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Mapping the campus learning landscape

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Abstract

Despite its practical and symbolic importance, the role of space in higher education remains under-researched. This study develops an understanding of student experience of the campus as a learning landscape. It is based on 28 participatory walking interviews with students, including the hand drawing of a campus map. Participants tended to see learning as about individual study or working alongside others, and rarely mentioned lectures. The choice of space to study was often shaped by convenience, and appeared to be somewhat static and habitual. There was a lack of exploration and only a limited sense of the benefit of fitting the learning task to the space. Yet students felt a sense of ownership and safety on campus. They actively used the characteristics of space to manage their own attention through studying where there were visible cues to study and controlling distraction.

Introduction

Space remains a relatively neglected topic in Higher Educational research, despite the large investment that universities have made in building in the last few decades (Ellis and Goodyear, 2016). Yet at a number of levels, the built environment of the campus reflects and shapes university life. University buildings symbolically represent the special and serious purpose of the institution (Temple, 2008). The quality and quantity of space for different activities say much about its priorities and identity (Jamieson, 2013). Campus design influences its effectiveness (Temple, 2018) and can influence students' sense of belonging, and their well-being (Kuh, 2005). It also symbolises and instantiates power structures. Building design and furnishing may project assumptions that effectively discomfort and exclude those with non-normative identities be that based on class, gender, ethnicity, disability or any other difference (Costello, 2000; Brook, Ellenwood and Lazzaro, 2015).

Considering more specifically the relation of space and learning, it seems that different learning purposes demand different configurations of space (Beckers et al., 2013). Spaces suitable for group work or individual study are likely to be quite different. Informal learning spaces are increasingly seen as equally important as formal ones, because of the stress on student centred learning (Jamieson, 2013). In this light, the whole campus can be conceived of as a range of spaces suitable for different forms of learning, and so a learning landscape (Barnett and Temple, 2006; Dugdale, 2009) or taskscape (Asher et al. 2017). Throughout a day students might be expected to exploit different features of this landscape for different learning tasks. These could include places off campus, such as cafes (Jamieson, 2013). Given theorisations that emphasise the role of the entire body in cognition, working in different spaces and movement would be likely to produce different thought patterns and so the landscape within which learning happens is critical (O'Loughlin, 2006). These reflections invite us to ask how students make use of the potentially rich resources of the campus and its surrounds to find places for different modes of learning.

The aim of this study was to describe how students use a campus as a learning landscape. More specifically it asked what were students' preferred places to study and why? It also sought to discover students' sense of empowerment and ownership in choosing and shaping the use of space. The data for the study was 28 participatory walking interviews with students on the campus at the University of Sheffield.

Literature review

Beckers et al. (2013) offer a neat conceptualisation of how pedagogic "purposes", learning "processes" and "place" could be thought of relating to each other. Their purpose-process-place framework identifies four alignments:

1. Behaviourism - teacher centred processes – the classroom setting;
2. Cognitivism – self regulated learning – the individual study setting;
3. Social constructivism –students interact with other students – a collaborative setting;
4. Connectivism – students interact with others and resources – informal learning setting.

The authors recognise that the four purposes might not be sharply differentiated in practice. Furthermore, any assumption that students prefer more active styles of learning may not reflect reality (Jessop et al., 2012).

Becker et al.'s (2013) framework is a useful starting point, but the directional arrows in the authors' graphical representation of their model imply that everything is driven by purpose. In fact, the organisation of space often seems to influence, usually constrain, processes and purposes: "Space influences pedagogy" (Jessop et al., 2012: 193). For example, traditional lecture theatre layouts effectively preclude more discursive, social pedagogies. Often the demands of efficient estates management may work against the creation of appropriately flexible learning spaces (Jessop et al., 2012). This prompts us to consider in more depth the relation between the three elements.

If we are thinking about extending the Beckers et al. (2013) framework further, we might also take inspiration from work around the notion of embodied cognition. With its roots in the phenomenology of Merleau Ponty, but increasingly informed by cognitive science, neuroscience and linguistics, this body of work argues that all thinking is embodied. We think with our whole bodies, rather than solely with the brain (Wilson, 2002; O'Loughlin, 2006; Robbins and Aydede, 2009; Shapiro 2017). For example, there is a strong link between walking and thinking. Many authors have said they seek inspiration by walking (Clughen, 2014). Keinänen (2016) found that many academics walk-for-thinking, moving at a particular speed and rhythm that creates a particular form of thinking. Reading too is embodied (McLaughlin, 2015). Reading experiences are influenced by where we read and how our bodies are positioned. What we would understand from a text might vary depending on whether we are reading in a library, on a train, or in the park. The differences in reading of digital books are just one example of the way the physical experience of reading matters (Mangen, 2014). Thus many of the most fundamental cognitive activities involved in study at university are embodied

accomplishments. It follows that all learning is embodied, not just learning to acquire physical skills such as sport (O'Loughlin, 2006). It also follows that the affordances for the body and movement of spaces shape learning possibilities in a potentially profound way. Yet recognition of the importance of the body and space in learning pedagogies, while far from non-existent, is limited especially in Higher Education. Authors such as Lengel and Kuczala (2010) have pointed to the importance of physical movement to memory and learning, while Wagner and Shahjahan (2015) have identified the critical possibilities of embodied cognition in pursuing pedagogies alternative to the mainstream. The current paper shares this interest in viewing learning as more than a cognitive activity.

A perspective on the campus as a learning landscape emphasises the value of different spaces for different learning tasks, but also movement and active physical engagement as aspects of effective learning, even in an academic context. It implies that moving and working in different sorts of space can refresh learning experiences. Exploiting the whole campus as a learning landscape implies not just fitting tasks to spaces, but also exploring movement and the feel of different spaces to think and work in different kinds of way, genuinely allowing students to take to the lead in their learning.

One of the reasons space's role in learning has seemed less interesting is because of the growing importance of the digital. Implicitly the digital is often assumed to mean that learning can happen anywhere, so that place becomes irrelevant. It may be more useful to see the digital and material not as a dualism, but as woven together in a socio-material assemblage (Gourlay and Oliver, 2018). Gourlay and Oliver (2018) explore how students navigate through complex material and digital infrastructures, with their varying affordances, to accomplish their studies. Think of a study group collaborating by meeting in various study rooms or at another moment in the cafe, and also collaborating in multiple online spaces, all with their different affordances. Even when physically together and when they are working with printed material and hand written notes, they might be also sharing a screen or searching on their phones. Learning becomes a coordination of a rich array of affordances, material, social and digital. Learning is messy, mobile, even "nomadic" (Ryberg, Davidsen, & Hodgson, 2018). Thus "'learning landscapes' are not just about physical spaces, but are complicated social networks of people, analogue and digital resources and nonhuman actors."(Gourlay et al., 2015, p. 273). They are not "built pedagogy" (Monahan, 2002), but actively assembled by students, combining spatial affordances with the digital. Such an interpretation is consistent with Nespor's (1994;2003) conception of all material learning objects taking their meaning from their positioning within wider networks of relations. Whereas Nespor stresses the alignments created through the operation of power by discipline or university, Gourlay and Oliver (2018) emphasise fluidity and agency.

While it is true that the role of space in Higher Education has generally been neglected, in libraries there has been a flowering of work about how library space is used and can be improved, often under the user experience (UX) banner (Priestner and Borg, 2016). Ironically this is because despite the rise of the internet and electronic study resources, academic libraries have seen a boom in usage as buildings. Liberated from the need to serve as housing for a vast book and journal collection, libraries have been turned over to create varied study spaces. New conceptualisations of such space have emerged such as the "information commons", where traditional library collections and IT resources are combined in one building, and the "learning commons" where learning units such as academic departments work along with the library and IT (Bennett, 2008). These designs emphasise creating different types of space in one building, flexibility and access to rich technological resources. Bennett (2005) gives emphasis to learning happening among communities of learners, yet other authors have stressed the need to maintain the library as a place of retreat and quiet (Gayton, 2008:60).

Studies of library space use by students have given us a fairly clear picture of student preferences in the design of informal study spaces such as libraries. They value room to spread out, a window for natural light and a view, certain levels of noise, access to learning resources (books, computers, etc), a power source, proximity to friends, comfortable furniture and cleanliness (May and Swabey, 2014; Cha and Kim, 2015). The "Criteria of quality" developed in the TEALS project convincingly identifies a range of factors that contribute to good design, from basic functions and resources, to inspiration (Horn et al., 2014):

- Welcoming and inviting
- Variety of spaces for different users and different uses
- Functional and efficient
- Flexible and adaptable
- Social and people-centred
- Sense of place and inspiration
- Access, safety and security
- Environmental comfort and sustainability
- Integration of technologies
- Positive image and identity

However, creating spaces where students like to learn is not solely determined by the architect of a building, by furnishing and décor, or even by librarian imposed rules on how to behave. It is also shaped by users' choices and practices. Thus, in the context of public libraries, Sequeiros (2011) has

proposed the idea of the reading atmosphere which is created through the agency of users themselves. Cox (2018) has proposed extending this to the notion of the learning atmosphere, which is partly created by students' own behaviour and unspoken agreement about appropriate behaviour. Yet we need to know much more about how such practices are experienced by individuals. For example, Brook, Ellenwood and Lazzaro (2015) explore how architecture, furnishings and expectations of behaviour in academic libraries all potentially conspire to exclude black students. They identify excluding aspects such as classical architecture with its references to Western culture, expectations of quiet behaviour and patterns of placing (usually white) staff in positions of surveillance over space. There are important questions to ask about how spaces are experienced differently based on such factors as ethnicity, gender and sexuality, and disability, especially in an era of concern over differential outcomes for students from a BME background (Equality Challenge Unit, 2017).

Method

Because of the study's aim was to explore students' experiences of learning, a qualitative study based on semi structured interviews was considered to be the most appropriate approach. However, given the focus on space, it was decided to use participatory walking interviews and include an element of map drawing in the data collection. As the name suggests, participatory walking interviews are interviews conducted walking in a place of interest to the research (Kusenbach, 2003; Evans and Jones, 2011; Finlay and Bowman 2017; Riley and Holton, 2017). They are useful for exploring issues such as place, sensory inquiry, embodiment and rhythm (Springgay and Truman, 2018). Increasingly common in social science research, the method has already been used a little in the educational context (Holton and Riley, 2013; Stevenson, 2017; Cox, 2018). By being in the place discussed, relevant thoughts and memories are directly prompted. Given our interest in the embodied nature of learning and student journeys around campus in the context of learning the method was appropriate. It can be seen to empower participants by placing them in charge of the walk and leading the interview itinerary. The content of the interview may focus more on the mundane and less noticed aspects of experience (Holton and Riley, 2017). The interview walk lends the method an element of participant observation. For all these advantages, the interview remains a staged event. There are also practical difficulties in terms of weather and the impact of background noise on the quality of interview recordings. There could also be issues of inclusivity, because basing the interview on walking could effectively exclude some with certain disabilities. However, for this topic the approach seemed fitting. For our study the interviewer accompanied the interviewee on a walk to three of their preferred places of learning (but for practical reasons excluding their home if

mentioned). In each of the spaces visited, interviewees were asked to describe the space, their feeling on entering it, its sensory and affective aspects and about control and sense of ownership.

In addition to using participatory walking interviews, a second innovative aspect of the data collection was that at the beginning of the interview, each participant was invited to make a hand drawn map "of the places that are important to student learning/ study/ 'university work' on a typical day, including any off campus places." They were also asked to "include in the map how you travel between them". Mental or cognitive mapping is well established in fields such as geography and planning since its pioneering use by Lynch (1960) (Curtis 2016). It has been used in studies of schools (McGregor, 2003). It has already had some applications to exploring campus experience (Gieseking, 2013; Gourlay and Oliver, 2018; Yu et al., 2018). It enables the researcher to capture a sense of participants' perception of a physical space, and its relation to their own identity. Combined with actually visiting the places, the map enriches our understanding of their learning landscape. In prompting a non-verbal representation of a place it potentially offers insights that might not be captured by a spoken interview. As with any data collection method there are some issues, such as about participant skills or confidence in drawing and around whether this form of representation reinforces a focus on the visual. Gieseking (2013) gives a comprehensive account of elements in a map that might be analysed. Here our interest was the places students identified and their movements between these spaces.

The study was undertaken at the University of Sheffield, a research intensive university in the UK. Interview participants came from five different academic departments: architecture, chemistry, education, the information school and psychology: representing a wide range of disciplines and some differing pedagogies such as lab based (chemistry) or studio based (architecture). The choice sought to maximise access to participants and exploit the researchers' own inside knowledge about learning in each department because one researcher was based in each of these departments.

A total of 28 such semi structured interviews, roughly six per participating department, was conducted seeking an approximate balance among interviewees between home and international students (12 or 43% international), females and males (18 female or 64%) and UG and PG students (11 or 40% Masters students; 2 PhD students). Participants were recruited by an email broadcast to students in all five departments and then the team member from that department selected from the list of volunteers, seeking to represent in the participants the range of levels of study and to balance home and international students, female and male. The final sample can only be seen as partially capturing the full range of factors shaping use of space, for example, we did not consider impact of part time and mature study. The study was based on obtaining voluntary, informed consent from

participants, and ensuring their confidentiality, and processes of ensuring this were approved by the University of Sheffield ethics review process. Participants were given an Amazon token in recognition of their time.

A thematic approach to interview data analysis was adopted, following the six steps proposed by Braun and Clarke (2006). Interviews were transcribed, then coded, producing 140 codes. We then searched for themes. After a process of reviewing themes to ensure they represented the dataset, themes were named and written up. Two of the main themes are reported here: why spaces were preferred, and degrees of ownership and control over space. The hand drawn maps were analysed by a simple content analysis of occurrences of named buildings to provide an overview. This was combined with a more interpretative analysis to reflect on how representations conveyed the sense of importance or character of buildings, in the context of the interview data.

Findings

Preferred places to learn

The participant drawn maps give us a picture of where students said they learned (Table 1). Maps included a total of 169 buildings, with from 3 to 11 buildings in each map, a mean of 6 per participant. Among the most commonly appearing places were the three "libraries": the Information Commons (IC) (appearing in 89% of maps), the Diamond learning commons (79%) and the more traditional Western Bank library (71%). In addition, the student's home (79%) and the Students' Union (64%) often featured on maps. A similar pattern was found among the three favourite places to learn selected, although the Students' Union was a lot less chosen at this point. Students from three departments (architecture, chemistry and the information school) typically included their own department building on their map. Two did not: education and psychology. A wide range of other academic buildings had a mention on the maps, but this amounted to a total of only 32 out of all the buildings identified, representing a mean of approximately just 1 per person. Although the University of Sheffield campus is integrated with the city, setting aside mentions of home, the number of mentions of non university spaces was low at 7 out of 168 places appearing on the maps (and mentioning approximately 30 unique places, counting "home" as one). Thus the six most mentioned places in the maps (listed in Table 1) represented 76% of all places identified in the maps and were 89% of all favourite spaces for learning.

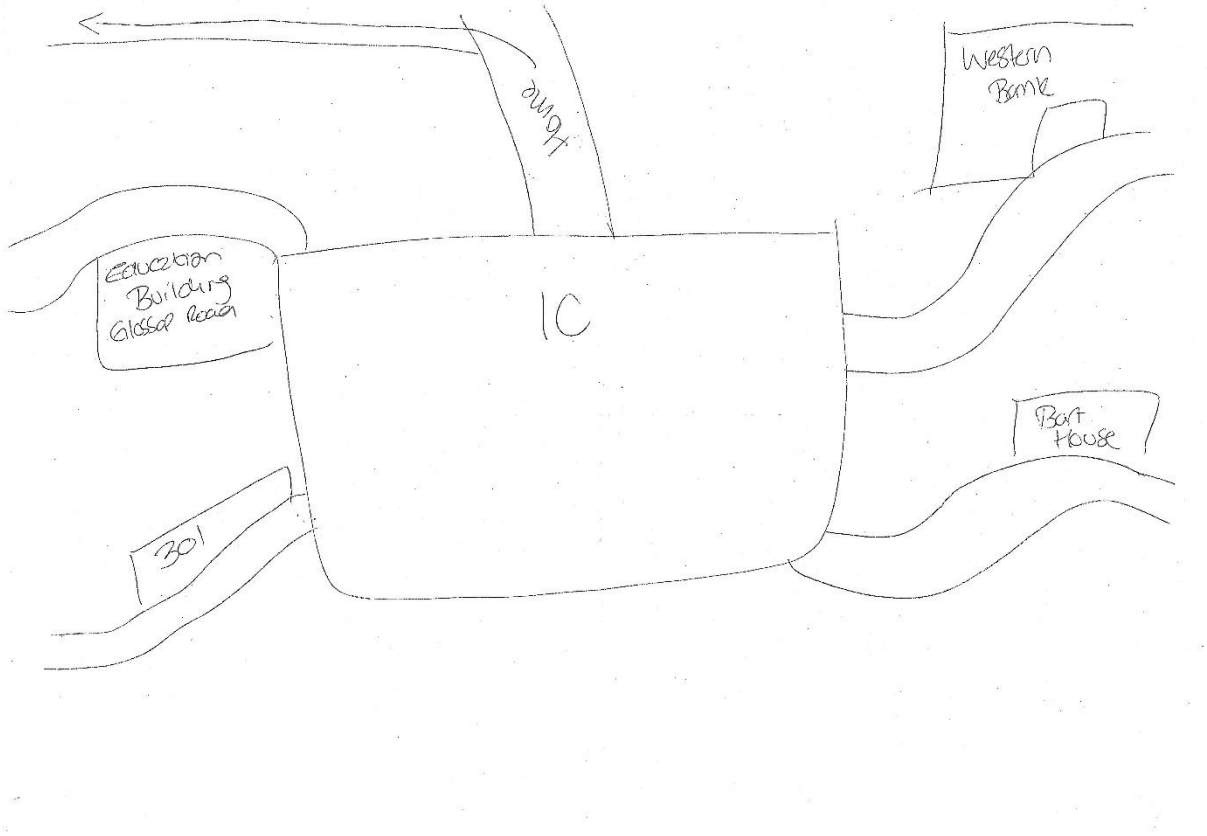
Table 1 Frequency of mention of buildings in participant maps, N=28

	Included on map	Selected as one of 3 favourite places
Information Commons (IC)	25 (89%)	18 (64%)

Diamond (Learning Commons)	23 (83%)	17 (61%)
Western Bank (Traditional library)	20 (71%)	9 (32%)
Students Union	18 (64%)	4 (14%)
Own department building	20 (71%)	13 (46%)
Home	22 (79%)	14 (50%)

The interview briefing had asked students to describe places where they liked to "learn, including where they are taught and where they might learn more informally, e.g. by doing things, working with others or reading." It is surprising, therefore, that their choices revealed that learning was nearly always assumed to mean independent, informal learning: most students chose at least one or two "libraries" as a place they learned. Although, home departments were frequently mentioned by participants from three of the departments, formal learning such as in lecture theatres was mentioned far less across the data, although several students mentioned using video lectures to catch up or revise material in their own time.

Figure 1 An education student's map



Much of what students conceptualised as learning primarily was an individual, internal cognitive process: "*Head down, just writing, just concentrating, by yourself learning*," as one put it.

Nevertheless, learning was seen as social in a number of ways. Working in a library meant doing so in the presence of many others. Learning was often undertaken "alongside others". Such others were as often friends valued for companionship, as course mates to discuss work with.

> *"I normally go with my flatmates… because they are on different courses to me, so I don't get distracted… it is nice to go with people, but if they are on my course I would just be like oh what are you writing for this, this, this, this and I feel more unproductive if I am with people on my course normally."*

Digital connections to others were sometimes maintained, but for times of deeper concentration disconnected:

> *Sometimes I leave my phone on and sometimes I don't. It does depend how urgent the work is, whether it is exams, how much I want to succeed, but it definitely benefits me if I don't contact people. But you know if I do it will be friends and family. Yes and sometimes I suppose, if it is in a revision period, it might be talking to other people, messaging about questions and answers and then often in my case checking answers on group chat. And not really contributing but checking that what I am doing makes sense.*

Group work as such was often more carefully planned in a booked room at a specific time.

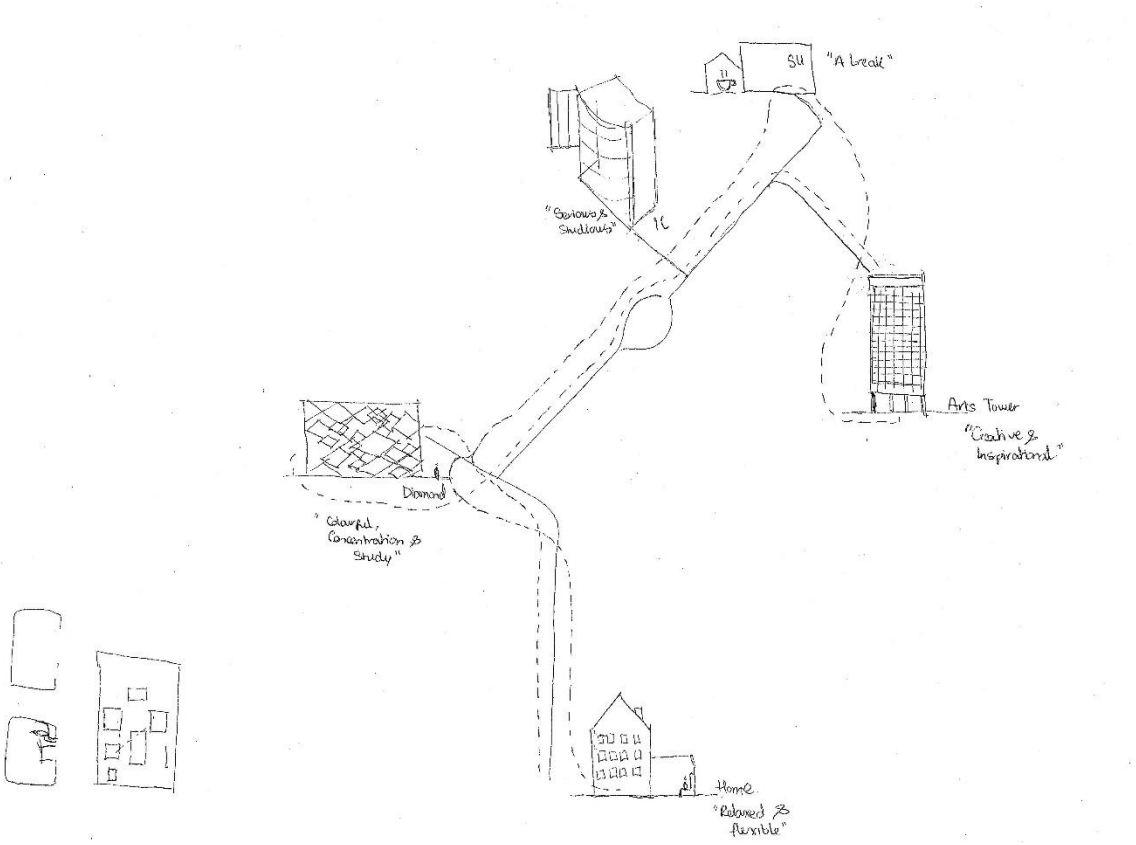
Learning was often referred to as 'work' and seemed to be treated as a job, which was further reflected in descriptions of space as 'office-like', blandly practical, or corporate: *"it is a typical office, office space so it is office lighting and I can't say anything about the decoration… it is some kind of office style so no specific decorations. So it is a very practical space."* Students said they studied quite long hours: *"I used to be here for straight like 24 hours… now if I come here I am here for not less than 10 hours, mostly"*. The impression across the interviews was of students being hard working.

Space and materiality mattered in the choice of where to learn. Students did not learn just anywhere; choices of space were important. Buildings and spaces each had a strong identity and were not interchangeable. Students often had strong emotional associations with certain spaces, both positive and negative, linking them with success, hard work or stress. These feelings often manifested at the moment of crossing the threshold with the anticipation of what was to come, or memories of previous experiences in the space:

"When I get in here, I am like, oh I need to do as much work as possible, as fast and I need to spend a lot of time, it brings back memories where I did all-nighters here and it is just, a bit stressful."

"It scares me a little bit only because I know when I am in here I have got some exams and some deadlines to fill, but it makes me feel a lot better because you know you are going to be productive in here, like whenever you leave I always feel really good, because I have done loads of work or people are going to make me work and I won't waste my time"

Figure 2 An architecture student's map



For one student, this association with hard work and success appeared to allow them to think differently about their work:

"When I am working in here I feel like, I feel very motivated to be honest. Very motivated and like I can do it… Even if I am stuck with something and I can't really understand and stuff I feel like I can do it."

As previous research mentioned above has discovered there was a wide range of individual difference in preferences for learning spaces. Students considered various factors when selecting a

space such as the level of noise, number of other people, lighting, digital connectivity, and potential for distractions. Some said they needed silence, while others found a *"studious buzz"* more conducive to learning. Visual cues were important to some, such as an inspiring view, material related to their subject, or even material not related to their subject: *"Even [if] we are not from the astronomy physics we still have very curious about outer space. They have a lot of star, a lot of anyway beautiful picture on here… make me study hard that we can change the world in the future."* Lighting was mentioned by some as a way to stay awake or to keep focus: *"I like the place that has a lot of light… I generally look for like the brightest place in a house or in a room or wherever I am. Yes, I always find it just makes me more focussed somehow."*

Yet even if they were demanding about qualities that would make a good space, student choice of space was often driven by convenience and a desire to avoid long journeys. The weight of books and laptops partly shaped movement. Despite the increasing use of digital resources, physical resources still seemed to be important to students. Many chose places for independent learning near books that were relevant to their course, and in general they avoided carrying books. Notes, stationery, and food and drink were also carried by many, as well as computers or tablets. Their capacity to carry all the materials required for a day on campus influenced where they went to study:

> *"Sometimes I don't bring my laptop charger and then I have to go home early because my laptop has died… I have to prioritise… I think I would rather bring lunch than a laptop charger… I can't always bring all of my notes because there is just so many in so many different plastic wallets… it just won't fit in my bag, so sometimes I might think oh I will do that work and then I think actually well I haven't actually got everything I need with me to do that work so I can't do that work."*

Students' choice of space was also strongly defined by habit. They had a few favourite places, and stuck to them. There was little evidence of wandering or exploration. The maps often included roads and pathways, but these tended to suggest rather routinized, purposive behaviours (Figures 2,3). *"I am really particular… first floor in that little area just behind the stairs, I like to be in that area there… I might be a bit of a stickler for habit."* The pressure of competition for space was brought up repeatedly and was a factor in choosing one location over another. One student stated that *"the IC is kind of notorious for not being able to find a space"* and another had *"learnt when to come in, it is better but I think in the first couple of years it just seemed like there was always a thousand people here and you were the only person who didn't have a seat".*

Figure 3 An information School student's map

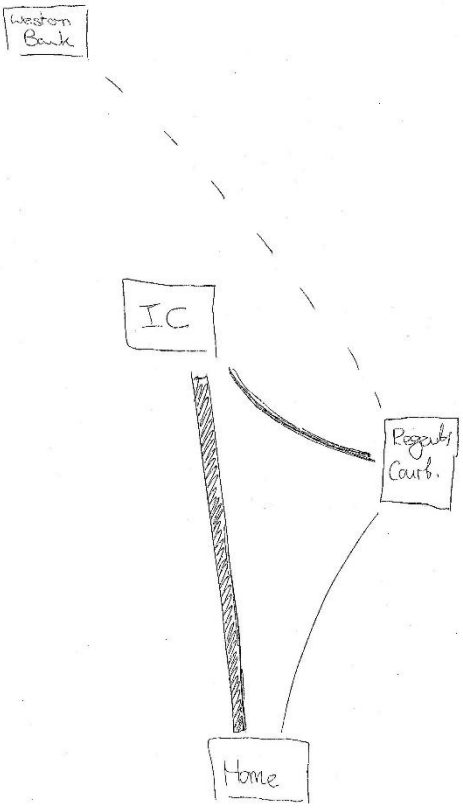
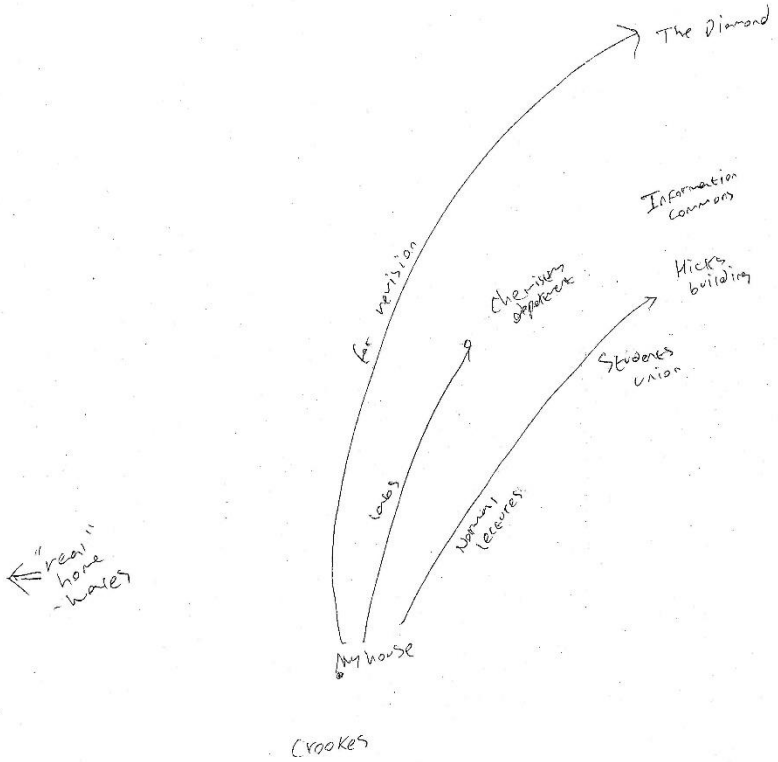


Figure 4 A Chemistry student's map



The task that students were undertaking, or the current stage of that task, also had some influence on their choice of location, although this correlation did not seem to be very fine grained. Figure 4, for example is a map illustrating three types of regular pathway, for "normal lectures", "labs" and "for revision".

> *"If I have different assignments I will choose to move because I have some habits like if I write essay I need a silent space to write… it is benefit for me to thinking. If I just search some information or do my design I will like to listen to music and I will have earphones so I will study in noise room like the second floor."*

> *"It depends where I am, at what point I am in the assignment… if I am just starting I struggle a little bit to get going so I tend to go in the IC, I get going in the IC but then when I am at a certain stage I can go home, and work on it from home."*

Participants therefore demonstrated some agency in matching study habits to space, but this was not very fine grained.

Ownership and control

Students felt they had ownership of the space they used, such as the libraries. In many cases a sense of student ownership came out strongly, but usually referring to the student body as a whole, and rarely to particular groups of students. Popular independent study spaces such as libraries and the learning commons were seen as belonging to *"all students."*

Due to construction and redevelopment two departments, Education and Psychology, had recently been rehoused in places which were not seen as convenient or suitable for students. Both were somewhat distant from the campus in city centre spaces. Some felt their department was *"not for students, it is only for staff, for teachers and for personnel"*. As a result, students in these cases only visited the department when absolutely necessary and avoided making the journey for voluntary activities such as drop-in sessions. Students often had lectures outside their own department, in a range of buildings around campus. In general, this reduced the sense of departmental identity to spaces.

Students from the three other departments did mention their home department. In particular, departmental space was highly valued in the School of Architecture which had a large amount of space dedicated for students to work in. This was rather distinctive, with large tables and space to create models and store materials: *"the Arts Tower is… almost tailor made for architecture, so the setup in the IC* [Information Commons] *is mainly sort of working at a desk and not being able to sort*

of spread out and draw, whereas the Arts Tower is much more geared towards that kind of thing." Students from this department expressed a clear sense of identity and belonging to their department, and a strong sense of ownership over their space:

> *"I feel very proud at first because when I come to Sheffield at first semester if other people ask which department are you I mentioned I am in Architecture department and they say that's Arts Tower yes, I think maybe many excellent student go in Arts Tower or you know architecture department so I feel very proud."*

Students seemed to feel implicitly safe in the spaces they chose, both in terms of their physical safety and that of their belongings: *"I am not bothered, I will just leave my laptop… no one is going to take [it]… I can just leave my paper and stuff because I just don't see why anyone would take it. It is like quite a trusting environment".* However, although students expressed a strong sense of ownership over the space, surprisingly they did not often make changes to the space itself while they were in it. For example, they rarely moved furniture unless instructed to do so by a member of staff: *"they tell us to move it so if they are looking for a certain layout, then they tell us that they want it. And we just like start doing that."*

If students did not actively reorganise space they used, they did control their own learning by choosing places that had the appropriate cues to promote concentration. Concentration, focus and the need to manage distraction came up frequently in students' discussion of their preferred spaces for learning:

> *"If I am working on my own and then I am not going to speak to anyone anyway it is easier to be in a silent environment compared to people chattering away because it does like build up to have noise. I always work with my headphones in, anyway so, can kind of enter your own little world and concentrate on what you are doing."*

> *"It can be like a bit crowded and a bit busy in the IC… there is just lots going on it can be a bit distracting."*

In the battle for concentration they chose places that offered *"studious cues"* such as the presence of books, computers, or digital screens*: "it is a library, it is a dedicated study space… we have got all the environmental cues with all the computers and the chairs, and the books, I feel much more productive in that setting"*. For some, simply being on campus was a prompt to engage in learning activities. One commented that it was an *"implicit thing… where you are passing through the gates*

so you are in this place now and you have come here with a purpose, because otherwise you wouldn't have put yourself through it and now it is time to get on with it and to be productive". The act of going to a specific place was an attempt to create focus and take control over the learning process. This extended to creating barriers for oneself in some cases, externalising the process of control: *"I come here because it is the furthest place away that I can really get to from my house, so I usually cycle down here. Cycling back involves going up [a steep hill], which isn't fun so… I put it off for ages which is great, it means I stay here and there is nothing to do here but revise"*. While most students maintained some form of digital connection during their learning activities, some made conscious efforts to avoid this potential distraction, such as leaving their phone in another room or turning it off altogether: *"I pretty much try not to use my phone because once I have started I don't stop so I put my phone on aeroplane mode when I go into lectures."*

Being around other students who were working was also an important way that students controlled their attention. It was useful as a cue that they too should be working: *"I feel really motivated because everyone else is working, so I feel like I should be working as well."*

> *"I feel productive… you don't know the people but you feel like you are working towards different things so, it is like a communal space, and everyone has respect for each other."*

Going to a place where others were working was thus a way of controlling one's own attention. But this reliance on picking up cues from others could backfire:

> *"If you see someone stressing you are like, oh I feel sorry for them, but then that can stress you out too so, you can either move or just stop looking at them really."*

Some spaces were more social than for learning:

> *"I think everyone goes to one place for a different reason like if you want to socialise you go to the Diamond, whereas if you are working really hard you go to Western Bank, or [the IC]."*

Being around other students was also a source of curiosity and awareness of other students' work, fostering a sense of belonging to the university as a whole:

> *"[the IC] feels very part of the university, you are reminded that you are part of everything which is good in a way."*

This was especially true in the Diamond learning commons, where the practical laboratories were mentioned by some students as a source of interest and inspiration, and a reminder of different forms of learning:

> *"I feel that something is going on… it was like, this is research, it is not only like reading books and something… you can see other professionals… you can see also their tools, and that makes it more real and usable."*

Discussion

Implicit in students' answers about their favourite places to learn was that learning itself was not strongly associated with lectures or being taught. It was conceived largely as an individual and internal cognitive process, or as about studying alongside peers. It was often performed sitting in concentrated study, away from distractions. Learning was social in different types of ways, but working alongside coursemates or other friends not on the course was mentioned more than formal group work. Thus implicitly it appears that learning is understood as what would be broadly categorised within Becker et al.'s (2013) framework as either cognitivist or connectivist. This probably goes against most teachers' assumption that learning happens through teaching (behaviourist) or in formalised group work settings (social constructivist). The popularity of "libraries", such as information and learning commons as places to study was consistent with this assumption about the nature of learning.

Participants from three of the five departments emphasised their own departmental space. The other two seem to have been strongly affected by moves to temporary accommodation during building work. Particularly interesting were the architecture students who had a different experience that involved construction assignments and was collaborative and playful, an approach to learning made possible by the studio space they had in their department.

Habit and convenience were important determinants of the use of space, confirming Asher et al.'s (2017) similar finding. But in contrast to their picture of students as in constant movement, our findings suggest that movement around campus was rather restricted. There was little exploration of different spaces for their benefits to thinking differently. There seemed to be a relatively limited awareness of the potential learning effects of different types of space and the range of places used was rather low. While there was some evidence that particular spaces were seen as good for particular types of learning activity, this was not very granular. However, the tendency to settle in one place was strongly shaped by competition for space and anxiety about losing somewhere to sit. Reducing physical movement may also inhibit learning from an embodied cognition perspective and

limited the potential value of a rich campus learning landscape. It also reminds us that features of place can shape learning processes, to complicate the purpose/process/place framework.

Students did have a sense of ownership over the space like the libraries they used, even if they did not actually physically reconfigure them. They also exercised control over their own attention through choice of space to study, such as by placing themselves in the company of others studying, near to cues to study and sometimes by disconnecting from their phones. Students exercised considerable agency in carefully picking spaces that helped them concentrate. This may explain low use of off campus spaces, as they did not contain the cues to learn or afford the same sense of ownership and safety.

We anticipated discovering much about student mobility. In fact, the maps and interviews suggest rather static and habitual behaviour. Our interpretation of this is that it reflected students seeking quiet in their favourite learning spaces. Quiet not just in terms of sound (as in a library) but also away from the noise created by other possibilities in complex socio-material infrastructures (Gourlay and Oliver, 2018). Working in a favourite spot, placing oneself among others who are studying, and surrounded by computers and bookshelves, is not merely about easy access to these as learning resources, but works as a means to contextualise activity as learning, and to resist the allure of alternative practices such as socialising or relaxation. Careful control is exercised over digital connections. Places that are unambiguously and deeply associated with study reduce the noise created by affordances for alternative practices, especially for periods of concentrated study. There was little evidence in the data of any sense of exclusion of any group, be that based on gender, class or ethnicity. Costello (2002) has explored the way that subtle signals from departmental décor effectively exclude people with certain social backgrounds. Similarly, an increasing critical strand of research on library design reflects on the way that often taken for granted design features project strong “white” cultural assumptions (Brook, Ellenwood and Lazzaro, 2015). It is hard to interpret this negative finding. It could have been because there was no such effect or that participants were reluctant to raise it in the context of an interview conducted by researchers in their own institution. The interviewer was a young, white British woman, and it is possible that this influenced responses. An optimistic interpretation would be hopeful for how richer uses of the campus could be promoted.

Conclusion

This paper has developed a rich understanding of how students use campus spaces, based on an innovative combination of map drawing and participatory walking interviews. It found that students rarely mentioned lecture theatres as a place where they learned. They saw learning as primarily happening in the library. Learning was conceived as either an internal individual cognitive process or

social but usually sitting alongside others who offered support, not group work with peers: fitting the connectivist more than the social constructionist model. Habit, convenience and competition for space were important in shaping how space was used. The tendency of students' use of space to be heavily influenced by routine and convenience, and for them to perform most learning tasks rooted to a desk for hours reflected a potentially rather stale view of learning. Beckers et al.'s (2013) model is a starting point for thinking about the relation of pedagogy, processes and place. We have suggested that the theories of embodied cognition and kinaesthetic learning take us further in realising the need to fit spaces to tasks in a fine-grained way and exploit the way that different environments help bring forth different sorts of academic work as articulated in the notion of the campus as a learning landscape. Nevertheless, students exercise considerable agency in creating bounded spaces where a focus on studied concentration is accomplished.

We began this paper by returning to the notion of the campus as a learning landscape because it foregrounds how learning happens beyond, as well as within, the classroom. The theory of embodied cognition deepens our understanding of the importance of bodies and movement during different tasks of learning in such a landscape in its physical dimensions. Ubiquitous, mobile access to digital connections and resources, rather than replacing the physical, as in some crude notion of virtualisation, adds a vibrant new dimension to this landscape, as a complex socio-material assemblage. A critical issue becomes how learners draw on the affordances of the learning landscape to create learning experiences. In our particular study we saw students active in choosing favourite spaces to learn, controlling their sensory environment and their connectivity to create safe, productive learning atmospheres. Yet important inhibitors appeared to be habit and convenience, competition for space and perhaps a rather narrow view of learning. Rebuilding of home departments had a significant impact on sense of belongingness. Learners appeared to find the campus to contain all they needed and so did not make use of spaces in the wider city, apart from their home.

We would imagine that in other universities learners' constructions of their learning landscape would look very different, because of the different physical and digital resources available, the different pattern of learning tasks being set and students' many individual differences, shaping confidence and literacies in configuring this environment. But what does emerge is that the learning landscape concept is generative in prompting us to think more broadly about the nature of student learning experiences, rather than centring on what happens in the classroom alone. A campus learning landscape is a dynamic, multi-modal, multi-dimensional (physical – digital) nexus within which learning experiences happen.

From a pedagogic point of view, recognising the importance of students' engagement with the dimensions of the campus learning landscape widens our understanding of learning experience. It prompts us to ask where and under what conditions students actually spend their time when learning. It asks questions about what we can do within the classroom to enhance students' agency in remapping where they learn. This could be by showing students how to be more reflective about how different learning tasks can be reshaped by using the campus differently or, indeed, by taking our own teaching outside the formal classroom, even outside the campus.

Reflecting on the methods used for the study, walking interviews combined with mapping produced a rich composite picture of the campus as a learning landscape. The mapping exercise supported the qualitative interview data with a quantifiable element. Clearly there were issues such as varying skills and confidence in drawing. This was very apparent in the difference between architectural students and others (compare figure 2 with the others). Yet even less skilled participants did manage to convey significant meaning through drawing, such as centrality of the IC in figure 1. The maps seemed to add in a powerful way to verbal data, though they need to be read alongside these to be fully understood.

There are many opportunities for further research around the learning landscape concept. There is a need to compare the patterns at Sheffield with other universities that offer different configurations of space. For example, students' feelings of safety may be specific to the character of Sheffield as a city; and also to explore different experiences of students, such as part-time learners or those with non-normative identities.

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