefore, the spaces at UoN have many limitations in concept and links to social learning activities and student-learning experience. The design of the social learning spaces such as Telford Exhibition Hall, Coats Cafeteria and ESLC social Learning Space and Coates Design Studio were not initially designed to promote learning activities as the main intention. These spaces mainly support refreshments and social interaction. As the design concept was not clearly defined to encourage student experience, even if students still use it for learning activities, there was not a high level of appreciation among the students.

In contrast, the Pavilion Building, starting with the renovation of some low utilisation classrooms, ended in the creation of a new pavilion for social learning activities and has become a main front door for the NTU (Evan, 2016). As it was a new design project, promoting informal learning and social interaction for learning purposes, it allowed designers to create a space to support both social and learning activities. Contrary to the first case study, the question for design was not how many seats or tables can put in; it was how to shift the perception of a university building, improve utilisation and encourage students' learning activities (Evan, 2016).

The four discrete spaces in the first case study provide different facilities for students, including refreshment, social interaction spaces, mixed social and learning spaces and group work areas. However, although these spaces could potentially link, they located in different buildings and users do not have visual contact between them. In contrast, in the Pavilion, different levels of social and learning activities exist in one complex structure. Furthermore, the first case study included different spaces which were built at the different times and by different designers. It was also indicated that the budget for renovating these spaces was comparatively limited. On the contrary, the Pavilion had huge investment from the NTU, who aimed to attract more students and promote the university reputation.

Despite the difference in the context, the same method was applied but with a few adaptations. The initial result of the first case study produced participant views about how design quality affects student-learning experience in terms of activities, time spent and user satisfaction. Nevertheless, the result of first case study showed that design characteristics have an effect on the degree of engagement with a learning experience, such as time devoted to study, activities involved in learning and motivation for learning as well as the feeling of support and belonging to a community.

However, these finding could not be drawn directly on quantitative data of the questionnaire and it may be criticised as lacking direct correlation. Therefore, the researcher adapted and changed the questionnaire in terms of question rephrasing to allow participants to evaluate their perception of design quality and the way this influenced activities. In addition, from the focus group of the first case study, it was suggested that some aspects, such as privacy, enclosure and comfort, should be added to the questionnaires – as these influence the users. In addition, in the initial questionnaire, although the researcher tried to explain the measurement criteria to users, some respondents still missed the question meaning. Therefore, the questionnaire was revised and expanded in specific areas, to more accurately measure the perception of users regarding design quality. Furthermore, 16 prompt questions, measuring the level of Student Learning Engagement, were also added to the new questionnaire. These questions help to draw a direct link between Student Learning Engagement level and the overall design perception and the value of social learning spaces.

The other methods, such as observation, focus groups and un-structured interviews remained the same across both case studies. Because of the difference of the context and the questionnaire structure, it is clear that the two-case study cannot not be compared like-for-like. However, as discussed above, there is a base line between the two that there were a strongly connected two piece of works together. Therefore, comparing the two case studies will illuminate clearly the findings of this research.

8.2 Student experience in social learning spaces

8.2.1 Design quality and student involvement in learning activities – student engagement

Both case studies demonstrated a strong link between the use of social learning spaces and positive student experiences. In both studies, students indicated that the presence of these social learning spaces on the campus is important to their learning experience and their university lives.

Firstly, the presence of these spaces affected their perception of how the university supports their learning. For example, the students in the UoN emphasised that they felt there was a lack of space to do group work and for individual study, which made them feel less involved in university activities – they study from home. Many students preferred to go home for individual work due to lack of food and drink to sustain them. Some students also were frustrated that, whereas they have limited space for study, some spaces (the spaces next to Telford Exhibition Hall shown in Figure 8.1) were inaccessible to them, which made them feel under-supported by their department or faculty.



Figure 8.1: Space in the background is inaccessible to student in the Telford Exhibition Hall, UoN
(source: observation picture 08/10/2015 at 12:01)

In contrast, the presence of the Pavilion in Clifton has changed the perception of NTU students. They appreciate the investment of the university in encouraging socialising and learning activities outside of classrooms. It has not only influenced students' habits in terms of using the campus more, it is also a source of motivation and encouragement for students to sit down and engage with learning material. With an open plan and easy to access for all, students found themselves able to enjoy doing their study in the university and finish before returning to their homes. Specifically, the second case study showed that the social learning spaces could encourage students with other university activities such as employability, university campaigns and open days. Students in NTU strongly emphasised that they easily find and connect with university events at the Pavilion.

Secondly, the possibility for interaction in groups, with friends and peers, was the greatest benefit of these social learning spaces. In both case studies, the number of potential interactions in student groups who regularly used the space were quite high compared with the irregular users. For example, as shown in Chapter 6 (Figure 6.19) the number of friends amongst those that daily used the social learning spaces were respectively higher compared with 'serval time per week' and 'several time per semester' visitors. A similar result was also found in the second case study, with regards to the Figure 7.32 in Chapter 7. This findings from the questionnaire is supported by the results from the observation; the percentage of students who interact with other students or staff results in high perception of quality social learning spaces relatively higher compare with low perception of design quality spaces.

Similarly, expanding the involvement theory, student engagement level was applied to the second case study. It was found that there was a positive correlation between the level of design quality and level of engagement, according to the Student Engagement framework. The result indicated that the perception of the design quality of Social Learning Spaces as above influence 14 of 16 aspects. Furthermore, it illustrated that the high level of perception regarding design corresponds to the high level of student learning engagement. This result is supported by the previous research, which confirmed that student engagement level is affected by the habit of using or not using the available social learning spaces (Matthews, Adams and Gannaway, 2010). These results proved that the design quality of social learning spaces had effects on student experience, especially in term of the criteria: "satisfied with my experience in this degree program"; "I feel I belong to the university community"; "I can explore academic interests with staff and students" and "Provide support in socialising".

Furthermore, it also encouraged them to have more interaction with others and encouraged them to engage with learning material as illustrated in the category: “I feel part of a group of students and staff committed to learning”.

Supporting this finding, it was also indicated that good quality social learning spaces changed perception about the learning environment and students felt more supported by the school as shown through the category: “Provide support to succeed academically”. These ideas support and reiterate the involvement theory where interaction is considered the key development of students learning process:

Interaction among community members is fostered by the availability of indoor spaces where people can come together without much effort. Institutions should consider whether their campuses have adequate places that encourage spontaneous, informal interactions among students (Kuh et al., 1991, p. 309).

In term of marketing and attracting the new students, good quality social learning spaces was indicated as a key factor when choosing a university to study.

8.2.2 Activities in social learning space

Generally, through the two-case studies, social learning spaces were being used not only for social activities but also for learning purposes, such as individual study and group-work discussions. In the both, students indicated that they used social learning spaces for both learning and social activities (results from observation, questionnaire, and focus group). However, it was demonstrated that the satisfaction in design quality of the spaces effected the proportion of learning and social activities conducted there. For example, this was found in the result from the observation. The Observation result of the first case study indicated high levels of in-group and individual study were found in the same spaces which were rated at a high level of design quality satisfaction in the questionnaire. Observation and questionnaire methods confirmed that a high level of learning activities correspondent to high rating of design quality in the both case studies. In the second case study, the longitude observation demonstrated that different spaces accommodated different activities. Figure 8.2 showed that, for example, in the booths over 65% users engaged with learning material and learning activities in groups or individually. Similarly, the three pods and two computer stations on the mezzanine were dominated by 60% and 85% engagement with learning activities, such as reading handouts, books, notes, working with laptops, writing notes; discussing in group with learning materials surrounding, practising presentations in group or with friends before seminar time. This confirmed that design of space could encourage or hint at the kind

of learning activities that should be undertaken. Satisfaction with design quality was important to users.

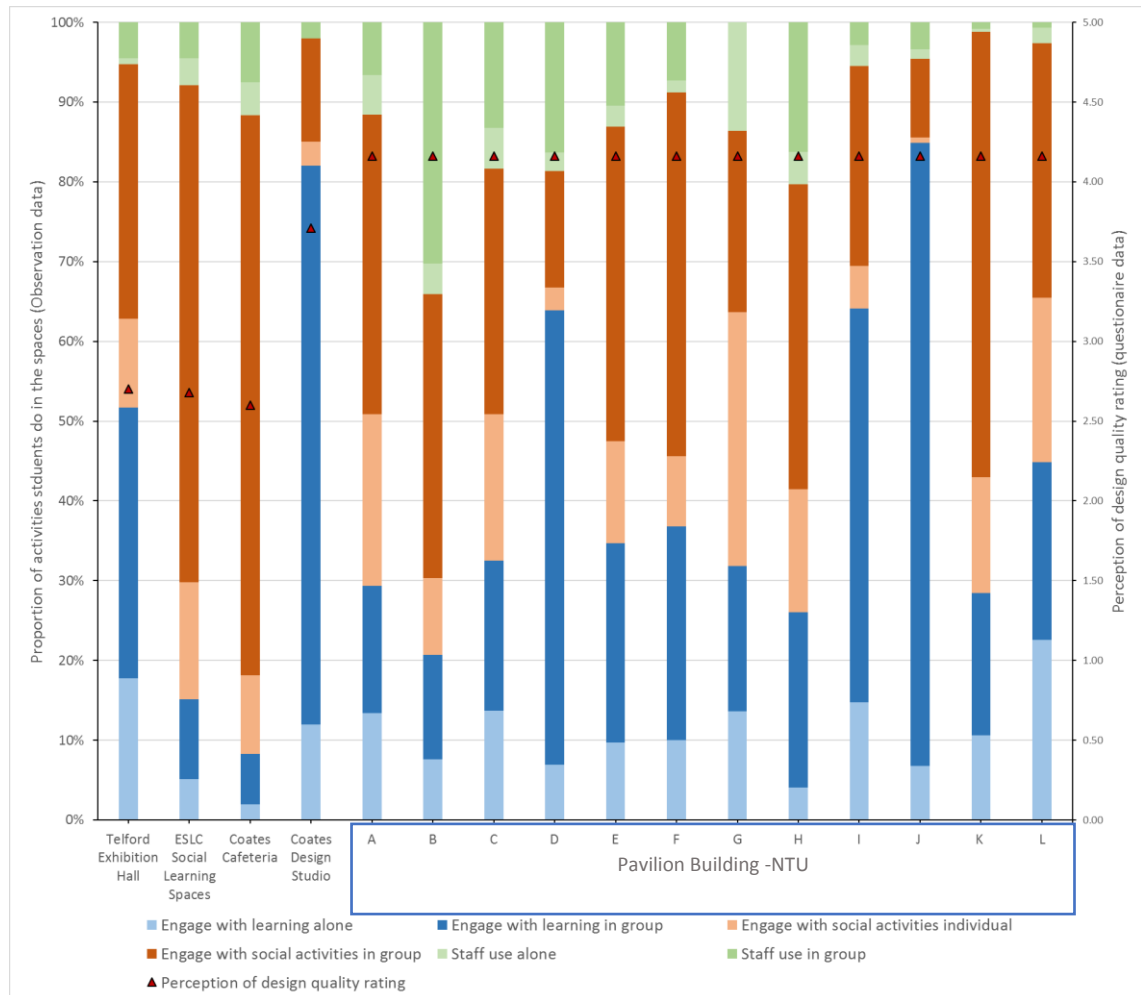


Figure 8.2: Different activities found in the study spaces (source: observation first and second case study; referring to cross reference the location of each space (A – L) on the building plan)

Similarity, students were asked to indicate their regular activities in the investigated spaces. Then they also rated their satisfaction with design quality. In the first case study, the level of activities relating to learning were found in the specific spaces which had high satisfaction in design quality among the users; for example, between 30% and 40% of learning activities in Coates Design Studio and in the Pavilion correspondent to high rating of design satisfaction (Figure 8.3).

Focus group discussion also demonstrated this result. In the first case studies, students mentioned that if they stay in the good design space which has all things they need, this would “encourage them to stay [a] longer time” and “get some things (work) done instead of doing nothing” (CS1, FC1, P2). The focus group in the second case study

also indicated that ‘nice’ – good design quality of social learning spaces makes it easier to interact and discuss their ideas about study with friends which they found “very useful for their learning experience” (CS2, FC2, P2). Students admitted that they were motivated by staying in the social learning spaces when they see others do their learning (CS4, FC4, P1).

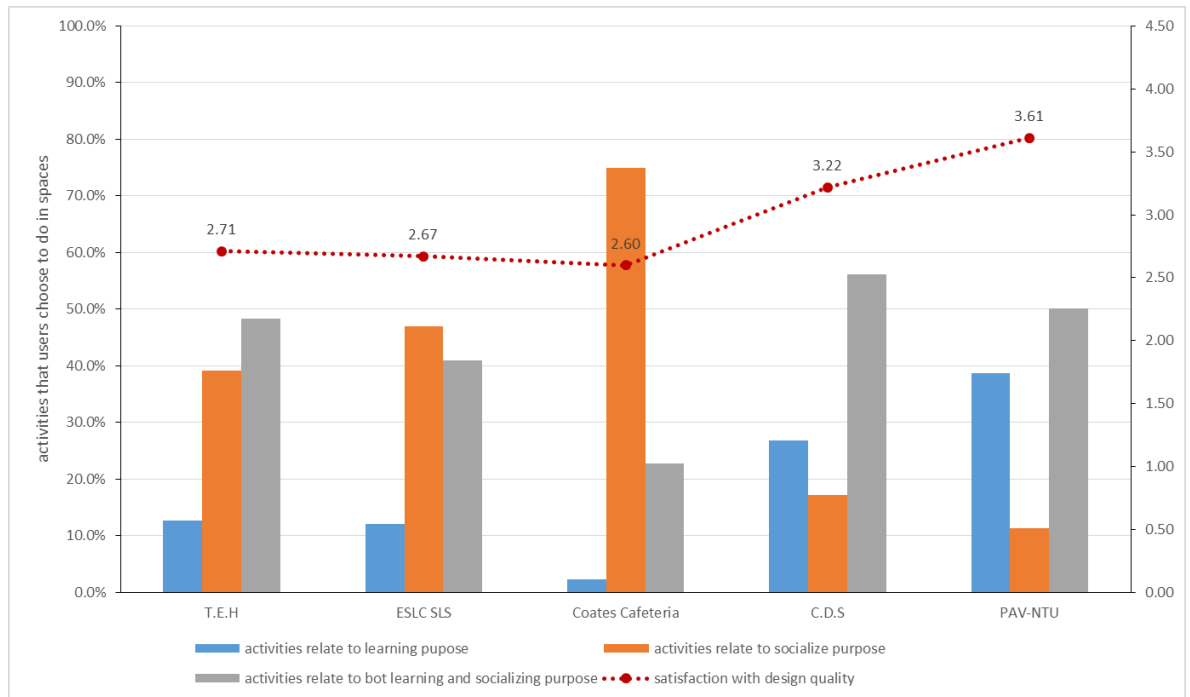


Figure 8.3: Activities students choose to do and their level of satisfaction with the design (Source: result from questionnaire – synthesis of case study 1 and 2)

8.2.3 The frequency of use and time spent in social learning spaces

The time students spend in the social learning spaces corresponds to the time spent on the campus for lectures and seminars. This makes sense, as students spend time before and after timetabled lectures to finish their university work before returning home. The presence of social learning spaces helped students to separate study from relaxing at home. In both the case studies, the results indicate that there is a positive correlation between the satisfaction with design and the time spent in each social learning space venue (Figure 8.4). This implies that if design quality satisfies users, users will spend more time in the space.

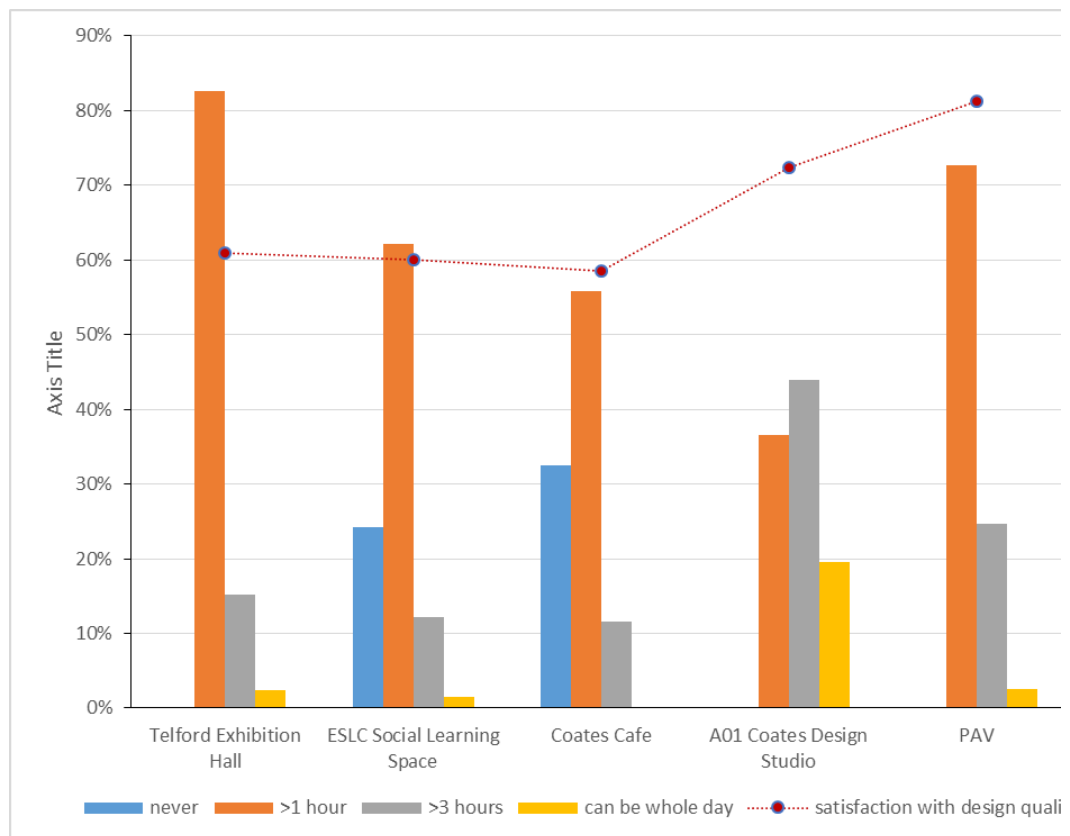


Figure 8.4: Correlation between times spend and level of design satisfaction (Source: synthesis data from questionnaire of both case studies)

In addition, time spent in social learning space had a positive correlation with learning engagement level, as it shown in the Figure 8.4. In the first case study, the users who use the space for learning activities would stay longer than users with social intention. The results show data from the four studied spaces. In the second case study, the result also showed average time spent – users with a study purpose tend to stay longer in the space than those with a social purpose. In focus group discussion, students in both case study mentioned that:

I don't think it is the case that will motivate my study and it make me work. It is just the sense of if you are in the nicer place you can enjoy working. It is not so much like "oh the building is very nice, so I will go there and work". It is just nice to sit in the nice building to do work. I don't think it will motivate your work, but it helps you to feel good when work in it and [I would] stay longer (P1, FC4).

While it is already indicated above that good quality of spaces make users want to stay longer, it implies that the space should have good design quality to keep users longer and involve them in learning activities instead of being a place in which they stay for a short time to socialize only. This is because it has been indicated by theory of learning engagement that the amount of time and effort students give to study will be

associated with their learning performance (Astin, 1984). Therefore, design quality of social learning spaces need to be considered a key factor to improve students' performance.

8.3 Design quality for social learning spaces

While different students have different learning styles and requirements from their environment, from the two-case studies, there are four significant qualities which impact on students' learning activities and user patterns within social learning spaces:

8.3.1 Attractiveness

Attractiveness may refer to many aspects of design language in different contexts. However, in social learning environments, the results from both case studies revealed a number of common attributes of attractiveness from the users' perspective.

First, the result of questionnaire, observation and focus group in the first case study, UoN, showed that spaces such as Coates Design Studios and Telford Exhibition Hall were highly appreciated; corresponding to high use and more learning engagement among students. The Figure 8.5 below illustrates this claim:

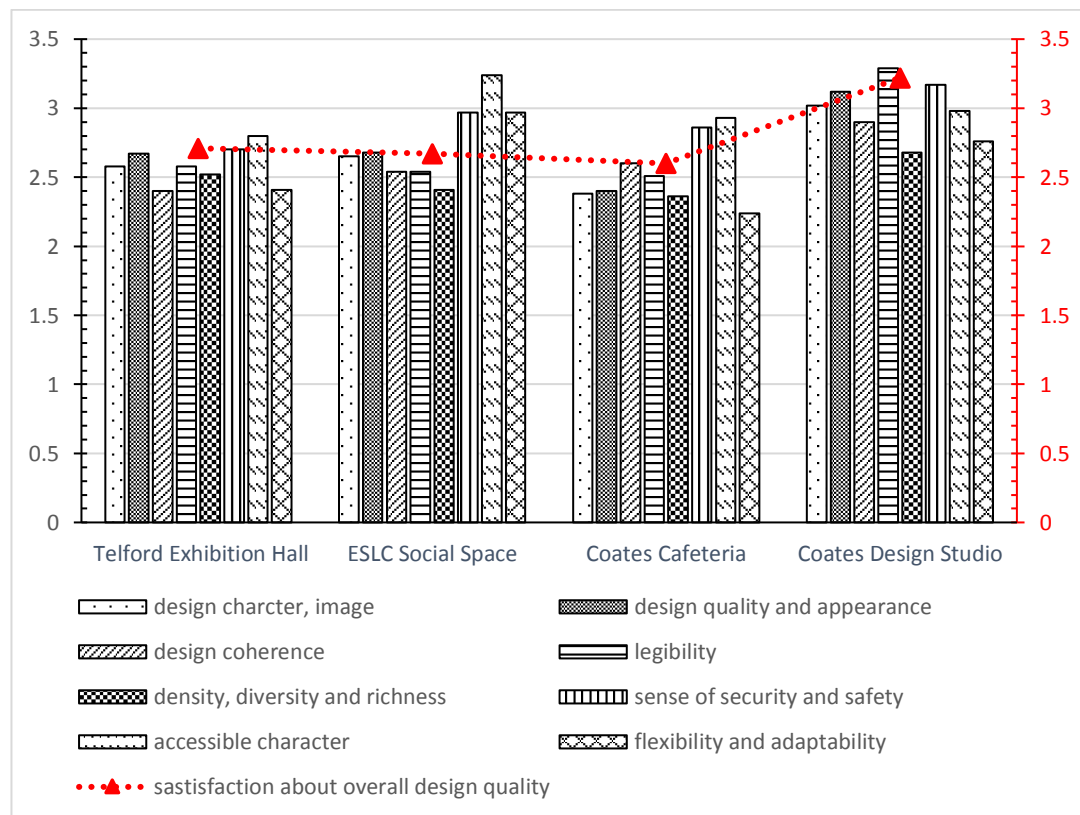


Figure 8.5: The perception of users about 8 design quality attributes of social spaces (source: questionnaire in four social learning spaces at UoN)

Although the first version of the questionnaire had not been designed to investigate in detail the attributes of attractiveness of the space, the result of focus group indicated that users prefer to use environments that have similar design factors: a contemporary design style, bright and full of natural and/or artificial light; open plan and a large amount of space are key to achieving ‘pleasant and nice’ spaces. These factors would also affect users’ intention of coming to use specific spaces in the university. With reference to the literature, these factors will be described closely to determine what constitutes ‘attractiveness’ of design. For example, users included spaces’ appearance volume, shape and height. They also referred to furniture and seating arrangements; a big concern among those from case study one. Similarly, comfortable furniture, attractive design and nice lighting were the main concerns among students. Moreover, a “spacious feeling” and the view outside were significant preferences and concerns for the users from the first case study. This evidence was found mostly in the focus group and open questionnaires.

Like the first case study, the result of the second also supported the important role attractiveness of the social learning space design. Initially, the attractiveness was important to both learning and socializing activities and it became a reason student enjoy using Pavilion Building. The result of the questionnaire showed that the physical appearance of the building was highly appreciated amongst the users. Although users were not consider these attributes the important factor that effects their learning or social activities in the questionnaire, the focus group showed a different perspective. Intangible feelings about the appearance of the spaces was key to successful design. In the focus group, “nice” space and a feel of good design dominated the users’ thoughts when they thought about why they choose PAV. Modern style, appropriate colour theme, bright and full of natural light had a high effect on users’ perception. Also, the feel of less ‘phobic’ with similarly to “spacious feel” and more relaxed environment was found in the first case study was significant concern about the attractiveness of the spaces.

I mean it should be an attractive building. You would not think about it at the beginning, but if you saw horrible ugly building, you realise yourself that is a horrible building, but you saw the nice looking building you are not necessarily take that in. But after I thought about this, I have been using this because it is nice building, as you [another participant] said it is at night when it lights up it looks really tasty, the campus looks quite nice with this nice building (CS2, FC2, P4).

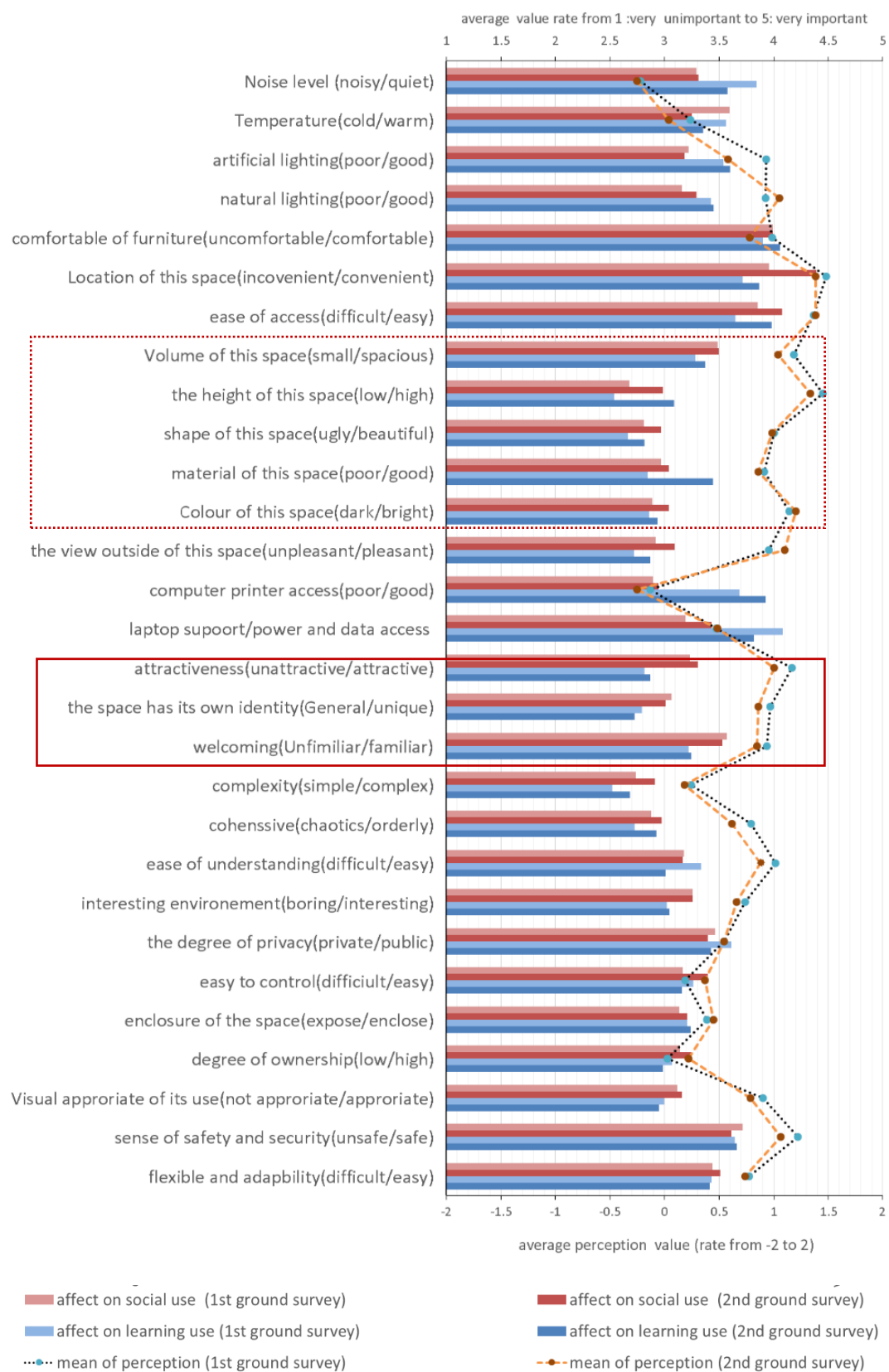


Figure 8.6: Perception of design quality (Source: result from questionnaires at Pavilion)

8.3.2 Comfort

The requirement of comfort refers to whether the physical performance of the space allows users to feel relaxed and at ease in the environment. Comfort in architecture research has been dominated by studies related to physical condition such as temperature, lighting or acoustics (Kenney, 2005). This research has been strongly affected by building design; whether building spaces can adapt in order to satisfy the requirement Building Guideline. Although this study acknowledges the effect of the physical factors on human comfort level, the emphasis is much more on the overall perception of comfort that the space provides users.

In fact, the result of the two studies found that comfort in student perception mostly relies on the feel of furniture and intangible feelings. While there is much research on the temperature, lighting or noise level users, in this case, defined their own concept of comfort through concerns about the softness and material of the furniture, the proportion of space, the colour theme, colour or quality of lighting, the balance between enclosure and exposure of personal spaces, communal space and the views outside.

Results of the first study indicated that student choice of social space sought a different view of users about their perception of comfort, which is not only relates to the physical aspect of design quality but also associate with the feeling of comfort that the space provide. It was indicated in literature that lighting and temperature are among the first things that humans notice regarding their comfort in the environment (Gee, 2006). These aspects are, “relatively homogeneous across the campuses and are probably not as carefully scrutinized by classroom designers as other features of [a] learning environment” (Graetz & Goliber, 2006, p. 16). In this study there was agreement that the environment should satisfy users’ requirement for temperature, lighting and noise level; however, it may not be the only thing users need. Qualitative results indicate clearly that these levels also depend on subjective comfortable factors, which relate to a need for the feel of “spacious spaces or open spaces” or “relaxing and cosy areas or less depressing lighting” (CS1, FC2, PC, HY, Geofry). Furthermore, privacy and enclosure, “the privacy and the space allow users to do what they want to do but they still stay in the open public spaces at the same time” (CS1, FC1, Negar), is also a factor that users indicated would affect their level of comfort in the social learning environment.

The similar result was found in the second case study, Pavilion of NTU, as users were highly satisfied with the comfort of that the Pavilion provided. Students also specified that the soft material of furniture, moderate and full of nice natural lighting and artificial lighting were the elements make them feel more inclined to use Pavilion. They also mentioned that, although level of noise was important for some specific activities, for example when they want to do focused and difficult study, the overall relaxed and comfort feeling that the design space provided would effect their choice of use beforehand. Students indicated that in winter, PAV could be cold but for them everywhere else is cold too. It seemed that users to some extent could adapt to uncomfortable conditions if the building provides them with good spaces to gather with friends and inspires them to get on with their work. Others mentioned that they may prefer the library if they need a completely quiet environment, but the Pavilion provides more a relaxed and “slow down” feeling where they feel less stressed about study. Some students indicated their home could be *too* comfortable for them, encouraging relaxation above learning activities. In contrast, coming to social learning spaces such as the Pavilion where they are surrounded by people doing their study would in turn encourage them to study better.

It is concluded that comfort is an important factor that affects user experience in the social learning spaces. Many other studies, especially in the classroom and formal learning spaces already illustrate that a level comfort is needed to maintain human activities and productivities in term of temperature, lighting and noise. However, not compulsory environments for learning, social learning spaces are an optional offer of the campus to encourage and support students in their self-learning and collaborative learning; the requirement for comfort needs to be expanded and requires more attention in terms of the perception of comfort and overall design quality that the spaces provide.

8.3.3 Convenience

Convenience is important to the use of social learning spaces. From the analysis of both case studies, social learning spaces should be located at the centre of campus and should be easy to access from different buildings. Observations also showed that there was intense movement in and around the Pavilion before and after lecture times. Students like to cut through the building, even if they may not intend to use this space. It is indicated by the questionnaire that the location and accessibility of the Pavilion is highly appreciated among the students (Figure 8.6 above).

Furthermore, location and accessibility were also indicated as highly effective in terms of both social and learning activities. It was indicated by students in the focus group that the main reason for using the Pavilion was to meet and see their friends and peers – the building is at the center of campus; these interactions help them to discuss ideas for coursework, tackle exams or just gain motivated by seeing others work: “This building is a central meeting place, you can go and do everything and then come back to here. It is a start place for the other type of learning taken elsewhere” (CS2, FC2, P2).

In the first case study, students came to spaces such as Telford Exhibition Hall, Coates Cafeteria, ESLC and Coates Design studio when they had a lecture surrounding the buildings or group-work meetings; there is clear purpose and intention in line with their learning schedule. In contrast, at the Pavilion, some students established the habit of seeing their friends *before* lectures or before they travel together to their study rooms. Some students called the building a meeting place in their daily experience:

It is the place to meet as well. I like to meet people here in the morning before I go to my lecture at New Hall Block and just to start walking together. I probably meet people here is the most rather than the Point as this is the Centre of camps, so it is easy to get to everywhere, really, wherever you are in lecture or seminar it is a lot easier to get here than other places (CS2, FC4, P3).

This is dissimilar to the first case study, where students indicated that they use social learning spaces surrounding the Engineering Faculty, however, these spaces may not be their favorite places.

In the second case study, the convenient location also affected users’ choice of space. Students indicated that the building has become their favorite place to gather between lectures:

If I have a break there are a few places you can go to, but the Pavilion always is the choice because of it situation where centralized, it is quite big, sitting down here or you can go canteen as it very centralized (CS2, FC4, P2).

According to the users, good location, connectivity and accessibility are key factors to the success of social learning spaces. In the first case study, some of their favorite social learning spaces were in an inconvenient location, far from their learning schedule locations; therefore, they would not go regularly. Similarly, students in the second case study also indicated that, although they may know of some other informal learning spaces surrounding the campus, the Pavilion was still more frequently used as it was easy to find and access:

There are a few spaces surrounding but you don't know where to go. They have the same sort of setting there such as cushions, sofas and other stuff down the in M. Darwin, just down there, but it is like a maze. You have to know where you have to go. If you go to these places there is no one there, because no one knows where it is (CS2, FC3, P1).

While the connectivity of social learning space in UoN confused the users, being well-connected and having a good flowing plan was recognized as highly attractive to users at NTU:

One thing I do like. It sounds a bit strange, but I like how many exits they are. Obviously, you got that one there and that one there and one at each end and it makes a lot more convenient as you walk around campus. Because when I lived in Hall in the first year, so when I need to get to Mary Ann Evans, I have to walk all the way around that way, now I just need to cut through, it sounds a bit strange, but it makes more convenient. That does make the difference (CS2, FC4, P2).

8.3.4 Flexibility

Flexibility and adaptability relate to how the building can be used for many different purposes, as well as the ability of the design to adapt to changing outside environmental conditions. Through the two case studies, it was clearly demonstrated that successful social learning space requires a high level of flexibility and adaptability in design.

Observation showed that during the academic year, there were a variety of activities held in social learning spaces in both cases. While Telford Exhibition Hall and ESLC Social Learning Space could be converted to accommodate different event activities, the other spaces such as Coates Design Studio was fitted and difficult to change. In contrast, Pavilion was able to accommodate different activities throughout the academic year, such as an open day, career exhibition and charity events, see Figure 8.7.:

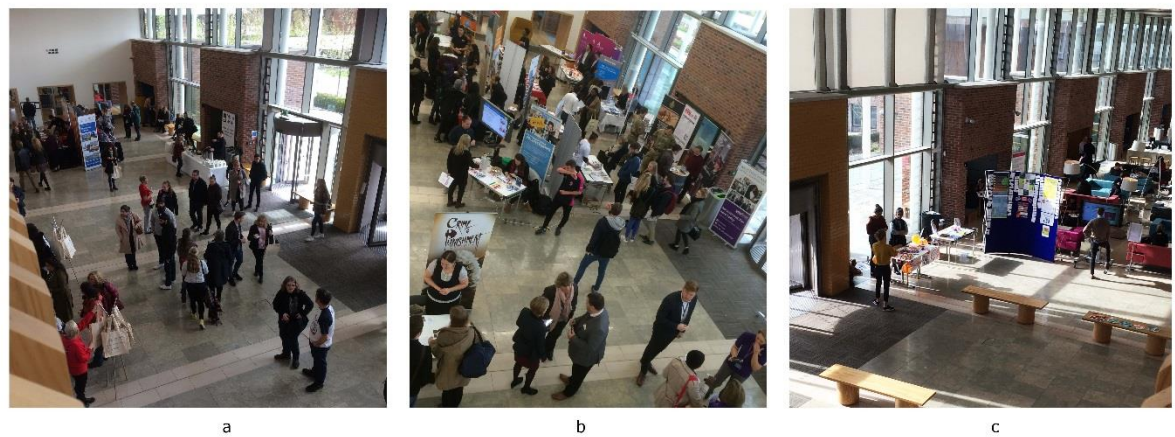


Figure 8.7: Different events throughout the year in Pavilion

- a. Open Day event on the foreground with exhibition and refreshment for prospective students and their families (observation on 24/04/2017 at 12:26)
- b. Open Day event on the magazine floor with faculty introduction and information desk (observation on 24/04/2017 at 12:26)
- c. Cake-sale charity event (observation on 07/03/2017 at 10:42)

In addition, the design of physical spaces can accommodate different activities that students and staff need. While students at UoN indicated that there was a lack of IT facilities for them in these social learning spaces – such as computers, sockets and laptop chargers, which were necessary to maintain their learning activities, students at NTU found that they were well supported in the booths, with screen connection and laptop service. They also acknowledged that these spaces can accommodate different size groups for work discussion and presentation activities. According to observation, there was an especially high level of use by staff, with around 20% of total users being staff, not students (as inferred by appearance, such as dress code, age, visible staff cards, posture and activities). Indeed, there was intensive use by staff, especially on Wednesday as lecture and seminar may not have allocated on Wednesday. Meeting, discussion and tutorials were the main activities that staff conducted in these spaces.

Students at UoN did not get any sense of other activities happening around faculty in their social learning spaces, except the ESLC lobby where showcases and exhibitions are typically located. NTU students, on the other hand, found themselves having a chance to experience different events and activities over the academic year when using PAV. Although they may not intentionally take part in these events, the

changing layout for different activities attracted them to the building to gain new experiences:

I think all the area downstairs here very useful, they have an open plan, because I could see that changing over time, because I remember there are the seats over there, I have used it to work few times. And they are changing a lot through the year and I found it is interesting (CS2, FC4, P2).

The flexibility of the spaces is also expressed through the design layout, which is easy to control, modify or change to satisfy need. As UoN students indicated, they like to be in social learning spaces that are easy to change and that provide them with a new experience each time. This could encourage them to use social learning spaces more frequently. Similarly, observation showed that the sliding doors along the front façade allowed flexibility connection between indoor and outdoor spaces, as shown in Figure 8.8.:



Figure 8.8: Flexible design allows users to use outdoor spaces easily

a. Sliding door allows extension into the outdoors when weather appropriate (observation on 25/05/2017 at 15:11)

b. Students can work on their study subject and enjoy the sun at the same time (observation on 22/05/2017 at 12:12)

c. The space under the canopy is well used in early morning (observation on 24/04/2017 at 9:56)

This design allows users access to the canopy space for both learning and social activities when the weather is good. In the focus group, students expressed their fascination with seminar rooms that can change size by dividing or combining areas to make different volumes.

“These rooms have the wall can fold back so you can extend them out and that really useful because some of the lectures that we have around 150 people, so you can extend long room back

through three rooms and can fit everyone in. If you just need small space, you can just close it off and have a small room with 60 people in there (CS2, FC3, P1).

This enabled these seminar rooms to be used for a variety of purposes: lecture, seminar, tutorial discussion or presentations, as well as group work and other social events. One student stated “I have one seminar in the room upstairs. It really nice it is quite big lot people can fit in there.” (CS2, FC3, P2).

While the design concept of some social learning spaces in the first case study made students feel confused, Pavilion created a different perception among the users. Students showed their interest in the flexibility of the design and expressed their thoughts about what each of design elements could mean to do.

Through their reflections, it was evidenced that users not only required satisfaction regarding the flexibility design of the building; they also expressed pleasure and curiosity in the way that flexibility was expressed through architecture languages:

This building has a lot of windows so in summer it is quite nice because you can open everything off and get quite cool in here. Whereas in the winter you can close these and put the blinds, but because it is quite a big space so it is difficult to heat this space in the winter. It can be a little bit cold because I believe the radiator is put on the roof if I remember it correctly and that can mean it can get a bit cold. It has a big window as well, so it uses a lot of heat through the window. I know as they want to keep all the natural light in so they put the blind it means in winter they can pull the blind so it can be a bit of warmer and have natural light in so it a bit of compromise (CS2, FC3, P3).

8.4 Design approach

8.4.1 Role of designer

Comparing the design approach of the different spaces in the Faculty of Engineering, it is clearly shown that design concept has a significant impact on the success of the social learning spaces. For example, if there is a clear concept focused on the student needs, it will attract students. In addition, the designer needs to understand student use and demographics. As Evan the designer of Pavilion building emphasised that:

when it became a bit of commitment to doing this, so we decide that it going to be nice building, we call it Pavilion [still the idea of pavilion] it is going mainly use for students because students have plenty of teaching spaces, or specialist subject area relate to their courses, but nowhere in the university over here for them to socialize without beer. So, the idea is place for those socialize activities with some informal type of work and without any alcohol involved [...] (Evan, 2017).

However, not all of the social learning spaces focused on the users. Some design was just a repetition of another model or applied good design models without investigating the locally specific needs of users. The design of Telford Exhibition Hall, for example, as the design of some spaces, was developed a long time ago and had no clear intention; this design has failed to attract the users. While there was an attempt to create colour themes by the painting decoration and lighting, it was indicated by users that the design is ‘confusing, not clear what it means and what it is used for’ (CS1, FC1, P6) or “No instructions or not clearly labelled” (CS1, FC2, P2). This lead to difficulties in navigation and failure to create a strong impression among students – some students indicated that, although they have been in the department for a long time, they did not previously know what Telford Exhibition Hall’s name was. Furthermore, some students indicated that they feel confused about where they should sit and what they should do in this area; due to the design concept, the space is not easy to understand. Similarly, Coates Cafeteria was called overcrowded and lacking in organisation; ESLC Social Learning Space was deemed too dark and therefore not suitable for learning activities or event activities. Although these spaces are well used because the Engineering Faculty is short of spaces for students, the level of satisfaction was quite low.

Through the second case study design approach, it was confirmed that a clear and easy to understand concept is important to the success of the social learning space design. Additionally, there was an emphasis on the design concept communicated to the users. The more the users could appreciate the design quality of the building, the happier and more satisfied they were with their experience and supportive of their university. Data

emphasized that the design concept of the building should be approachable to users, and easy to understand. Furthermore, considering the social learning space design in terms of the overall masterplan of the campus was important to the success of not only the social learning space itself but also the campus spatial structure as a whole.

From the architect's perspective, the concept of flow was significant. Evans (2017) indicated that one of the initial observations to understand the site of the campus was the students' movement. He emphasized the importance the two main flows of students, from bus stop to lecture or teaching spaces and from residential hall to lecture rooms or library. Therefore, the idea of locating the PAV as the centralized building means that the "Heart of the Campus" effectively aligns with high-density traffic (Evans, 2017).

Social learning spaces have become a key area of campus planning; understanding the overall structure of the campus, to locate the social learning space at the central point, has been key to the success of the Clifton campus. This suggests that the design approach should not only focus on local interior or the facilities of single spaces; the vision of the overall campus as a whole body of user experience needs to be considered in the design process.

8.4.2 Student voice in the design

In the first case study, the design of Coates Design Studio seems to have developed with comparatively more concern for student needs and to an extent involved student voice. It is indicated that the project involved student views in its design process, in terms of required activities, number of spaces for each group work area, type of technology supports, furniture and material concept (however the overall theme had to follow the University Standard), as well as which group of students could gain the authority access to it (Paul, 2016). Although the Coates Design Studio has satisfied the users in term of usage requirements and technology support as well as the support from the academic staff in specific schedule time (focus group result); the perception of design quality did not reach very high satisfaction among the users (questionnaire result). While it was considered by the local and priority group of students that the Coates Design Studio was well in used and helpful compare with the other available spaces in the faculty to their study process, students still not perceive this as a successful design space for students; it was indicated:

I might prefer the Coates Design Studio. It is for students have a group discussion there, table is quite large and bigger screen. Yes, it is better for group work. normally, majority is group works and group projects (CS1, FC2, GF).

However, when discussing their favourite learning spaces, the Coates Design Studio was not considered a favourite:

The Coates Design Studio, I like it, it is warm, but sometimes it too warm, when there are too many people inside this and the ceiling is low it can get very warm. Here [Telford Exhibition Hall] I feel more spacious. I don't like low ceilings spaces, just like in the Coates café, the ceiling is very low. I don't really like to go there. Yes, it [Coates Design Studio] is good for group work but not for individual work; normally I will study at home (CS1, FC2, PC).

Furthermore, the role of designer in this project was not clear established, as there were many restrictions in terms of budget, design format (colour theme, type of material and furniture have to follow to university design standard) and existing structure of the buildings. It was hard to tell whether the role of student voice in the design process made the project more successful compared with the others which had less intention of focussing on student learning requirements. Therefore, in the first case study the role of student voice in design process is still an unclear. However, it implied that the response to student requirements, feedback as well as the involvement of student voice would be a good starting point for creating good design projects for students to use.

The second case study, in contrast, showed different views about how to understand students' needs and involve different people in the design process. In this project, although the designer did not directly contact and collect student ideas, there was a strong concern for student views and needs in the design approach. The architect indicated that his design team spent much time observing student learning patterns on the campus before developing a concept. He emphasised that the most important factors were students' movement, their habits of usage and their expectations. These were constantly emphasised throughout the design process. There was also involvement of several different views from staff and student via meetings and discussions, where the student voice was gathered and incorporated in the design concept. Furthermore, students were also well-informed about the design of the PAV throughout the construction process.

It deemed, however, that student views were unhelpful when it came to the details of design, such as colour, shape, structure or layout of the spaces as they may not be trained in design language. However, good design quality with an aim to satisfy the

users, coherence between language and function, open design approach to the discussion will bring about a successful project. The designer stated:

So, it [Pavilion's design process] is a very long story I know. The point is the brief was unclear when it started; and the process lasted probably in two years maybe in three years. With the dialogue and diagram like this, [I have been] sitting in the meetings discussing things and getting more people involved in it [the design diagram]. It gradually improved through a lot of discussions on this sort of drawings. It is a process of refinement and honing; and that is essentially how the scheme is ended up (Evan, 2017).

Throughout the two-case studies, the role of students in the design process has been confirmed. However, there was a different approach in terms of how to understand and involve students in the design process of each case study.

8.5 Conclusion

As this research applied the mixed method to multiple case study settings, comparison is crucial to the conclusions and how to answer the research problems. Although the two cases cannot be compared in term of the questionnaire, due to it was changed and adapted throughout the research process, the two case studies can be seen as modifying and expanding the scope of the research from general to particular.

Through comparison and synthesis, there is a link between the use of social learning space as well as the perception of these spaces to the students experience in term of activities and level of engagement. While these effects may not necessarily result in students gaining a higher result which only measures academic performance, the environment can encourage or discourage positive learning activities and create the essential conditions for interaction and promoting positive inspiration among the users that directly change their academic performances in many ways.

First, the key factor contributing to the success of the social learning space, as identified in this study, is attractiveness of the design. It is evident that a contemporary design style, bright and full of natural and/or artificial lighting, open plan and a large amount of space are key to achieving a 'nice' social learning environment. This corresponds to previous studies, which suggest that lighting and the volume of space influence study in collaborative learning spaces (Graetz and Goliber, 2006).

Second, a well-connected and centralised location also significantly increases the use of social learning spaces. This finding supports research conducted by Harrop and Turpin (2014) in informal social learning spaces in library buildings.

Third, comfort plays a key role, which is influenced by furniture and materials as well as the perception of a welcoming design, appropriate privacy, ease of control of personal spaces, and the feeling of safety. This finding is reinforced by other studies such as Webb et al. (2008) and Matthew et al. (2011).

Finally, a high level of space flexibility and adaptability is greatly appreciated among students and influences the use of both social and learning activities. This result is like those found by Melhuish (2011), where innovative learning space design that is easy to change to fit with different uses was found to be significant.

Although these factors may not be obvious to students at first sight, they may subconsciously/intuitively lead to use or non-use of spaces. Furthermore, ‘social learning space’ may not be a label that is explicitly understood (compared to say ‘lecture room’); however, students can clearly express their preferences for spaces that provide for both social and learning activities without calling these activities ‘social learning’ per se. Although “heavy study work”, such as essays or reports tend to remain with conventional study spaces (some students indicate that they prefer home, libraries or computer rooms, where tools and programs are available for such work), social learning spaces are preferred for collaborative group work, presentations, and discussing ideas for exams and assignments. Interestingly, the way in which staff, as well as students, make use of social learning spaces suggests that such modes of working, and the spaces that facilitate these, are not exclusive to student learning but can make a positive contribution to a social learning environment that embraces the wider university community. It is noticed that these physical performance should be considered in term of users’ perception – it is not only about the objective data.

It is also emphasised here, that there is a strong correlation between these four identified factors. Although the users have been aware that these factors will affect their usage, users could change and adapt their perception according to the space they favour. For example, it is indicated that in some attractive spaces, the level of comfort required could fluctuate. Users can bare and modify behaviour to adapt to their conditions, for example, wearing jackets. However, in spaces that may not already attract them, small discomfort has a huge impact on users’ choice of whether to use these spaces or not.

Chapter 9 :

CONCLUSION

This chapter presents a discussion of the previous chapters, to highlight the empirical evidence and contribution of this study to the design of learning environments in higher education. It recounts the research problem and research questions and offers findings in response to each question in turn. Furthermore, the findings are compared with what was identified in former studies. Finally, it provides some suggestions for future research.

9.1 Recalling the research questions

Physical social learning spaces are crucial sites for learning and social activities, but these have been overlooked as a subject of design focus in campus environments. In the literature, it remained lack of empirical evidences about what these spaces are used for and how to design them effectively to support student experiences. The aim of this study was to contextualise the need for social learning spaces in context of changes in education, and to identify the design attributes which satisfy students' requirements; to gather their perceptions of design quality and encourage positive learning behaviours. The search focused on students; their voices and contribution to the design process of campus environment has been neglected in the prevailing architecture design process.

To fill the gap in literature, the aim of this study is to investigate the empirical evidence for the relationship between design quality and student experience in social learning spaces via the mixed-methods approach. In short, the focus can be articulated as:

What is the relationship between design quality of social learning space and student experience?

Emphasizing student experience, this study draws some important findings in terms of how the design of social learning can be developed effectively, to foster positive student experiences. It is found that by providing attractive, comfortable, convenient and flexible spaces, design encourages students to engage in positive learning activities, high levels of interaction and cooperation with others; they are more likely to have optimistic attitudes towards their learning.

9.1.1 The positive role of social learning spaces as part of the student learning experience

Research question one asked in what ways students have been using social learning for their learning purposes and for socializing. As indicated in Chapter 1, when a group of former strangers have their own sense of community and share social reality through interaction, they are involved in the learning community which will assist them in becoming a mature member of that learning community (Lave and Wenger, 1991). In this study, the results provide the empirical evidence to support that these social learning spaces have a significant role in the process of involving individuals in the learning community, through promoting daily learning experiences such as self-learning, group learning, discussion with peers and social activities such as relaxing, talking between classes and having contact; as well as providing opportunity for

volunteer work or careers discussion with employability services. Along with the support from the theory and other studies, the result confirms the significant role of social learning spaces and emphasises the importance of the physical design of these spaces on learning behaviour of the users.

Both qualitative and quantitative empirical evidence has shown that students spent nearly a third of their time in a university environment in the social learning spaces. Students use these spaces frequently; some students use it as part of a daily pattern for learning. These activities show that students used the social learning spaces to accomplish their learning tasks – they do coursework, practice presentations or read through handouts. Although this may not directly prove that their results will improve, by creating a supportive atmosphere, social reality and participation in meaningful activities or interaction with learning, it is illustrated that students can achieve high level of academic performance.

In the qualitative data, students view good social learning spaces as not just places for chatting or waiting between lectures; these spaces allow discussion and interchange of information for learning. These spaces are also essential to the students in the way these environments provide opportunity to interact with the community (friends, peers, tutors and other university support service such as employability, charity events, and university open days). These findings are based on both qualitative and quantitative evidence. It is indicated in the Vygotsky's (1978) social development theory that social interactions are necessary for cognitive development; it encourages learning improvement. Therefore, the data confirms that the use of particular spaces deemed as 'social' assist students in the learning process.

Furthermore, while not all the students recognise that good design quality of social learning spaces as a source of inspiration, students demonstrated that these places are a part of their students' life, where they enjoy work with less of a focused feeling or sense of exhaustion (as compared with the library). Relatedly, a lacking of these places results in students feeling a lack of support, meaning they feel less connected with their university as they have no space to stay and work with friends or colleagues in the campus. Therefore, these places should not only be designed as general spaces between the lecture rooms or a leftover space with some common furniture, as students indicated in the qualitative data. Precise, thoughtful design which encourages enjoyment, relaxation and feelings of community support are important to student experience in the campus environment of the contemporary university.

In summary, the use of social learning spaces benefited student learning experience in three main ways: 1) engagement with learning activities, 2) interaction with the learning community, and 3) creation of enjoyment and feelings of support on campus. With this in mind, the influence of design attributes on these aspects will be discussed below.

9.1.2 The positive correlation between the design quality of social learning spaces and positive learning activities, interactivity with the learning community, and feelings of support

In this research, drawn from case study comparison between NTU and UoN series of social learning spaces, it was found that the good design quality influences the decision of student about the activities that they would do in the spaces. As much research has illustrated (Henshaw, Edwards and Bagley, 2011; Melhuih, 2011b), the physical environment, which relates to the physical layout of the spaces and the furniture settings, changes one's ability to engage in communication, particularly in a classroom environment. In this study, students also indicate that good design quality promote learning activities as opposed to socialising activities. Students prefer to do multiple tasks at the same time; their learning materials include laptop, handouts, books, as well as food and drink to maintain their focus; therefore, appropriate design of such as amount of spaces, layout, furniture, lighting and styles are required in order to encourage more learning activities in social learning spaces. Students indicated that group work is important to their learning process and they previously struggled to find the right places for these activities in a university environment. Social learning spaces has become significant places for them, however, the design quality of these places may not satisfy their needs.

Furthermore, the well designed spaces were thought to both encourage positive activities and maintain a long staying time in other to finish the task at hand. Comparing the two case studies, one has a high level of satisfaction regarding design; one has a lower level of satisfaction. Overall, more learning activities happen in correlation with the design quality satisfaction level. From qualitative data of case study 2, students indicated that they enjoy the work they do in a nicely designed social learning building and it became a source of encouragement to come to the campus for self-learning instead of staying at their own residence. Relatedly, in the first case study, design quality of social learning spaces did not encourage the student to conduct self-learning in a university place (section 8.2.1). They only use the social learning space for breaks, or group work because they have space between their schedules. The library

is felt to be the only place for self-learning; however, some students indicated that sometimes space in the library or computer rooms were too full and noisy which not make them feel comfortable enough to stay for a long period (section 6.4.7). Students refer to comfortable place where it can have all facilities they need. In addition, the social learning spaces should provide a feel of spacious, good views and a moderate level of privacy. such as social learning spaces which students able to use without competing for these in a university environment are indicated to be helpful in their learning process. While the NTU case study uses social learning spaces to attract students, UoN still struggles to find appropriate locations and design qualities to attract students.

9.1.3 The positive correlation between perception of design quality and levels of student engagement

As discussed in Chapter 2, the definition of learning has changed throughout the last decade in both Education and Psychology. Consequently, the matrix to assess learning is now not only the learning outcome model; it has been expanded to include learning experiences (Bligh and Pearshouse, 2011). With this new focus, student engagement is seen in terms of learning activities, which would directly or closely affect performance. Although Student Engagement was not new to measuring student performance, it had not yet been applied as the main matrix to assess learning space design. The matrix has mostly been used to evaluate formal physical space, such as classrooms linked to learning outcome assessment. Therefore, in this research, one of the concerns were to understand the initial relationship between student engagement and design quality, via both qualitative and quantitative evidences.

In this research, there is a positive correlation between the perception of design quality and student engagement level, measurable by the student engagement framework categories. It reveals that high levels of satisfaction with design qualities are associated with high-levels of student engagement. There are only two categories that did not correlate with the perception of design quality(section 7.4.3): working with students outside the class and discussing ideas from the course with staff. However, the observation and focus group indicated a contradict result. Observation in both case studies show that there was a considerable level of use by staff (around 10% in the first case study, with around 20% in the second case study). There were a large number of meetings and discussions held between staff members, especially on Wednesday in the Pavilion Building when students may not use the space much. On contrary, there is no similar use of staff in the UoN Engineering social learning spaces. It indicated

that the quality of social learning spaces also influences the frequent use of staff as well.

The qualitative result indicates that ‘nice’ design of social learning space encourages students to spend more time outside the class engaging in learning activities as opposed to lack of or not good design quality. Students indicated that high design quality makes them feel more connected with the university than they did before it was built. Furthermore, the presence of different events encourage them to engage more with their learning, as well as future development. Employability events inspired them, as did seeing peers at work which made them think about further study after graduation. Some students recognised the space as the inspiration; others consider it as a symbol of support from the university. Relatedly, in first case study of UoN, some spaces are only open for some group of students which makes others feel less support. Less flexibility in the designs of these spaces could not encourage students involve in University events as students could not accidentally find the events surround their daily spaces(see section 8.3.4) .

9.1.4 The four important design qualities that contribute to the success of social learning spaces

9.1.4.1 The first essential design quality: attractiveness

According to quantitative data, important to students’ perception of good design were lighting, spaciousness, open layout, and coherent design languages, such as colours, shape and styles. Qualitative data also show that the perception of attractiveness of spaces makes students more likely to learn or boosts the feeling of wanting to do more study activities in the campus environment. Therefore, they may stay for longer and create the habit of coming to the spaces as a pattern where they can meet and interact or study in a group of friends. Time spent in learning university environment is an essential factor to build the connection between student and their learning environment (Kuh et al., 2008). One student comments:

Before when we were in the first year, it took a bit of longer for me when I had to come here. Because of the city campus looked so much nicer than here. When you come, they were a bit of old buildings and stuffs. But now, I don’t mind. It does gently make me changed, it is better to come in here. It is defiantly because the building is nicer [...] I think gradually since this [Pavilion] building been built it is becoming the main building in here [Clifton Campus]. So you can go anywhere from here (CS2, FC4, P1).

By contrast, if campus has limited attractive social learning spaces, students reported that they tended to choose home for their study. Furthermore, the feel of a lack of good

spaces to work created the feeling of being less supported. Literature also indicated that the design of physical spaces contributed to the level of involvement of the students on campus, it also influenced their learning experiences through verbal and nonverbal language (Strange and Banning, 2001).

9.1.4.2 The second essential design quality: comfort

Comfort is also an important design quality that users required using social learning spaces. It has been consolidated by many studies that the comfortable quality of the environment mainly refers to measurable temperature, lighting and noise level (Graetz and Michael J. Goliber, 2006). Many researchers, especially in school classroom design, have tried to link the comfort levels to learning performance: outcome, test result, level of interaction (Blackmore *et al.*, 2011).

In contrast, this study found that perception of comfort relates more to subjective factors, such as comfy furniture material that satisfies the needs of users, attractive natural or artificial lighting, amount of open space as well as the degree of enclosure or appropriate design language. These elements give a first impression, which affects the choice of whether to use the space as well as the activities that students would prefer to do in the space. As an optional environment for learning, social learning spaces should encourage and support students in their self-learning and collaborative learning; the spaces should appeal to students and invite them to use it at first sight. Therefore, the requirement for comfort needs to be expanded and requires more attention in order to include the *perception* of comfort.

9.1.4.3 The third essential design quality: convenience

Convenience is an essential design quality of the successful social learning spaces. Much of literature on learning spaces has not mentioned the convenience factor, as they usually deal with individual spaces. However, as contemporary learning in higher education recognises mobility of learning and students have multiple tasks on their timetables, there is a strongly requirement for a convenient location. However, some new social learning spaces was developed without consider the important of convenient location element. While architecture theory, especially urban design, has paid more attention to the relationship between different spaces and how to create convenient access and location for users (Gelh, 2010, Moughting,1999). This design quality has not been applied in the design of social learning spaces in campus nowadays. In this study, a central location is found to be important to the choice of whether or not to use social learning spaces in this study. From the analysis of both

case studies, successful social learning spaces should be located as the centre and be easy to access from different buildings.

According to the users, good location, connectivity and accessibility were key factors to the success of social learning spaces. If the spaces could not be in dialogue with campus movement of students or locate far away from learning schedules locations, students do not use them. To transform space into a *place*, location is essential, as it establishes habit and becomes a feature in the user's personal mind-map. As a student indicated:

It is the place to meet as well. I like to meet people here in the morning before I go to my lecture at New Hall Block and just to start walking together. I probably meet people here the most rather than the Point as this is the centre of camps so it is easy to get to everywhere, really, wherever you are, in lecture or seminar it is a lot easier to get here than other places. (CS2, FC4, P3)

A centralized location, multiple access points and convenient connection to different buildings are attributes of successful social learning spaces. Furthermore, the wider literature has also indicated that the location of the space may also communicate nonverbally about the institution's mission. Therefore, university administrations must carefully consider the location and accessibility of spaces in terms of the overall campus structure.

9.1.4.4 The fourth essential design quality: flexibility

Flexibility and adaptability relate to how the space can be used for many different purposes or activities, as well as the ability of the design to adapt to changing outside environmental conditions and the change in technology required for future learning. In addition, flexibility of the spaces is also expressed through the design layout, which allows users environments that are easy to control, modify or change to meet their needs – which are expected to change rapidly. This criterion also relates to the variety of activities and events that the spaces can encourage students to participate in throughout the year. The result of this study (section 6.4.6 and 7.5.1.4) indicated that students also would like to have some new experiences in learning spaces as this will attract and stimulate their minds.

Flexibility has been mentioned in the research in the school sector, as well as in some studies of classrooms or library environments in higher education. However, the application of the flexibility criterion has been limited in design practice, for example, movable chairs, different shape and size of tables or rotating computer screens. It has

been criticized that these ideas cannot meet long-term expectation as well as unable to fit in with the overall planning structure of the campus.

In the specific context of social learning spaces, the empirical evidence shows that flexibility in design will benefit learning experiences, but studies have been limited. The result of this study confirms that flexibility of the design will encourage students to stay longer, as well as will allow them to do multiple tasks at the same time which is a requirement of learning in the new century of technology.

9.1.5 Student's role in the design process

From the data of this study it is concluded that student views are important to both the design process and evaluation of design's effects on learning. Student voice and needs should be considered at the beginning of projects. Instead of following rational design process, which is mainly based on what is indicated by the design brief, designers should have a good understanding of users as well the theory that underpins appropriate and innovative building design. However, the study also suggested that it is unnecessary to involve students in the detail of design decisions, as they may not understand the design language from an architecture perspective. However, an open design approach, with discussion with those involved in educational practice would contribute to a successful project. It is advised that observation and "deep" understanding of user behaviour and learning patterns is needed, before forming the building concept.

9.2 Suggestions for the further research

Like any study, this research had a defined scope; this allowed for focus on particular aspects of architecture and education, but it also precluded the exploration of other areas of potential interest. Although the researcher worked to address the effects of some limitations, it is important to note where further work could be undertaken. To conclude, the following suggestions are made for work which can follow from this study.

Firstly, this study just only investigated in the two institutions, due to the accessibility of contact and limited research time. A series of case studies and further research in different countries could provide a variety of contexts which would allow further comparison; this could address the question of whether these two examples are typical or unique, and whether students studying in different socio-cultural contexts have different perceptions and experiences of space. In addition, it would also be good to compare two successful but different projects to open the discussion about variety of design approach.

Secondly, the study only focuses on students – the main users of the social learning spaces. However, as it was concluded that the high design quality of social learning spaces could attract the frequently use of staff and make the good impact on visitors views too. Therefore, perception of staff and visitors also need to be investigated in the further research.

Thirdly, complexity surrounding campus physical environment influences the use of specific spaces. Therefore, this could be a limitation of this study as many contextual factors have not been accounted for in the comparison. ‘To what extent does the location of a campus itself, for example in a city or as part of a parkland suburban setting, effect student’s study options and choices?’. This could be the research topic of another study.

Finally, learning in higher education has changed rapidly which, as argued throughout this thesis, requires ongoing research in terms of how to build the infrastructure to keep pace with these pedagogical developments. However, it is not only education practice which needs to keep pace with these trends; architects are also required to build their own research and knowledge in the wider context of teaching and learning higher education. As Temple (2007, p.74-75) emphasised:

We need a better understanding of the role of space in the dynamics of creating more productive higher education communities and its connections with learning and research. This should be the

subject of further research. The literature throws almost no light on managerial decision-making about space issues affecting students or staff: this is a topic where further work would be useful.

Social learning space is an example where the research in architecture has not been updated to reflect the changes in higher education; therefore, design in practice relies upon little theory or empirical evidence when attempting to build successful space for the users. Similarly, many other categories of spaces in the campus environment need more attention and focus, to provide better understanding how to build successful campuses in the future. Research from the perspective of architecture is required in the future, to guide the practice and to ensure that the new buildings we construct will serve the needs of modern society.

This study affirms that universities should continue to intentionally design social learning spaces that promote positive student learning experiences, and that to do this requires a design process which carefully considers empirical evidence and user perspectives. Further evidence collected over time can inform the open-minded approach of designers, as well as clients, to create innovative design projects to satisfy the demands of users.

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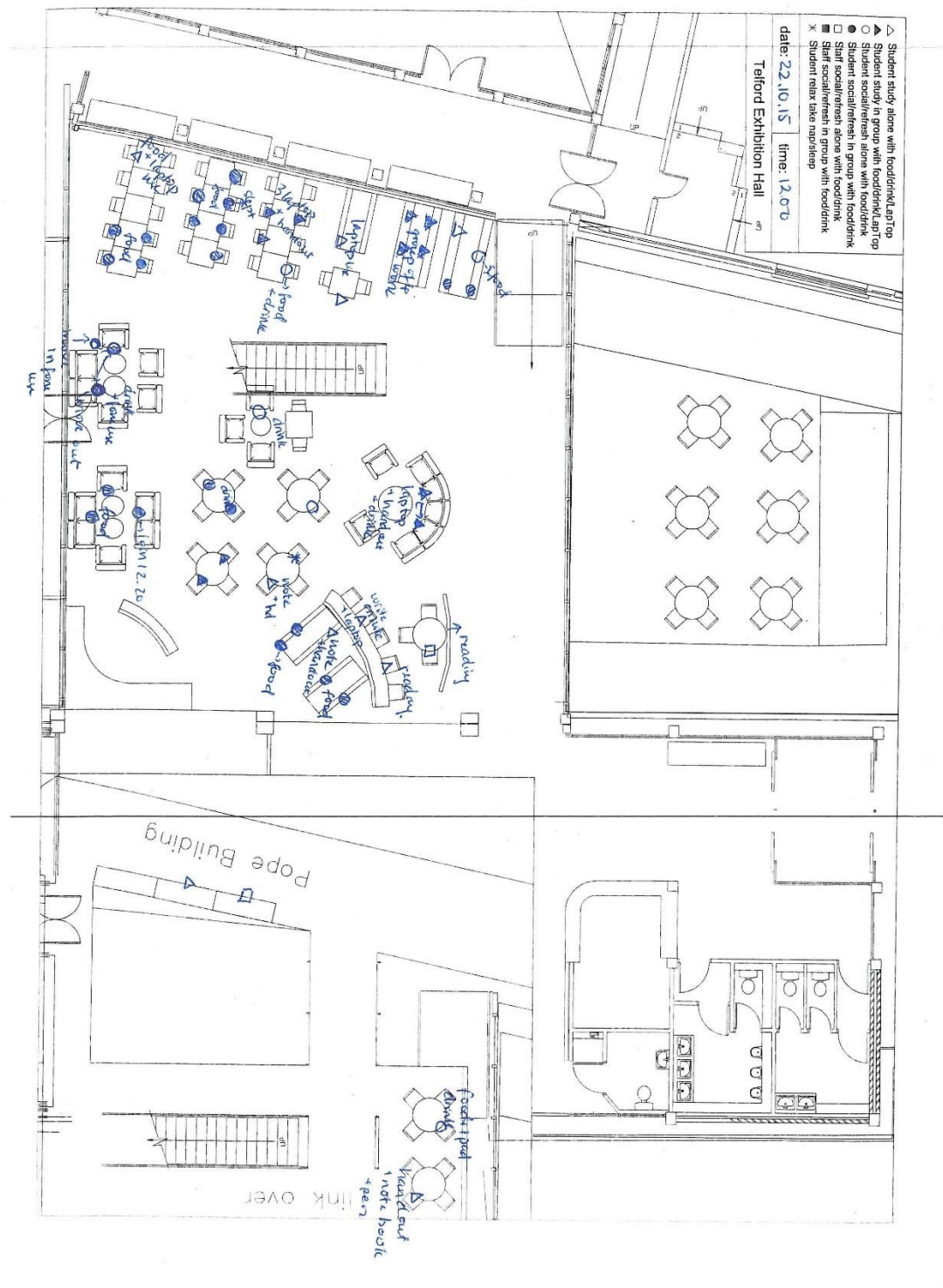
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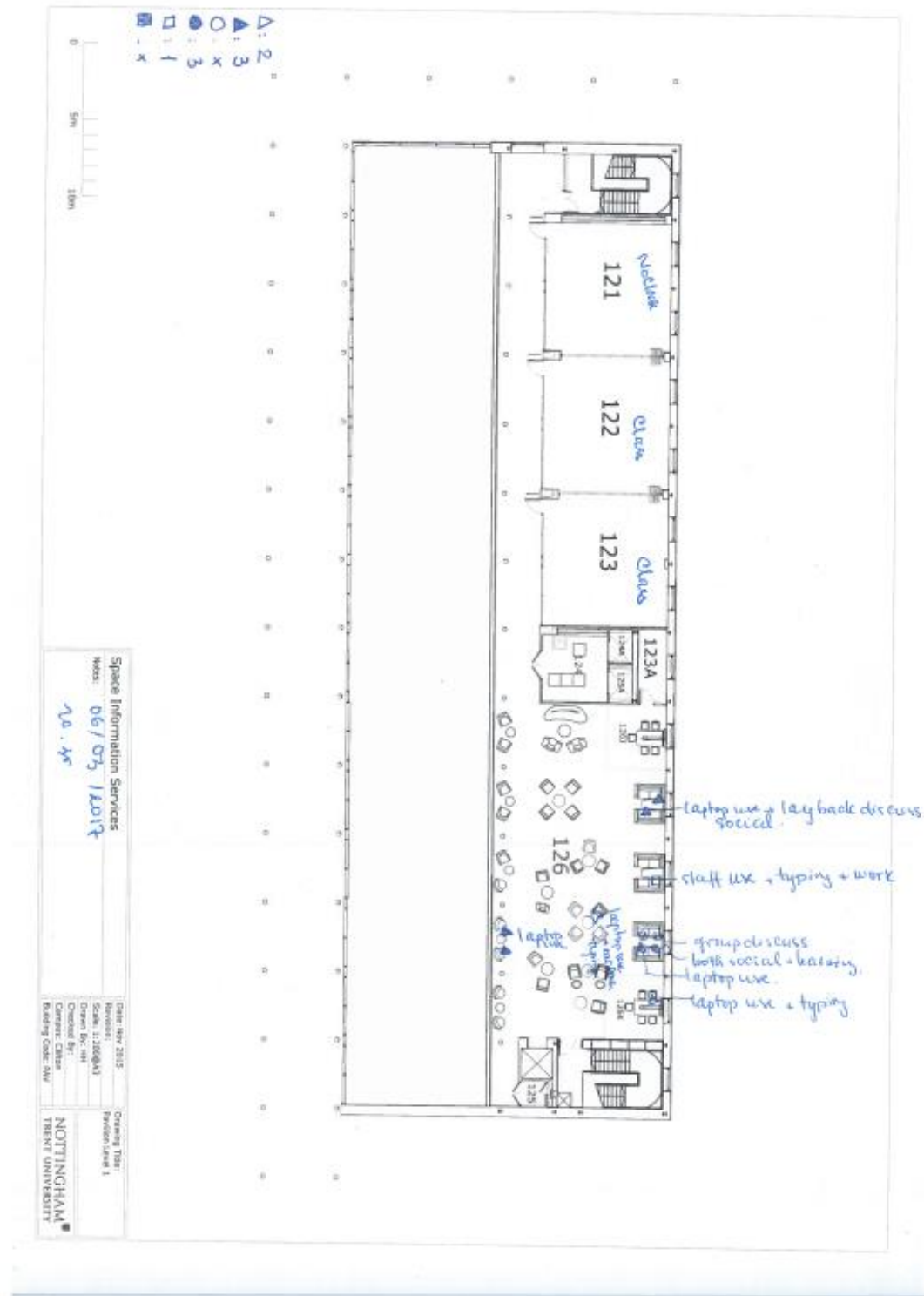
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Appendix 1a: Example of observation sheet for the case study 1-UoN





[illegible]



Appendix 2a: Questionnaire form for piloting study

Questionnaire sheet (version 1)

Please indicate whether you are:

- ☐ University staff
- ☐ Student:
- ☐ 1st year (Course:.....)
 - ☐ 2nd year (Course:.....)
 - ☐ 3rd year (Course:.....)
 - ☐ 4th year (Course:.....)
 - ☐ Postgraduate (Course:.....)
- ☐ Visitor

I. Perception of spatial quality

Please indicate your perception about the design of this space

1. How do you rate the design character, image and response to the context of this space? (i.e. the space has its own character and relates well to its context)

☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable	Further comment:
---	------------------

2. How do you rate the design quality and appearance of this space? (i.e. the space is visually appropriate, attractive, well designed in terms of shape, material and/or colour, attractive and fit for purpose, providing architectural quality)

☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable	Further comment:
---	------------------

3. How do you rate the design coherence of this space? (i.e. the space and buildings have collective value when seen together and create places which are distinctive and understandable)

☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable	Further comment:
---	------------------

4. How do you rate the legibility of this space? (i.e. The design of this space allows the users to form movement routes easily, and allows an easy understanding of its function)

☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable	Further comment:
---	------------------

5. How do you rate the density, diversity and richness of this space? (i.e. The space has a number of various elements in the scene and promotes a variety of functional choice for users)

☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable	Further comment:
---	------------------

6. **How do you rate the sense of security and safety in this space?** (i.e. the design of this space encourages the sense of a safe environment and promotes occupation for a long duration)

☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable	Further comment:
---	------------------

7. **How do you rate the accessible characteristics of this space (entrances, doors, pathway, etc.)?** (i.e. the space has good connection and is well integrated into the surrounding spaces and buildings)

☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable	Further comment:
---	------------------

8. **How do you rate the flexibility and adaptability of this space?** (i.e. the setting of spaces can easy to be changed to fit with variety purposes of uses)

☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable	Further comment:
---	------------------

II. Use value

9. **How often do you use this space?**

- ☐ Daily (or attempt to use it daily)
☐ Several times per week
☐ Several times per semester
☐ Never use (please specify why)

10. **How many hours per week you might spend in campus?**

.....hours/week (approximately)

11. **How many hours per week you might spend in social learning space (i.e. like this space)?**

.....hours/week (approximately)

12. **Why do you use this space?**

- ☐ Socialising (meeting friends, peers or colleagues)
☐ Meeting and discussion with peers, exchange information
☐ Learning (group work, working on course work alone or with friend)
☐ Refreshment (break, eating or drinking, reading, smoking, using social media)
☐ Social cultural events (research show case, exhibitions, meeting events)
☐ Other comment (please specify)

13. How long would you usually stay in this space?

- ☐ 15min (pass by or may stop for chatting)
- ☐ >1 hour (stay for a short time)
- ☐ >3 hours (stay for a while to work on something)
- ☐ Can be whole day (stay for long time as part of learning time)
- ☐ Other comment (please specify)...

14. How many people do you typically know when you stay in this space?

- ☐ Many friends (≥ 10)
- ☐ Some of my friends (5-9)
- ☐ Few of my friends (1-4)
- ☐ Many Acquaintances (knowing them by sight and or name) (≥ 10)
- ☐ Some Acquaintances (knowing them by sight and or name) (5-9)
- ☐ Few Acquaintances (1-4)
- ☐ None

III. Occupant Satisfaction

15. Please identify your impression of the space

- ☐ Exciting/attractive/cool
- ☐ Welcoming
- ☐ Comforting
- ☐ Safe
- ☐ Bland
- ☐ Unwelcoming
- ☐ Uncomfortable
- ☐ Other(please specify)

16. Overall, how satisfied are you with the configuration of this space?

- ☐ Very high
- ☐ High
- ☐ Medium
- ☐ Low
- ☐ Not applicable

17. Overall, how satisfied are you with the design of this space?

- ☐ Very high
- ☐ High
- ☐ Medium
- ☐ Low
- ☐ Not applicable

18. How does this space meet or exceed your needs as a user?

- ☐ Very high
- ☐ High
- ☐ Medium
- ☐ Low
- ☐ Not applicable

19. How satisfied are you with the comfort this space provides?

- ☐ Very high
- ☐ High
- ☐ Medium
- ☐ Low
- ☐ Not applicable

20. Please rate whether the space provides a positive environment for activities and social interactions?

- ☐ Very high
- ☐ High
- ☐ Medium
- ☐ Low
- ☐ Not applicable

21. Does the design of this space communicate the vision and identity of the academic environment?

-This space represents the vision and identity of the University of Nottingham
☐ Yes ☐ No

-This space represents the vision and identity of the Faculty
☐ Yes ☐ No

-This space represents the vision and identity of the Department
☐ Yes ☐ No

22. How do you rate how this space promotes your sense of belonging to the academic environment?

- ☐ Very high
- ☐ High
- ☐ Medium
- ☐ Low
- ☐ Not applicable

To which of the below does this space promote your sense of belonging to:

- ☐ University
- ☐ Faculty
- ☐ Department

23. Please describe any other comments about the space below (if applicable)

.....

.....

.....

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.....

.....

Thank you for taking time to answer these questions

Appendix 2b: Questionnaire form at The University of Nottingham

Questionnaire sheet (version 2)

Name of the space: ☐ <i>ESLC Social learning space</i> ☐ <i>Telford Exhibition Hall</i> ☐ <i>Coates Cafe</i> University: <i>University of Nottingham</i> Investigated date:...../...../201..	 The University of Nottingham UNITED KINGDOM · CHINA · MALAYSIA
--	---

I. Please indicate whether you are:

- ☐ University staff
- ☐ Student:
 - ☐ 1st year (Course:.....)
 - ☐ 2nd year (Course:.....)
 - ☐ 3rd year (Course:.....)
 - ☐ 4th year (Course:.....)
 - ☐ Postgraduate (Course:.....)
- ☐ Visitor

II. Please indicate how you have used this space

1. How often do you use this space?

- ☐ Daily (or attempt to use it daily)
- ☐ Several times per week
- ☐ Several times per semester
- ☐ Never use (please specify why).....
.....

2. How many hours per week you might spend in campus?

.....hours/week (approximately)

3. How many hours per week you might spend in social learning space (i.e. like this space)?

.....hours/week (approximately)

4. Why do you use this space?

- ☐ Socialising (meeting friends, peers or colleagues)
- ☐ Meeting and discussion with peers, exchange information)
- ☐ Learning (group work, working on course work alone or with friend)
- ☐ Refreshment (break, eating or drinking, reading, smoking, using social media)
- ☐ Social cultural events (research show case, exhibitions, meeting events)
- ☐ Other comment (please specify)

5. How long would you usually stay in this space?

- ☐ 15min (pass by or may stop for chatting)
- ☐ >1 hour (stay for a short time)
- ☐ >3 hours (stay for a while to work on something)
- ☐ Can be whole day (stay for long time as part of learning time)
- ☐ Other comment (please specify).....

6. How many people do you typically know when you stay in this space?

- ☐ Many friends (≥ 10)
- ☐ Some of my friends (5-9)
- ☐ Few of my friends (1-4)
- ☐ Many Acquaintances (knowing them by sight and or name) (≥ 10)
- ☐ Some Acquaintances (knowing them by sight and or name) (5-9)
- ☐ Few Acquaintances (1-4)
- ☐ None

III. Please indicate your perception about the design of this space

7. How do you rate the design character, image and response to the context of this space? (i.e. the space has its own character and relates well to its context)

☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable	Further comment:
---	------------------

8. How do you rate the design quality and appearance of this space? (i.e. the space is visually appropriate, attractive, well designed in terms of shape, material and/or colour, attractive and fit for purpose, providing architectural quality)

☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable	Further comment:
---	------------------

9. How do you rate the design coherence of this space? (i.e. the space and buildings have collective value when seen together and create places which are distinctive and understandable)

☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable	Further comment:
---	------------------

10. How do you rate the legibility of this space? (i.e. The design of this space allows the users to form movement routes easily, and allows an easy understanding of its function)

☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable	Further comment:
---	------------------

11. How do you rate the density, diversity and richness of this space? (i.e. The space has a number of various elements in the scene and promotes a variety of functional choice for users)

☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable	Further comment:
---	------------------

12. How do you rate the sense of security and safety in this space? (i.e. the design of this space encourages the sense of a safe environment and promotes occupation for a long duration)

☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable	Further comment:
---	------------------

13. How do you rate the accessible characteristics of this space (entrances, doors, pathway, etc.)? (i.e. the space has good connection and is well integrated into the surrounding spaces and buildings)

☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable	Further comment:
---	------------------

14. How do you rate the flexibility and adaptability of this space? (i.e. the setting of spaces can easy to be changed to fit with variety purposes of uses)

☐ Very high ☐ High ☐ Medium ☐ Low ☐ Not applicable	Further comment:
---	------------------

IV. Please indicate your satisfaction about this space

15. Please identify your impression of the space

- ☐ Exciting/attractive/cool
- ☐ Welcoming
- ☐ Comforting
- ☐ Safe
- ☐ Bland
- ☐ Unwelcoming
- ☐ Uncomfortable
- ☐ Other (please specify).....

16. Overall, how satisfied are you with the configuration of this space?

- ☐ Very high
- ☐ High
- ☐ Medium
- ☐ Low
- ☐ Not applicable

17. Overall, how satisfied are you with the design of this space?

- ☐ Very high
- ☐ High
- ☐ Medium
- ☐ Low
- ☐ Not applicable

18. How does this space meet or exceed your needs as a user?

- ☐ Very high
- ☐ High
- ☐ Medium
- ☐ Low
- ☐ Not applicable

19. How satisfied are you with the comfort this space provides?

- ☐ Very high
- ☐ High
- ☐ Medium
- ☐ Low
- ☐ Not applicable

20. Please rate whether the space provides a positive environment for activities and social interactions?

- ☐ Very high
- ☐ High
- ☐ Medium
- ☐ Low
- ☐ Not applicable

21. Does the design of this space communicate the vision and identity of the academic environment?

-This space represents the vision and identity of the University of Nottingham

☐ Yes

☐ No

-This space represents the vision and identity of the Faculty

☐ Yes

☐ No

-This space represents the vision and identity of the Department

☐ Yes

☐ No

22. How do you rate your sense of belonging to the academic environment?

☐ Very high

☐ High

☐ Medium

☐ Low

☐ Not applicable

To which of the below does this space promote your sense of belonging to:

☐ University

☐ Faculty

☐ Department

23. Please indicate your reason of choosing to use this spaces (if applicable)

.....

.....

.....

.....

.....

.....

.....

Thank you for taking time to answer these questions

Appendix 2c: Questionnaire form at Nottingham Trent University

Questionnaire sheet (version 3)

I. Please indicate how you use this space (please tick one item for each question)																																													
1. What is the main purpose of your use? ☐ Social purpose (relaxing, meeting or talking with friends not related to academic work) ☐ Learning purpose (individual study, group work, meeting academic staff or peers) ☐ Both social and learning purpose *(could you approximate how much with % figure: Social:%, Study: %) 2. How often do you use this space? ☐ Daily (or attempt to use it daily) ☐ Several times per week ☐ Several times per semester ☐ Several times per year ☐ Never (please specify why) 3. How many hours do you usually stay in this space? (in hours approximately) <table border="1"> <tr> <td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>More than 10</td> </tr> </table> 4. How long would you like to stay in this space if you do not have any schedules or classes? (In Hours approximately) <table border="1"> <tr> <td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>More than 10</td> </tr> </table> 5. How many acquaintances do you typically know in this space? (person you might recognize by sight or name) <table border="1"> <tr> <td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>More than 10</td> </tr> </table> 6. How many friends do you typically know in this space? <table border="1"> <tr> <td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>More than 10</td> </tr> </table> 7. Overall, how satisfied are you with the design of this space? ☐ Very satisfied ☐ Somewhat satisfied ☐ Neither satisfied nor dissatisfied ☐ Somewhat dissatisfied ☐ Very Dissatisfied	0	1	2	3	4	5	6	7	8	9	More than 10	0	1	2	3	4	5	6	7	8	9	More than 10	0	1	2	3	4	5	6	7	8	9	More than 10	0	1	2	3	4	5	6	7	8	9	More than 10	8. Overall, how does this space satisfy your needs as a user? ☐ Very satisfied ☐ Somewhat satisfied ☐ Neither satisfied nor dissatisfied ☐ Somewhat dissatisfied ☐ Very dissatisfied 9. Please rate whether this space provides a positive environment for your interactions with others? ☐ Very positive ☐ Somewhat positive ☐ Neither positive nor negative ☐ Somewhat negative ☐ Negative 10. Overall, how satisfied are you with the comfort of this space ☐ Very satisfied ☐ Somewhat satisfied ☐ Neither satisfied nor dissatisfied ☐ Somewhat dissatisfied ☐ Very Dissatisfied 11. Does this space promote your sense of belonging to the campus-learning environment? ☐ Very high ☐ high ☐ medium ☐ low ☐ Very low To which of the below does this space promote your sense of belonging to: ☐ University ☐ Faculty ☐ Department Please indicate any other comment (if applicable)
0	1	2	3	4	5	6	7	8	9	More than 10																																			
0	1	2	3	4	5	6	7	8	9	More than 10																																			
0	1	2	3	4	5	6	7	8	9	More than 10																																			
0	1	2	3	4	5	6	7	8	9	More than 10																																			

II. Please indicate which of the following activities that you have done in this space (please mark the frequency of activities in the second column)

	Activities	Never 0%	Rarely 25%	Somet imes 50%	Often 75%	very often 100%
Social	☐ Talking with friends (not relate to learning)					
	☐ Using social media not for learning purpose					
	☐ Relaxing (break, eating or drinking)					
Individual study	☐ Using computer for learning purpose					
	☐ Reading handout or course material					
	☐ Doing assignment/course work					
	☐ Using an online learning system to discuss or complete an assignment					
Learning with others	☐ Working with other students on course projects or assignments					
	☐ Explaining course material to one or more students					
	☐ Asking another student to help you understand course material					
	☐ Preparing for exams or assessments by discussing or working through course material with others					
Interact with staff	☐ Asking questions about course material					
	☐ Discussing your academic performance and/or feedback with teaching staff					
	☐ Talking about your career plans with teaching staff or advisors					
	☐ Discussing ideas from your course with staff outside taught sessions, including by email/online					
Networking	☐ Working with teaching staff on activities other than coursework					
	☐ Interacting with others to exchange information					
	☐ Developing professional or social contacts					
	☐ Attending in department/faculty events (research showcase or exhibitions)					
Other (please specify)						

III. Please indicate the degree to which these parameters apply to this space

	Very	Slightly	Fair	Slightly	Very	How does this parameter influence your purpose of using this space as a social space (i.e. interacting with friends and peers)?					How does this parameter influence your purpose of using this space as a learning space (i.e. individual learning or group learning)?				
						1 = very unimportant	2	3	4	5 = very important	1 = very unimportant	2	3	4	5 = very important
A. Comfort															
Noise level of this space	Quiet				Noisy	1	2	3	4	5	1	2	3	4	5
Temperature	Warm				Cold	1	2	3	4	5	1	2	3	4	5
Artificial lighting of this space	Very poor				Very good	1	2	3	4	5	1	2	3	4	5
Natural lighting of this space	Very poor				Very good	1	2	3	4	5	1	2	3	4	5
Comfort of furniture	Uncomfortable				Comfortable	1	2	3	4	5	1	2	3	4	5
B. Access															
Location of this space	Inconvenient				Convenient	1	2	3	4	5	1	2	3	4	5
Ease of access to this space	Difficult				Easy	1	2	3	4	5	1	2	3	4	5
C. Appearance															
Volume of this space	Small				Spacious	1	2	3	4	5	1	2	3	4	5
The height of this space	Low				High	1	2	3	4	5	1	2	3	4	5
Shape of this space	Ugly				Beautiful	1	2	3	4	5	1	2	3	4	5
Material of spaces	Very poor				Very good	1	2	3	4	5	1	2	3	4	5
Colour of this space	Dark				Bright	1	2	3	4	5	1	2	3	4	5
The view outside of this space	Unpleasant				Pleasant	1	2	3	4	5	1	2	3	4	5
D. Technology															
Computers and printers access	Very poor				Very good	1	2	3	4	5	1	2	3	4	5
Laptop support	Very poor				Very good	1	2	3	4	5	1	2	3	4	5

IV. Please indicate the degree to which these parameters apply to this space:

Please mark your perception about this space on the scale below A. well design- place attachment	How does this parameter influence your purpose of using this space as a social space (i.e. interacting with friends and peer)?				How does this parameter influence your purpose of using this space as a learning space (i.e. individual learning or group learning)?					
	very	slightly	fair	slightly	very	1 = very unimportant	2	3	4	5 = very important
Attractiveness	Unattractive				Attractive	1	2	3	4	5
The space has its own identity	General				Unique	1	2	3	4	5
Welcoming (e.g. degree of familiarity with the space)	Unfamiliar				Familiar	1	2	3	4	5
Complexity of the design elements	Simple				Complex	1	2	3	4	5
Cohesiveness (similarity) of the design elements in this space	Chaotic				Orderly	1	2	3	4	5
Ease of understanding function of the space	Difficult				Easy	1	2	3	4	5
Interesting environment (e.g. the perception that entering this space would lead to increased interaction or learning interest)	Boring				Interesting	1	2	3	4	5
The degree of privacy in this space	Too Private				Too Public	1	2	3	4	5
Easy to control the space	Difficult				Easy	1	2	3	4	5
Enclosure of the space	Expose				Enclose	1	2	3	4	5
Degree of ownership	Low				High					
Visual appropriateness for its use	Not appropriate				Appropriate	1	2	3	4	5
Sense of safety in this space	Unsafe				Safe	1	2	3	4	5
Flexibility and adaptability (i.e. Easy to change to fit with variety of use)	Difficult				Easy	1	2	3	4	5

V. Background information

1. Please indicate whether you are:

- ☐ University staff ☐ Visitor ☐ Student
 o 1st year (Course:.....)
 o 2nd year (Course:.....)
 o 3rd year (Course:.....)
 o 4th year (Course:.....)
 o Postgraduate (Course:.....)
 ☐ Male ☐ Female
 ☐ Home student ☐ International
 ☐ Full time ☐ Part-time
 Age: ☐ <18 ☐ 18-20 ☐ 21-25 ☐ >25
 ☐ Living in campus
 ☐ Living in off campus

2. Do you consider yourself as a regular

user of social learning spaces? (Spaces designed for socialising, group or individual work outside formal classrooms or lecture theatres etc: Telford Exhibition Hall, Coates Café, ESOL social learning spaces, Coates design studio...)

- ☐ Yes ☐ No

3. In total, how many hours per week do you spend in all social learning spaces on campus?

hours/week (approximately)

4. Overall, What is your perception about the design of social learning spaces on this campus?

	Very bad	Bad	Neutral	Good	Very Good
Very bad	☐	☐	☐	☐	☐

4. Can you specify in which social learning space on campus you spend most time?

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	5
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Thank you for taking time to answer these questions!

To what extent do you agree or disagree with the following statement	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
Overall, I am satisfied with my experience in this degree program	☐	☐	☐	☐	☐
I found my studies intellectually stimulating	☐	☐	☐	☐	☐
I feel part of a group of students and staff committed to learning	☐	☐	☐	☐	☐
I have learned to explore ideas confidently with other people	☐	☐	☐	☐	☐
I feel I belong to the university community	☐	☐	☐	☐	☐
I am able to explore academic interests with staff and students	☐	☐	☐	☐	☐
I have not considered discontinuing my studies on this degree	☐	☐	☐	☐	☐
I feel I made the right decision in choosing to study this degree	☐	☐	☐	☐	☐
I am confident of passing all of my units of study this semester	☐	☐	☐	☐	☐
How much time do you spend:	never	rarely	sometime	often	very often
Working with students outside of class	☐	☐	☐	☐	☐
Working with students inside of class	☐	☐	☐	☐	☐
Discussing ideas from your class with other students	☐	☐	☐	☐	☐
Discussing ideas from your courses with staff outside the class	☐	☐	☐	☐	☐
How much do you believe UoN has	Very untrue	Untrue	Neutral	True	Very true
Provided you support in socialising	☐	☐	☐	☐	☐
Helped you to cope with non-academic responsibilities	☐	☐	☐	☐	☐
Provided you support to succeed academically	☐	☐	☐	☐	☐

Appendix 3a: Guided questions for Focus group

Guide questions for the Focus Group



Research project: The role of social learning spaces for the student experience at the University of Nottingham and Nottingham Trent University

Participants will be asked to discuss about the following series of open-ended questions, with more detailed questions to explore each issue in greater depth:

1. Open Question: How the social learning spaces have play the role in your study?

Probing questions:

- ✓ How did you use the social learning space?
- ✓ What are you usually doing in social learning spaces? Do you have your intention before come to the social learning space?
- ✓ Do you feel it helpful to your study process? How the experience in social learning spaces had contributed to your study process?
- ✓ What would affect your choice of using social learning spaces? And why?
- ✓ How you schedule yourself around the social learning spaces in engineering faculty such as Telford Exhibition Hall, ESLC, Coates Café, and George Green Library?

2. Open Question: How the design of social learning space would meet your need?

Probing questions:

- ✓ What make you like/dislike about the design of social learning space in engineering faculty such as Telford Exhibition Hall, ESLC, Coates Café, and George Green Library? And why?
- ✓ Could you describe some good and bad experience in some of social learning spaces in engineering faculty?
- ✓ Do you think the number of social learning spaces in engineering faculty has satisfied the need of students?
- ✓ How the spaces should be changed to meet your need as the users?

3. Open Question: How the comfort of the social learning space would support your activities?

Probing questions:

- ✓ What will make you (not) comfort to stay for long time/ or have a discussion/interact with friends? (In term of lighting, noise, distraction, temperature, comfortable, function of the furniture)

4. Open Question: How the quality of the design of social learning space would support your activities?

- ✓ What do you think about the flexible furniture, movable tables and chairs or white board in social learning space?
- ✓ Whether it should have vibrant colour? Soft material or any other requirements?
- ✓ How the space can be easy for you to use?
- ✓ What make you feel secure and safe in the social learning space?
- ✓ Do you think social learning space should include the food area, printer, and computer?
- ✓ Do you think it should include mixed between relax and learning functions?
- ✓ Ask about identity?

5. Open Question: How the social learning spaces would best provide you a positive environment for interactions and create the sense of community?

Probing questions:

- ✓ How the design would encourage you easily to talk with your friends?
- ✓ What do you think about the learning community of the engineering? Do you feel belong to that?
- ✓ To what an extent, how the use of social learning space would help you involve in the university, faculty and department community?

6. Open Question: What is the successful of social learning space in your perspective?

- ✓ What your idea of social learning would be in the future?
- ✓ Would you like to involve in the design process of these space? Do you think this will help to improve the quality of the design?
- ✓ Do you think the new developing of social learning space will improve the student's experience?

Appendix 3b: Focus group form at The University of Nottingham

<i>Focus group participant information</i> <i>Case study: Social learning spaces in Engineering Faculty</i> <i>University of Nottingham</i> <i>Focus group date:/...../2016</i>	 The University of Nottingham UNITED KINGDOM • CHINA • MALAYSIA
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Name of participant:

Your name would appear in the research as: Ms/Mr

Email:

Please indicate whether you are:

☐ 1st year (Course:.....)	☐ Male	☐ Female
☐ 2nd year (Course:.....)	☐ Home student -	☐ International
☐ 3rd year (Course:.....)	☐ Living in campus hall	☐ Living in private house
☐ 4th year (Course:.....)	Age ☐ <18 - ☐ 18-20- ☐ 21-25 - ☐ >25	
☐ Postgraduate (Course:.....)	☐ Full time	☐ Part-time

1. What is the role of the social learning spaces in your study?

1. How often do you use Coates Design Studio?

0	1	2	3	4	>5
---	---	---	---	---	----

Times/ week



2. How often do you use Telford Exhibition Hall?

0	1	2	3	4	>5
---	---	---	---	---	----

Times/ week



3. How often do you use Coates Café?

0	1	2	3	4	>5
---	---	---	---	---	----

Times/week



4. How often do you use ESLC Social Learning space?

0	1	2	3	4	>5
---	---	---	---	---	----

Times/ week



➤ Could you rank your favourite space (1:most favourite----4 least favourite?)

Rating	Spaces	Reason?
	Coates Design Studio	
	Telford Exhibition Hall	
	Coates Café	
	ESLC Social Learning space	

➤ How you schedule yourself around the social learning spaces in Engineering Faculty? What would affect your choice of using social learning spaces?

.....

➤ What is your intention before coming to the social learning spaces? What are you actually doing?

.....

- How the experience in social learning spaces has contributed to your study? Do you think it helpful? How it link to your study?
-
-

2. How the design of social learning spaces would meet your need?

- ✓ What make you dislike about the design of social learning space in engineering faculty such as Telford Exhibition Hall, ESLC, Coates Café, and Coates design studio? And why?

Bad Service. Hate it. Spread it.



- ✓ Could you describe some good and bad experience in some of social learning spaces in engineering faculty?
- ✓ Do you think the number of social learning spaces in engineering faculty has satisfied the need of students?

3. How the quality of the design of social learning spaces would effect on your choice of using them?

- ✓ What do you think about the flexible furniture, movable tables and chairs or white board in social learning space?
- ✓ Whether it should have vibrant colour? Soft material or any other requirements?
- ✓ Do you have difficulty in way findings in the social learning spaces? Do you find any difficulty in understanding it function of use? Are these factors important to your choice of using the spaces?
- ✓ What make you feel secure and safe in the social learning space? Do you like a crowded spaces?
- ✓ What do you think about mixed functional of use (spaces should include food areas, printers, and computers..etc)?

- ✓ What do you think about the accessibility to these spaces? Would you prefer to them to link together? How far it could be convenient to you to use it?

- ✓ What do you think about the identity of the social learning spaces in engineering? Do you have any strong impression about these spaces? Could you describe particular favourite social space (it may not be in the faculty)?



4. How the comfort of social learning space would support your activities?

- What make you not comfort to stay for long?(temperature, noise, lighting..)

- Do you feel distraction in the social learning space? How you it could affect your choice of using these space?



5. How the social learning spaces would best provide you a positive environment for interactions and create the sense of community?

Probing questions:

- ✓ How the design would encourage you easily to talk with your friends?

- ✓ Have you accidental meet friends in the social learning spaces? What do you think about the idea of learning along with your friends or just like to be alone?

- ✓ What do you think about the learning community of the engineering? Do you feel belong to that?



- ✓ To what an extent, how the use of social learning space would help you involve in the university, faculty and department community?



6. What is the successful of social learning space in your perspective?

- What is your idea of social learning spaces should be designed?

- Do you think the design of social learning space is important to the student's learning experience?



- What would be changed to improve the design quality of these spaces?



Oldenburg's (1991) definition of social learning space, "a physical and/or virtual area that is not predominantly identified with either social or work/study perspectives but transcends both and facilitates both formal and informal student centred collaborative learning" (2002).

Appendix 3c: Focus group form at Nottingham Trent University

<i>Focus group participant information</i>	 The University of Nottingham UNITED KINGDOM • CHINA • MALAYSIA
<i>Case study: Social learning spaces in the NTU –Clifton Campus</i>	
<i>Focus group date:/...../2017</i>	

Name of participant:

Your name would appear in the research as: Ms/Mr

Email:

Please indicate whether you are:

☐ 1st year (Course:.....)			
☐ 2nd year (Course:.....)			
☐ 3rd year (Course:.....)			
☐ 4th year (Course:.....)			
☐ Postgraduate (Course:.....)			
☐ Male	☐ Female	☐ other	
☐ Home student	☐ International		
☐ Living in campus hall	☐ Living in private house		
Age ☐ <18	☐ 18-20	☐ 21-25	☐ >25
☐ Full time	☐ Part-time		

1. What is the role of the social learning spaces in your study?

- ✓ How you schedule yourself around the social learning spaces in this campus? What would affect your choice of using social learning spaces?

.....

- ✓ What is your intention before coming to this space? What are you actually doing?

.....

- ✓ How these activities you do in here do has contributed to your study? Do you think it helpful? How it could link to your study?

.....

2. How the design of social learning spaces would meet your need?

- ✓ What make you dislike about the design of social learning space in this campus? And why?

- ✓ Could you describe some good and bad experience in some of social learning spaces?

Bad Service. Hate it. Spread it.



- ✓ Do you think the number of social learning spaces has satisfied the need of students? What need to be added into these spaces?

- ✓ Do you use or perceive this space differently in the 1st and 2nd semester? How about in different season autumn, spring and summer?

3. How the quality of the design would effect on your choice of using these spaces?

- ✓ What do you think about the physical aspects of the spaces? (*such as noise, temperature, lighting, comfortable furniture, location, access, volume of the space, height, shape, material, colour, view*)
- ✓ What do you think about IT support of these spaces such as computers, printer, laptop supports, and plugin?
- ✓ What do you think about the intangible aspects of the design? (*such as attractiveness, identity, welcoming, complexity, cohesiveness, interesting, privacy, and the feel of ownership, visual appropriate, safety and security, flexibility*)
- ✓ Which of these aspects will encourage you working more or increase you learning better?
- ✓ Which of these aspect will encourage you like to use these spaces as social spaces?
- ✓

4. Why you choose to work on learning activities in specific space?

Example: What make you not comfort to stay for long?
 (Temperature, noise, lighting...)

Do you feel distraction in the social learning space?

How you these could affect your choice of using these spaces?



5. Do you think the spaces such as the Pavilion will make you feel more support from the university?

- ✓ Does it make your image about the University is better?
- ✓ Do you feel better when you doing your work here instead of doing work at home?
- ✓ To what an extent, how the use these spaces help you feel easy to involve in the university, faculty and department activities?



6. What is the successful of social learning space in your perspective?

- ✓ What is your idea of social learning spaces should be designed? 
- ✓ Do you think the design of social learning space is important to the student's learning experience?
- ✓ What would be changed to improve the design quality of these spaces?



Thank you so much for your discussion



Reference: Oldenburg's (1991) definition of social learning space, "a physical and/or virtual area that is not predominantly identified with either social or work/study perspectives but transcends both and facilitates both formal and informal student centred collaborative learning" (2002).

Appendix 3d: Call for participants

CALL FOR PARTICIPANTS

Task

Participants will be requested to spend around **1.5 hours** in the focus group of **4-5 students** to discuss 6 main them questions about student experience in the social learning spaces such as : Coates Design Studio, Telford Exhibition Hall, Coates Café and ESLC (see on the back).



Place to do discussion in Telford Hall

Compensation

A small compensation of £10 will be given to acknowledge your time cooperation.

Session selection *(I highly appreciate if you can offer your preferred time)*

Date	15/03/2016	16/03/2016	17/03/2016	18/03/2016
Time slot	12:30-14:00	14:00-15:30	13:30-15:00	13:30-15:00
	15:30-17:00	15:30-17:00	15:30-17:00	15:30-17:00

Contact *(I will email you to confirm the session after collecting your information)*

How often do you use Coates Design Studio ?

1	2	3	4	>4	(times/week)
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How often do you use Telford Exhibition Hall ?

1	2	3	4	>4	(times/week)
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How often do you use Coates Cafe?

1	2	3	4	>4	(times/week)
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How often do you use ESLC ?

1	2	3	4	>4	(times/week)
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Your name :

Your email :

CALL FOR PARTICIPANTS

DISCUSSION OF STUDENT EXPERIENCES IN SOCIAL LEARNING SPACES ON



First space : Coates Design Studio A1



Second space : ESLC (Engineering Science Learning Centre)



Third space : Telford Exhibition Hall



Fourth space : Coates Cafe

Appendix 4: Question of the Semi-structured Interview

Question of the Semi-Instructed Interview



Research project: The role of social learning spaces for the student experience at the University of Nottingham and Nottingham Trent University

Participants will be asked the following series of open-ended questions, with more detailed 1uestions to explore each issue in greater depth:

1. Open Question: Could you describe what values your design is intended to express, and why these are important?

Probing questions:

- ✓ What were the significant objectives that drove the initial concept and its development?
- ✓ Is there promotion of particular idea important in your work? If so, what ideas are you interested in and why?
- ✓ Would you describe your design approach as being applied in this project? Does the approach work well in practices?
- ✓ How does the design quality applied in your work (for example as character respond to the context, quality and appearance of the furniture, coherence, legibility, diversity and mixed use, security and safety, accessible, flexibility and adaptability, location....)?

2. Open Question: Could you explain who you consider the users of your project are, and how their needs or expectations influence your work?

Probing questions:

- ✓ How do you define or classify the users of your design?
- ✓ Do you undertake any work (research / consultation) to find out who your product users are, how they engage with your work and what they like or dislike?
- ✓ Do you have received any special request or feedback from the users about the project before taken the design process?

- ✓ Do you take an interest in student learning experience? Do students have any special requirements for the design? Did the users play the role in the design process and how?

3. Open Question: Could you describe how you produced the design in terms of the conventional opportunities and/or constraints that affect your practice?

Probing questions:

- ✓ What sources (books, design example, theory, people and organizations) did you draw upon to inform your work?
- ✓ How did you make compositional decisions such as which stories to tell, what forms and/or materials, colour to use, how symbolism was used, or how to sequence the final design?
- ✓ Were there any difficulties or limitations working on the project you wish to tell?
- ✓ What is your opinion about the success of the design in use now? Has it functioned as planned?
- ✓ Do you think it should be improve/modified/change in any particular aspect?

4. Open Question: What do you think about the design of social learning space should be in the future (to an extent)?

Probing questions:

- ✓ What the role of social learning space could be in the future?
- ✓ What will contribute to the successful of social learning space in your perspective?
- ✓ What do you think should be a potential framework for the design of social learning space in the future?

