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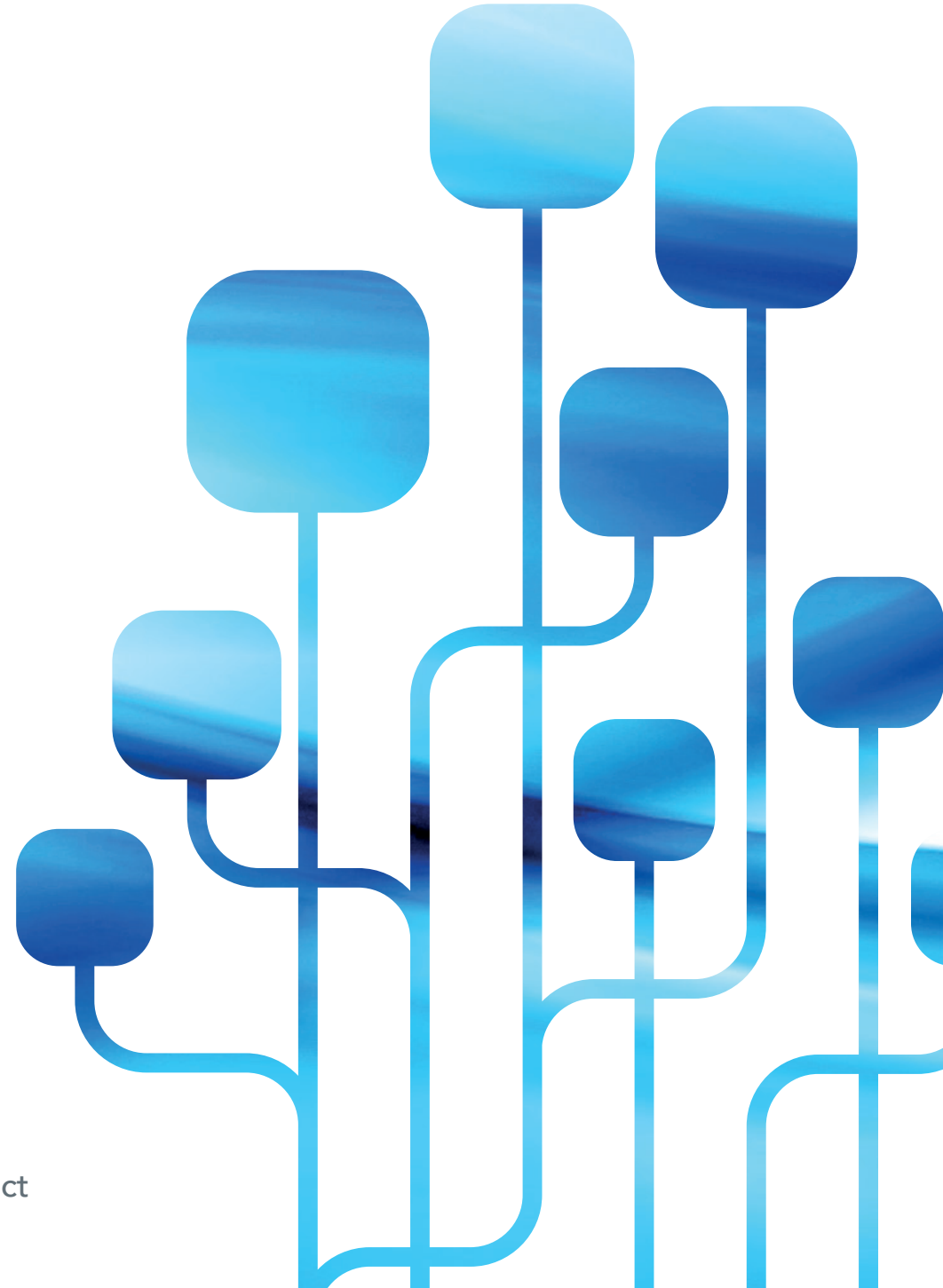
Libraries After Lockdown

SCONUL

From Adaptive Practice to Service Redesign

Drivers for the Usage of SCONUL Member Libraries



SCONUL Research Project

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Drivers for the Usage of SCONUL Member Libraries

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Andrew M. Cox and Melanie Benson-Marshall

Information School, University of Sheffield

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Executive Summary

Usage of library space within SCONUL member libraries is either increasing or is being sustained at a high level. This is despite the fact that many journals, textbooks and monographs are now available digitally and therefore are accessible anywhere, thus reducing the apparent need to visit the library.

Part one of the report seeks to set the changes in library space use in the wider context of changes in campus design and use. In particular, it reviews wider trends in campus design that seem to be mirrored in library space and the drivers for change in space use across campus as a whole.

Part two summarises six key inter-related drivers of change in the use of the academic library, namely the student body, pedagogy, ICTs and the digital, estates management, service convergence and marketing. It also summarises some of the main recommendations for new spatial design found in the literature. It reflects on these factors in the light of the neo-liberalisation hypothesis.

Part three opens with a systematic analysis of 51 published international case studies of library users and how and why they use library space. This suggests that users have multiple reasons to visit the library, with use of technology and of print material high up the list. Group work was another common reason to use the library. The variety of types of space in the library and the range of resources were other attractors, but crowdedness was perceived to be a problem. There is relatively less in the studies about who uses the library and when they use it, though the evidence suggests that most users are studying alone. Parts four and five go on to examine what user experience (UX) studies have added to our understanding and summarise some other research on specific related issues, such as noise control or the experience of particular user groups, such as students who commute to the university.

Part six analyses data supplied by SCONUL member libraries using the framework developed in Part three. This confirms the published case studies in emphasising the use of computers and printers, and group work as reasons for coming to the library. Use of the print collection is given more emphasis. Friendly supportive staff were found to be an important attractor to the library, as well as the availability of quiet space.

Part seven looks forward to a number of factors that will shape library use in the future, namely the concept of the smart campus, concerns around 'decolonisation' and about student wellbeing, and sustainability.

Part eight reflects on the potential impact of the COVID-19 pandemic on the outlook. While it is too early to predict the long-term effects of the pandemic, the factors discussed in the rest of the report suggest that physical space will remain important to SCONUL libraries.

Part nine offers a summary of the report's conclusions about what is maintaining the popularity of library space. This can be attributed to the absolute growth in the number of students; the more intensive use of departmental space; trends in pedagogy towards active learning and group work; the value students place on studying in the library – because it is a space dedicated to learning, where others are studying around them, and there is access to quiet spaces, technologies and printed reading material. It is unclear whether the location of library services in the building play an important role.

The framework developed in the study (Appendix 1) offers a useful resource for future studies, including local ones.

Contents

Project Brief

SCONUL commissioned this research into the drivers for the use of the physical library space at SCONUL member libraries. For the purposes of this research, users include all categories of registered users of academic library services, including undergraduates, taught and research postgraduates and academic staff. What constitutes 'library space' will be defined by the individual institution. The study entailed:

Phase 1: a literature review covering published international sources on the question of the drivers for the use of academic library space

Phase 2: a project, working with the SCONUL project team, to obtain unpublished research material exploring the drivers of use of their own library space from SCONUL member libraries

Phase 3: analysis of the raw materials and associated analysis obtained through the project and the production of a written report describing the project, research findings and key points of learning.

Context

SCONUL collects data on the number of visits to libraries by users. This, plus anecdotal evidence from members, indicates that usage of library space within their institutions is either increasing or is being sustained at a high level. This is despite the fact that many journals, textbooks and monographs are now available digitally, and therefore are available remotely. It can be theorised that the other elements of the library 'offer' to users (support services, access to content not available digitally and the library space as a destination) are all playing a part in driving this continued demand.

These issues are important for libraries because, in order to plan the development of their own services, library directors need to make working assumptions about the nature of user behaviour over the long term, and how changes in their services might affect demand. This applies to the commissioning of new buildings and the configuration of existing buildings, but also to collections management and investment in above campus services.

There has been relatively little published research exploring the issue of user demand for the use of library space in the current hybrid print / digital environment and how it has changed or may change over time under different conditions. Many libraries have carried out their own research with users, and SCONUL are keen to ensure that this project draws on the wider body of research findings held across the UK and Irish library community. This research may be quantitative or qualitative, for example exploring matters such as the sense of community inherent in users' conceptions of the library.

The purpose of this piece of commissioned research is that it should be used to inform individual library directors' development of their own services and SCONUL's work envisioning the library of the future and the development of shared or collaborative services on behalf of the community. It may also serve to identify gaps in the research base on these issues. This work is part of a broader stream of work looking at a range of aspects of the transformation of academic library services.

Part One: The campus learning landscape

Change on campus

Given that academic libraries are embedded in institutions, the same forces that shape the campus as a whole will also play out in the design of the library. One aspect of this is that the library ceases to be a unique kind of a building needing to store a vast collection of books and journals. Library space design becomes more like that of other buildings. Furthermore, the increasing stress in LIS thought on strategic alignment also means that library leadership is self-consciously orientating itself to institutional missions. Indeed, some authors have suggested that the library might offer a leadership role through developing new ideas about learning space for the whole institution (Matthews & Walton, 2014). It follows that it is useful to place developments in library space usage in the wider context of campus design as a whole.

A good starting point for this perspective is to examine campus real estate strategy. Beckers, van der Voordt et al. (2015) identify a number of real estate strategy priorities from (Dutch) university policy documents:

- increase user satisfaction
- support innovation
- support corporate image
- support culture
- support environmental responsibility
- stimulate collaboration
- support change
- support user activities
- control real estate costs
- control physical risks

In a similar study, Hajrasouliha (2017) found that the top ten commonest goals in a sample of 50 US campus masterplans were (in rank order):

- walkability (found in all the plans)
- sense of community (48/50)
- liveability and safety (41/50)
- environmental sustainability (37/50)
- landscaping (34/50)
- town–gown relationship (31/50)
- identity (27/50)
- imageability (27/50)
- partnering (26/50)
- learning environment (24/50)

It was surprising that learning featured so low down this list.

Reflecting on these lists, it is clear that real estate strategy links strongly to key institutional priorities such as marketing, cost control, sustainability, risk management and the promotion of certain types of valued features of organisational culture such as community, innovation and collaboration. Clearly there are some tensions within these competing objectives, e.g. between cost or risk control and innovation; between innovation and culture. The 'sticky campus' refers to the driver for universities to keep students on campus both for learning and revenue reasons (HEDQF, 2019). It is apparent that many of these trends are shaping thinking about library design too, e.g. ideas about promoting collaboration; but also issues of marketing and imageability; and ultimately of cost control.

Trends in space design on campus see the working out of these strategies. Although again based on data only from Dutch universities, the trends in design identified by den Heijer (2011) also seem plausible for the UK (Harrison & Hutton, 2013). These are:

- more sharing of space and less individual territory
- a shift from mono-functional to more multifunctional space
- a shift from quantity of space to quality of space
- space independency arising from ICTs
- increased re-purposing of existing buildings rather than new building
- reduced footprint of campus
- increased partnership with other institutions, both other universities and business.

These appear to be widespread trends appearing across all types of university and affecting many buildings across campus, including the library. Space independency enabled by ICTs is obviously relevant to libraries, but it is interesting to see that the shift to multifunctional space is not solely a library phenomenon. Nor would it seem that repurposing space is a trend unique to the library.

Many similar trends figure in Coulson, Roberts and Taylor's (2017) key directions of change in campus design, of which the most relevant to libraries are:

- adaptive reuse
- starchitecture – iconic or flagship buildings that express institutional ambition
- hub buildings – providing social, learning and pastoral functions for students in one place. Coulson, Roberts and Taylor (2017) see the origins of this trend as lying in both the library and student union.
- interdisciplinary research buildings – promoting collaboration for innovation through breaking down enclosed lab space and prompting chance encounters
- joint venture buildings – with other universities or other external organisations
- large-scale campus expansions
- online learning
- master planning

While Coulson, Roberts and Taylor (2017) identify the development of the library particularly with the hub building, other trends such as seeking to create interdisciplinary connections could also influence library design. This could be based either on repurposing an existing building (adaptive reuse) or iconic new builds (starchitecture). Coulson, Roberts and Taylor (2017) summarise the trends at work as 'place, interaction, access and efficiency'. Thus universities seek to develop a sense of place, enhance collaboration, widen participation, but equally must manage resources efficiently. Starchitecture may deliver a sense of place through an iconic building, though Coulson, Roberts and Taylor (2017) recognise that the focus on the building could detract from ensuring the value of the space around it. Adaptive reuse also sustains a sense of place, but through heritage. Efficiency is particularly manifested in the return to master planning.

As architects, Coulson, Roberts and Taylor's (2017) view is predominately a top down one. An alternative perspective is offered by examining experiences of campus use (Domae, 2017; Holton & Riley, 2013; Whitton, 2018). Thus another strand of literature explores the geographies of campus space. This seeks to reveal how spaces are actually experienced. It gives much more weight to the agency of people in shaping the use of space and also the complex playing out of design, routine and bodily experience.

In tune with this shift, Dugdale (2009) suggests that the campus should be seen as a 'learning landscape'. This phrase recognises that learning happens all across campus, with learners making use of spaces of different qualities for different learning purposes, be that a lecture theatre, a department, the library, the students' union, a café, or any other available space. In a sense it is about fitting the learning task to the affordances of an available space. The 'learning landscape' perspective suggests the need not just for different spatial designs, but also for fundamentally different ways of thinking about the design of space. Rather than planning being linear and top down, it needs to be a 'nonlinear process, emphasizing co-creation of concepts with users, pilot projects, ongoing refinements and incremental implementation' (Dugdale, 2009, p. 60). It should be based on a set of strategies to be applied and refined, not on a static plan. Development is through engaging with 'hybrid groups', rather than a narrow range of obvious stakeholders. Space use is flexible, not single use. Ownership of space is layered. Thus ways of thinking about spatial design seem to be shifting in the direction of complexity, emergence and non-linearity – trends that are also seen in library design thinking, notably through UX.

The concept of taskscapes as used by Delcore et al. (2009) and Asher (2016) points to the way that students perform a complex web of different tasks, some study-related, others social- or work-related, in different places, with different technologies and people, such as going to work in the library for the day, dropping into the library between classes or trying to find a quiet place to read in a café. To understand use of campus space one must look at the whole picture of tasks. Domae (2017) suggests some of the key tasks (or as she calls them time–space routines) that shape campus movement and experience, such as going for coffee, dropping by the library, etc. These mundane journeys shape how campus is experienced. Studies emphasise the way that tasks may involve moving across the city as a whole, not just the campus. Thus Marshall and Priestner (2016) found that students habitually move between a triangle of spaces comprising their college, the library and the supermarket.

Others, in contrast, such as Beckers et al. (2015) suggest that the variety of spaces on campus has increased to include places like cafés so that the mesh of taskscapes is accomplished within the campus itself.

Drivers of change on campus

Den Heijer (2011) and Coulson et al. (2017) seek to capture major patterns of change, but still without considering the underlying drivers for these changes in great depth. Literature on this is rather lacking, with the work of the UK Higher Education Space Management Project (Space Management Group, 2006), Temple and Barnett (2007) and Temple (2008) offering the best starting point for a model, albeit that this work is now over a decade old. Table 1 summarises some of their main findings. Usefully, to recognise rather contradictory forces at work, the authors differentiate change drivers that could reduce the amount of space used, drivers that would change use without changes in the amount of space needed, and changes creating more intensive uses of space. Some factors are endogenous to HE, some exogenous.

Driver	Reduced space use	Changed use within envelope	Increased space use
Institutional planning and management		Changed teaching/ research mix	
	Extended teaching day/ week/year	More space for taught postgraduate and research students	
	Staff working away from institution	Increased community use of facilities	New central infrastructure functions
	Better space management techniques		Higher standard/more extensive student facilities
	Remodelling and better design of new space		
Changes to teaching and learning	Workplace-based and itinerant learning	Changed approaches to library use	Partnerships with other institutions
		New mix of teaching space sizes	
		IT use leading to more flexible space use	
		Increased social/group work space for student-led learning	
Disciplinary changes	Size reductions and improvements to equipment	Changed equipment needs	New research fields requiring specialist facilities
		Specialist space for social science and humanities work	

Table 1: Reproduced from UK HE Space Management project (2006, p. 19)

The analysis from the UK HE Space Management project (Space Management Group, 2006) continues to convincingly identify many of the key forces at work, such as efficiencies in space use, increasing student numbers, changing teaching methods and new health and safety demands. Changes in library space are seen as a trend in themselves, but trends in library space use are also an outcome of some of these factors.

Changes in library architecture

While the main purpose in this section has been to explore how academic library use and design might reflect wider trends in campus design, there is also an argument for looking at general changes in library design as the clue to explaining how academic libraries have changed specifically. Worpole's (2013) list of changes in library design summarised in Table 2 apply to both public and academic libraries. These trends imply a general shift towards openness and accessibility of information.

Traditional library architecture	Modern library architecture
Neo-classical	Modern
Imposing steps and entrance	Street-level, retail entrance
Needs of disabled people unmet	Good accessibility
Clerestory light	Atrium light
Temple of knowledge	The 'living room' in the city
Institutional furniture	Domestic or 'club' furniture
Stand-alone service	Shared services
Hierarchical design	Open design
Canonical stock holding	Contemporary cultural market-place
Individual study carrels	Seminar rooms and computer suites
Defensive space	Networked space
The rule of silence	A culture of mutual respect

Table 2: A comparison of traditional and modern library architecture (adapted from Worpole (2013)

Part Two: Drivers for change in use of the academic library

While being shaped by changes across campus as a whole, for the library world Scott Bennett and Donald Beagle have been central to redefining thinking about library design through the concept of the learning commons (Beagle, 1999, 2010; Bennett, 2003, 2005, 2006, 2007, 2009, 2015). Bennett locates the change in technology and a move in HE from teaching to learning, leading itself to a shift from the book-centred to the learning-centred library paradigm (Bennett, 2009); and a shift from focussing on 'things' such as service points, to learning processes (Bennett, 2015). He emphasises (Bennett, 2005):

- readers having a sense of ownership over space
- furniture that encourages collaboration
- design for use in different ways at different times
- managing acoustical and other environmental conditions e.g. natural light
- domestication of space – implying that people are comfortable with the others using the space and feel able to act spontaneously

Table 3 extends the analysis of campus-level changes developed in Part one to pick out key drivers for libraries exploring some of the most important logics of how these might impact on library space (Appleton et al. 2011; Childs et al. 2013).

	Drivers of change in campus space demand	Nature of impact on library
Student body	Increasing student numbers and student diversity (both through widening participation in HE and internationalisation).	All things being equal, more students will come to the library, simply because there are more students. They may have also more diverse needs.
	Generational differences in students' needs and expectations?	Current students may have different needs from previous students.
Pedagogy	Shifting philosophies of learning with more emphasis on: resource-based, independent, active learning emphasis on social aspects of learning.	Greater need for learning spaces rather than teaching spaces Variety of needs arise: library remains the obvious place for resource-based learning library provides spaces for group learning.
ICTs and the digital	Distance learning and purely IT-based learning, while cost effective, has not become the dominant model. A blended learning approach seems to be becoming the norm. Mobile and tablets/wifi allow ubiquitous computing. Online content can be accessed anywhere, including off campus.	F2f teaching continues to be important, so students must come to campus and so to the library. Despite mobile devices and bring your own device (BYOD) some tasks are better done on a PC, e.g. if specialist software is needed. Content is online – but there is a persistent preference for the printed book for some tasks. The resilience of the print collection. Need IT/resource-rich spaces to study.

Table continues overleaf

	Drivers of change in campus space demand	Nature of impact on library
Estates management	Universities have increased central control over space, reducing the amount of dedicated specialist space in departments, strengthening central timetabling and also extending the teaching day. Low occupancy rates are a key driver for changing use	There is less free space in departments for students to use. The library is a more important option, e.g. as somewhere to be between classes. Community needs to be constituted with other learners rather than within departments. 24/7 library opening mirrors the wider trend to intensification.
Service convergence	As part of the trend toward hubs, more and more services are co-located for efficiency and effectiveness	Library buildings accommodate multiple student-facing services. Library services 'pop-up' elsewhere.
Marketing	Need to compete for students partly via modernity of estate and place-making	Willingness to invest in learning space such as library – cheaper than improving all buildings

Table 3: Key drivers of library space use

The following section discusses the main six inter-related factors driving library space use. While the LIS literature as a whole tends to focus on the first three, the role of the fourth, fifth and sixth should not be neglected.

The student body

Changes in the student body are clearly a key factor shaping campus space. The growth in student numbers partly explains intensification of use of the campus and of the library. The diversification of the student body (more part-time, mature, differently-abled and ethnically diverse home students and more international students) also complicates the nature of demands on space (Ellis & Goodyear, 2016). Recognition of this complexity underlies the popularity of UX, with its focus on discovering the diversity of learning experiences.

There may also be a generational change in the nature of student ways of thinking and studying. Some of the literature around learning and library space gives great emphasis to changes linked to a new generation of students. This was a very strong argument in early work, notably Van Note Chism (2006), but it is also seen, for example, in AUDE's (2018) latest report. Appleton, Stevenson and Boden (2011) reflect the widely held view that the current generation of students are more social and experiential learners, and more independent in their learning. Such changes are sometimes attributed to the impact of Internet use, but often seem to reflect more fundamental social shifts. The desire for more independent learning could be linked to changing authority structures in society. These can also be seen as driving new pedagogies and so demanding new spatial arrangements. However, these trends can be taken too simplistically. In a diversifying student body, attitudes to learning differ; digital literacies are much more variable than the early 'digital-natives' rhetoric would suggest. Despite the stress on this generation of students being 'social', students are generally thought not to like assessed group work, even if they do seek sociality as part of the learning experience.

Even though changes in the student body are often referred to as a key driver for change, new building may not be designed based on a systematic study of changing user need, according to Head's (2016) review of a number of library building projects. Although spending a lot of money on building developments, and notwithstanding the rhetoric of user-centred design and an increasing stress on student involvement in the design process (Mahat & Dollinger, 2019), she suggests that formal gathering of data from students or even formal post-occupancy evaluation is rare.

Pedagogy

There have been many changes in pedagogic thought and practice in the last few decades, with implications for space (Jamieson, 2013; Long & Holeton, 2009; Middleton, 2018). All reflect a shift away from an instructivist or transmission logic of learning, towards constructivist or social constructivist models. The term 'student-centred learning' implies a move from teaching in the direction of the student 'learning experience' (Appleton et al. 2011). The focus on experience may also bring with it acknowledgement of the affective (even sensory) aspects of learning, as it is seen as less a purely cognitive process. More emphasis is given to creativity, inspiration and reflection (Acton, 2018; Long & Holeton, 2009).

For the library it could imply: a shift from 'material focussed to people focus' (Moore & Shoaf, 2018), the relaxation of certain behavioural rules (such as the code of silence) and student experience and ownership as a key driver. An aspect of this trend is towards more 'independent study' as opposed to direct teaching; more focus on problem solving, variety in assessment tasks and 'active learning' with its stress on 'student engagement' (EDUCAUSE, 2019). New fashions of learning also tend to imply intensive use of resources, both IT and information sources.

Learning is also more often seen as social, be that directly through group work and peer learning, or facilitated through social media. 'Connectivism' very much focuses on the value of learning in a context of a rich range of informational and social sources, including via social networking (Middleton, 2018; Selwyn, 2017).

'Connected learning' is a broad conception that brings many of these ideas together, stressing interest-driven learning, interaction and dialogue, co-creation and the active creation of knowledge (Selwyn, 2017).

All such shifts in pedagogy imply different uses of space, such as:

a. a move from a narrow range of teaching spaces (lecture theatres and some seminar rooms) to a variety of learning spaces, including active learning classrooms and informal learning spaces to accommodate a widening range of types of learning activity;

b. greater flexibility both in the sense of immediate learner control and longer-term adjustment to changing needs;

c. greater stress on student feelings of ownership and safety;

d. Since learning is active, social spaces need to allow movement and noise – unlike traditional library space.

While many of these trends place emphasis on independent and self-directed learning, this does not necessarily point in the direction of using just any 'informal' space. Rather, as HEDQF (2019) observe, students prefer space designated for study.

Beckers (2019) and Beckers et al. (2015) propose and test a model in which purposes (pedagogies), process (learning activities) and places (configuration of space) need to be aligned (Table 4).

Purpose	Process	Places
Behaviourism	Instructor–learner	Classroom
Cognitivism	Learner–content	Individual study setting
Social constructivism	Learner–learner	Collaborative setting
Connectivism	Learner–interface	Informal study setting

Table 4: Purposes, process and places (adapted from Beckers (2015)

The notion of 'built pedagogy' points to the way that space designs can shape what learning happens (Monahan, 2002). But intentions do not always work out smoothly. Creating flexible spaces does not necessarily mean that they will be used dynamically if there is not actual room in the timetable to reconfigure them (Jessop et al. 2012). We should also be aware of the 'hidden curriculum' in building that excludes certain social groups by projecting a set of cultural values and implicitly a sense of who belongs (Costello, 2002).

ICTs and the digital

The role of ICTs in shaping campus space seem to be rather underestimated by Temple and Barnett (2007), but they are commonly central to accounts of change in campus and especially LIS accounts of library space. The increasing digital availability of content, including much library-owned and subscribed-to content, has decentred the print collection. By seemingly allowing access to most content from anywhere, including off campus, it has made visiting the library to access content appear to be increasingly unnecessary. This digital shift could be seen as potentially undercutting the need for a physical library. It is the evidence that visits to the library have grown rather than decreased that is the central paradox considered in this report.

Just as seemingly ubiquitous access to computing and digital content appear to threaten the role of the physical library as a collection, so also distance learning and, most recently, MOOCs are seen to threaten the place of face-to-face learning and the place-based university. In fact, just as books retain some popularity, blended learning as a hybrid of face-to-face and technology-enhanced learning seems to be preferred to pure distance learning.

Since 2015, the influential NMC Horizon report has identified the theme of 'redesigning learning spaces' as one of its key trends. The precise description of this trend shifts subtly over the years but the text in the 2019 report reads:

> *The transition to active learning classrooms and spaces in higher education has gained considerable momentum in recent years. Designing and evaluating spaces that facilitate active learning and collaboration require investments and strategic planning to renovate or construct classrooms, libraries, and common spaces where learning takes place. Although efforts often focus on the elements of redesigned learning spaces—such as wireless bandwidth, display screens, flexible furniture, varied writing surfaces, and abundant power—obtaining stakeholder buy-in and transforming pedagogical approaches are equally significant considerations. Faculty, students, instructional designers, IT staff, and facilities personnel are some of the key stakeholders in the redesign of academic spaces. Physical learning space design is considered a short-term trend, yet a commensurate focus on virtual learning spaces may be further out on the horizon. Many online platforms have bundled solutions to facilitate team-based learning and synchronous meeting spaces, yet emerging learning spaces programmed in extended reality (XR) have the potential to create more engaging and personal experiences for learners than any current developments in online course design.*
> **(EDUCAUSE, 2019, p. 11)**

The emphasis here is on top-down design and on a specially designed space rich with the latest technologies, here XR – but in 2015 an earlier version of the same paragraph stressed web conferencing and large screens. ICTs enable highly specialist spaces to be produced, but in a way that is future proofed, because they can be reconfigured with new technologies in the future. The Horizon reports recognise that barriers to rapid transformation are both cost and the willingness of stakeholders such as teachers to engage with the potential of new ICTs.

Maker spaces also feature in Horizon reports and could be seen as a similar, slightly more specific concept with a focus on making activities and technologies. The pedagogic ideas behind maker spaces around creativity, group collaboration, independent and motivated learning, and learning by doing, all resonate with the new pedagogies discussed in the previous section (Curry, 2017).

Whereas the Horizon reports imagine the impact of ICTs as arising through carefully designed technology-rich spaces, much interest has also been found in informal learning spaces (Cunningham & Walton, 2016; Jamieson, 2013). 'From this perspective, "learning" on campus needs to be understood as a complex web of experience and interaction undertaken over a wide range of physical environments, from internal to external spaces, including classrooms, cafes, plazas, and the library' comments Jamieson (2013, p. 145). One could add that this is overlaid with a range of internal and external digital places.

The picture painted by the Horizon reports emphasise top-down design of technologically rich environments. An alternative perspective on the relation of the digital to material space is offered by authors such as Gourlay and Oliver (Gourlay et al. 2015; Gourlay & Oliver, 2018) who explore how students themselves navigate across complex material and digital infrastructures, with their varying affordances, to accomplish their studies. Think of a study group assembling resources and activities across a number of spaces, physical and virtual, over time: collaborating online but also meeting up in a café or study room, searching on their phones, working together on a screen, but also printing material out and using hand-written notes. This offers a much more bottom-up perspective on how space is actually used and experienced, interwoven with the digital: here learning is messy, uneven, mobile – even 'nomadic' (Ryberg et al. 2018). The digital and material are not viewed as a dualism, but as woven together in a socio-material assemblage. It also points to the fallacy of seeing learning as shaped top down through spatial design, 'built pedagogy'. 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). This perspective obviously parallels the notion of connectivism, but in a less celebratory mode. It prompts us to ask much more about how use of the library and other campus space and the digital are interwoven.

Estates management

Partly in response to growing student numbers, but also reflecting the rationalisation and professionalisation of resource management, university estates management has become stronger and space (and time) are much more closely controlled in universities than in the past. Rationalising use of estates assets was the second top driver for estates managers, after recruitment (Wates Construction, 2012). Given that building costs are second only to staff costs for universities this is not surprising (Temple & Barnett, 2007). Historically, occupancy rates seem to be rather low (den Heijer, 2011; Neary et al. 2010). A critical aspect of this trend it that academic departments are given less exclusive space through central timetabling of room bookings and only the most specialist needs are reflected in purpose-built spaces. Use of the campus is intensified by extending teaching hours per day or the teaching year in some cases. This has an indirect impact on the library because there are more students but less capacity in departments to house them between lectures or for coursework. As a result, the library and other learning commons spaces have to be a shared central facility for all departments.

Service convergence

Driven by cost saving but also service effectiveness, there is a trend towards bringing student-facing services together, particularly in the context of teaching-focussed institutions and where service organisation is also converged or super-converged.

The apogee of the trend could be the Hive, where the academic library is combined with the local government-run public library and archives (Allen, 2016). This reflects many of Coulson, Roberts and Taylor (2017) trends: starchitecture, the hub and the joint venture.

A similar logic can be perceived behind library services being distributed within other buildings or 'popping up' temporally dispersed across campus. Both offer efficiencies but blur the identity of buildings.

Marketing

A major factor in campus design is marketing, in a context of intensifying national and international competition for students. Estates management is increasingly driven by student recruitment (Wates Construction, 2012). Some evidence suggests that an attractive campus is a major factor in student choice (AUDE, 2015) – though this is disputed in some literature (Marmot, 2014). AUDE (2015) research suggested that for 67% of students, facilities are the main driver of student choice (behind course and location). University marketing material relies heavily on images of physical spaces (Whitton, 2018). The logic is that an impressive library or learning commons building is an investment to yield more students. Investment in a space relevant to all subjects such as a learning commons is clearly more cost effective than investment in particular departmental buildings, since it has potential to impact recruitment for all courses. The investment made by institutions in library building and refurbishment reflects this driver.

Discussion

The ways that changes in the student body, changing pedagogy and ICTs have come together to reshape library space have been widely discussed. We should also acknowledge the agency of librarians as a professional community that recognises the need to change. Less acknowledged are factors such as cost-efficient space management, service convergence and marketing.

Inevitably, there are barriers to change that should not escape notice, notably:

1. cost in a context of limited resources;
2. the inherent inflexibility of library buildings which in the past were built intentionally with a view to permanence (Moore & Shoaf, 2018);
3. the slow decision making in long-lasting institutions such as universities, combined with uncertainties about the direction of factors driving change;
4. staff inertia and the challenge of 'rethinking the practice of teaching' (EDUCAUSE, 2019).

A focus on campus as infrastructure would remind us of the way that infrastructures develop slowly because nothing is truly built de novo and because of 'the inertia of the installed base' (Star & Ruhleder, 1996). University campuses have a mix of types of spaces built over decades, even centuries (Jessop et al. 2012). While there is a natural focus in the literature on innovation and the most exciting new learning and library space designs, most teaching is in legacy spaces or in space repurposed under cost constraints (Jessop et al. 2012).

Figure 1 summarises some of the main factors shaping library space, both drivers and inhibitors, and represents their inter-relation. Library space design has seen a shift from book storage to a focus on people; from information sources provision to learning. To some extent the shift in pedagogies could be seen as an autonomous, intellectual change among educators, but it may also be seen as linked to changing

perceptions of learning needs in terms of skills for employability or life-long learning. It is also often seen as driven by student demand, new generational learning styles and the diversification of the student body. It could also be seen as enabled, even driven, by ICTs – such as social media enabling connected learning. Set against this is the conservatism of university institutions and staff ability to respond to the change. The other complex of factors revolves around estates management, which is driven by cost cutting and marketing (as well as student experience). Cost management points to tighter control and use. Marketing points in the direction of new building. We have included service convergence here, but this could also be seen to be linked to the changing student body and improving student experience. Against this are again inertia and the cost implications of new building.

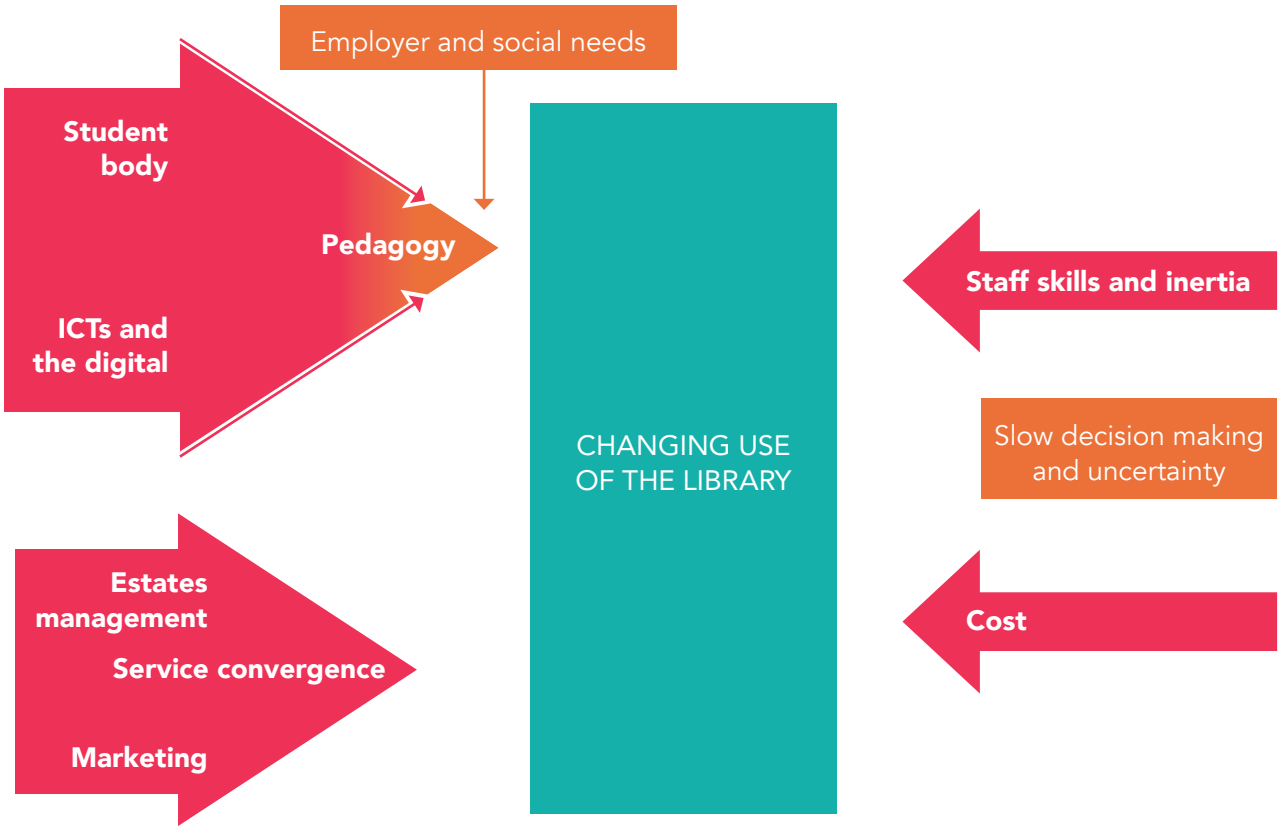

Figure 1: Changing use of the library: drivers and barriers

It is easy to see that these factors play out differently in different contexts. In student-focussed institutions student demand is a key driver. There may also be institutions whose structures allow more rapid decision making. In research-intensive institutions, the collection remains central.

Changes in library and learning space

Arising from factors around the student body, pedagogy and technology, a number of authors have attempted to summarise the features of new learning spaces or specifically changing library design principles. Tables 5 and 6 compare a few of these summaries.

Designing for 21st-century learning	Challenging traditional assumptions and rethinking learning spaces	Personalised learning strategies for higher education	The UK Higher Education Learning Space Toolkit
(Joint Information Systems Committee, 2006)	(Van Note Chism, 2006)	(Keppell, 2014)	(SCHOMS et al. 2016)
Flexible	Flexibility	Comfort	Create a sense of community and encourage participation
Future-proofed	Comfort	Aesthetics	Integrate and connect learning
Bold	Sensory stimulation	Flow	Meet a range of different learning needs
Creative	Technology support	Equity	Offer a comfortable working environment
Supportive	Decentredness	Blending	Make effective use of technology
Enterprising		Affordances	Be inclusive and sustainable
		Repurposing	Involve, inspire and motivate students

Table 5: Key design features of new learning spaces

Ten commandments of good library space	Saltire Centre design themes	Case studies of recent UK library space designs	TEALS toolkit	A study of architects, librarians and library consultants' experiences
(McDonald, 2006)	(Watson, 2007)	(Waller, 2016)	(Abbasi et al. 2012)	(Head, 2016)
Functional	Flexible open space	Flexibility	Positive image and identity	Collaborative
Adaptable	A spectrum of spaces	Collections	Welcoming and inviting entry	Interdisciplinary
Accessible	Our expectations of students	Access to technology	Functionality and efficiency	Flexibility
Varied	A role for conversational learning	Service strategy	Flexibility and adaptability	Functional
Interactive	Learning as a social process	Variety in space provision	Variety of spaces to cater for different users and uses	Active learning
Conducive	Recognition of individual difference	Furniture	Being social and people centred	Welcoming
Environmentally suitable	The integration of IT in the building		A sense of place and inspiration	Open
Safe and secure	The importance of design		Environmental comfort and sustainability	Social
Efficient	Third spaces		Access, safety and security	Transparent
Suitable for information technology			Integration of technologies	Agility
Oomph				

Table 6: Key design features of new library spaces

A number of themes are recurrent across nearly all these lists: flexibility, variety and the place of IT. The social is also always important but could be read in earlier accounts as being about micro-scale interactions, whereas in later accounts (e.g. SCHOMS et al. 2016) a greater connection is made to notions of engagement, participation and community. 'Bold' or 'oomph' seem to be referring to a 'sense of place'. Sustainability is mentioned in most lists. Later models (Abbasi et al. 2012; SCHOMS et al. 2016) are more rounded, including such features as comfort and a sense of welcome.

Waller (2016) is the only source in these two tables to mention the collection as part of the service, but she makes an important point in the library context. In some senses, many of these features might be easily achieved in buildings outside the library. Yet there are reasons why the library is particularly able to support many of them. Freed from the necessity to house a vast printed book and journal collection, the library becomes an obvious place where requirements for resource-centred learning can be met. Having traditionally offered books and computers, the library seems to be the natural place for resource-intensive learning. Critically, while computers may have become the most important resources, there seems to be quite a lot of evidence that students continue to prefer printed books for some tasks (Mizrachi et al. 2018). The latest Association of College and Research Libraries environmental scan (2019) reflects on push back by students and faculty against withdrawal of print stock. There is also growing evidence that many forms of learning are indeed more effective through printed books than reading on screen (Delgado et al. 2018). Thus the collection remains a valued resource, even in the context of the digital.

Library space and the neo-liberalisation hypothesis

One perspective on these connections could be through the important critical perspective on higher education, sometimes referred to as the New Public Management or neo-liberalisation (Maisuria & Cole, 2017; Nicholson, 2015). As an important critical strand in educational literature this perspective cannot be ignored. In this thesis it is argued that universities, like other public sector institutions, are losing their unique value systems and being run more and more along the lines of rationalised management and for profit, like any other part of the capitalist system. Symptoms of this logic include intensification of management control, a focus on measurement of performance and league tables and increased use of commercial discourses in both policy and day-to-day talk (e.g. referring to students as 'customers'). Critics argue that these logics undermine the unique character of universities as institutions with their commitment to independent critical thought.

Connected to this is the notion that there is a 'hidden curriculum' which inculcates certain attitudes and values beyond those being explicitly taught through the subject curriculum, including potentially to train the workforce for capitalism. One vehicle of the hidden curriculum is the built environment (Costello, 2002; Gair & Mullins, 2002; Tor, 2015). A simple example of the hidden curriculum is the way that a classroom seating layout with rows of chairs facing a lectern implies a transmissive learning logic, or the way that a building being towards the centre of the campus implies its importance. The organisation of buildings can also project a strong sense of who belongs and who does not (Costello, 2002).

The changes discussed in this report could all be seen as linked together in a neo-liberal logic. Thus, seeking increased numbers of students through marketing clearly reflects a profit logic and reflects the reduction in public funding to support education. With more students, there is pressure to manage them more efficiently. This naturally gives rise to more efficient practices of

space use such as the creation of multi-purpose, rather the discipline-specific buildings. In this logic one could also suggest (a little cynically) that the new pedagogies, while sounding exciting, happen to require less teacher time: because the student learns independently or with peers. Thus more students can be 'managed' without great increases in staff. Indeed, it is a trend consistent with casualisation of staff roles. ICTs are often seen as a way to deliver learning more 'efficiently' although, it is often argued, at a cost in terms of higher forms of learning, including criticality. But the argument is complicated by a tension in capitalist logic between cost cutting and efficiency, and marketisation through branding and selling experience.

It is interesting to consider the case study by Kuntz et al. (2012), who investigate the impact of a neo-liberal logic applied to the design of a departmental building. It points to the way that an existing academic sense of community is disrupted by rationalising and commodifying logics. This seems to be plausible for an academic department. But the evidence suggests a growing sense of communality within academic libraries, even if it seems to be premised more on institutional than disciplinary identity.

Thus this perspective would interpret the increasing numbers of students studying in the library to be a symptom of neo-liberalisation. One piece of evidence for this might be the way that university spaces, including libraries, seem to have an increasingly corporate feel (Boys, 2014). Hancock and Spicer (2011) see the Saltire Centre as seeking to construct the enterprising 'new model worker' through its aesthetics of energy, liquidity and movement. The distinctive aesthetics of the space are designed to produce 'more active and more creative' individuals and valorise liquidity. Closet-Crane (2011) sees discourses around the learning commons as linked to a form of branding. Discourses of student choice linked to study space could be seen as linked to commodification and in this context an observation by Delcore (2009, p. 29) is interesting: 'Some users in the student population… carry with them the expectations developed in a lifetime of experiences with retail establishments and standard-setting web services like Google and Facebook. Users often experience the disjuncture between their expectations and the library / university reality as puzzling and disappointing; often, they feel poorly served.'

This analysis has some plausibility, though neo-liberalisation could be seen as basically an untestable hypothesis. It is clear that these trends are not new, though their precise manifestations may shift. For example, most are admirably summarised as early as the turn of the century by Becher and Trowler (2001), without ever using the term neo-liberalisation. The argument is that as a capitalist logic, the process of making education more like the private sector is a 'bad thing', chiefly because it undermines a more profound notion of learning. But it may also be useful to acknowledge that there is a public funding argument for more efficient management of resources, and the need to compete for students is a seemingly inevitable feature of university life. Thus we are left with the question of how and whether changes in library space reflect and reinforce commodified social relations.

Part Three: A content analysis of library case studies

Subhdg B Methodology

On examining the literature, we identified that there were many published case studies where individual libraries had investigated patterns of user behaviour in the physical library. We formed the view that through a systematic analysis we might be able to identify some strong common themes that would further inform the questions addressed in this report. Further, given that stage two of the project was to analyse locally produced data from SCONUL member libraries, these case studies offered a valuable potential point of comparison if summarised.

We identified 51 such case studies published in the last ten years and a further 11 exploring methods which also contained empirical results. We undertook a systematic content analysis comparing what they found about four key areas. (See Appendix 1 for the framework that emerged from this analysis.)

- Who uses the library
- When they use it
- What they do there
- What shapes their preferences and where they like to study

Direct comparison is not always possible. Each case study is unique to that particular library, and comparability is reduced by each piece of research asking different questions. In the figures quoted below, even frequently observed usage patterns are not reported in a high percentage of studies, simply because there is little consistency in what questions were being asked. Nevertheless, common findings that occur in many studies can be identified and provide a strong indication of a common pattern. Another limitation is the bias towards US studies. Around two-thirds of the studies examined academic libraries in the US (69%, that is, 42.5 out of sixty-two studies; one study was conducted across the US and Canada, hence the 0.5). Canada (4.5 studies), Australia (3), UK (2) and the Netherlands (2) were also represented in small numbers. There was one study each from Croatia, Hong Kong, Norway, and South Africa, and one that covered libraries from four 'American-style universities' in the Middle East and Europe.

The most common methods used in the case studies were surveys (58%, or 36 studies) and observations (56%, 35). Interviews were used in 21% (13) of the studies and focus groups in 10% (6). Gate counts data were analysed in 13% (8). Other methods used included photovoice (5), comment boards (either with set questions or open for general comments or suggestions [5]), design exercises, such as asking students to design their ideal space (4), mapping (3) and more technical spatial analysis (2).

Who uses the library

There was little understanding of how variables of gender, age, ethnicity, subject discipline or level of study among students affected library use. This was because studies did not ask or did not report the results of such questions, and those that did usually presented the demographic characteristics of the sample but did not try to differentiate usage differences between groups. Five studies (8% of the total) reported

that male students used the library more than female students, but this was a small number of studies overall. Business, humanities and science students were the groups most often mentioned as using the library more, while law and fine art students were noted to use it least. Again, however, these observations came from a small number of studies (between 1 and 3 papers for each). There was a suggestion that undergraduates value 'library as place', i.e. the characteristics of the physical space that made it a good place to study or socialise, whereas postgraduates seemed to value 'information control', i.e. access to resources (5%, or 3 studies). No studies examined staff use of the library: a point that is telling in itself.

The main common finding is that students often work alone (32%, or 20 studies), but there is also a trend to work 'alone together' (18%, 11) – i.e. alongside others (sometimes friends, sometimes strangers) for a sense of companionship and social cues to influence them to study.

When the library is used

There were indications that students who used the library made heavy use of it, visiting several times a week (16%, 10) and often for extended periods of time (several hours plus in the case of 23% or 14 studies). Monday to Thursday were generally reported to be the busiest days, Friday to Sunday being quieter (although one study noted an increase in use on Sunday evenings (Johnson & Finlay, 2013). In terms of time of day, late afternoons and evenings were most often observed to be busy (13%, 8), followed by afternoons (5%, 3), with only one study finding mornings to be the busiest times. Libraries tended to become busier as the semester progressed (6%, 4), particularly for individual study. There was a sense that different spaces were more heavily used at different times of the day, but this seemed to vary by library – one study found that quieter spaces were more popular in the evening (Steigerwalt et al. 2019), but another found the same to be true for group work spaces (Pierard & Lee, 2011).

What users do in the library

What users do in the library seemed to be more a focus of investigation in these studies than who visited or when they did so. Students often had multiple reasons for visiting the library and accomplished several objectives in one visit (23%, 14). Individual study was by far the most common activity mentioned, including working on papers or assignments, revising for exams or revisiting class material. Use of technology was high, most often laptops or desktops (89%, 55), but also printers, scanners or photocopiers (55%, 34). Use of tablets was observed to be lower than expected in several studies. Students were often observed to be multitasking with multiple devices, including smartphones alongside print resources (21%, 13). Use of print materials was fairly frequently mentioned as a reason to use the library (mentioned in 29 studies, 47%). However, in a very careful study by Allison et al. (2019) (not included in the 62 papers examined) opening a learning commons has had no impact on collection use positively or negatively.

Group work was another common reason for visiting the library, with 63% (39) of studies mentioning this. Conversation and socialising were frequently observed (40%, 25), although it was not always clear whether this was work-related or purely social. Students were observed taking breaks from work to use social media, text friends, watch films or play games (19%, 12), as well as eating and drinking in study areas (27%, 17) and occasionally sleeping (11%, 7).

Taking classes was not mentioned or observed often as a reason to visit the library, although from a methodological point of view this could be difficult to track given that many studies did not ask this question or focussed on observing student behaviour once in the library rather than reasons for visiting. Several studies noted low use of service desks or point-of-need learning services (10%, 6).

Why users prefer to study within the library

A recurrent theme throughout the literature was the usage of, and need for, a variety of different kinds of spaces that reflected the wide range of activities, learning styles and environmental preferences of a diverse student body. For example, silent or quiet study space was very important to many students (58%, 36), but others (or the same students at different times) preferred background noise or spaces where they were free to converse or conduct group work without feeling they were disturbing others. Background atmosphere or ambience was important in general, whether this was noise-related or taken from other cues such as seeing others work or being surrounded by books. Flexible space was popular (26%, 16) and studies also cited the need for a variety of furniture and seating types for different tasks and purposes (32%, 20).

Students' behaviour often seemed to reflect the issue of space availability; many complained that the library was often crowded and it was hard to find a space (31%, 19). Several studies noted, however, that sometimes this was something of an illusion – spaces were available but were seen as undesirable or students did not want to take them. For example, a group table of six might be occupied by three or four students, either working individually or as a group, and thereby was perceived as occupied even though space was available. Linked to this was the finding (27%, 17) that students liked space to spread out their resources and belongings. Another common related theme was that of students leaving their belongings for long periods to save their seat (8%, 5). This was often observed to be only for short breaks or to visit the stacks, a printer or the toilets; however, in one study, students were observed to be leaving their belongings in the library while attending lectures elsewhere on campus, using the library as a base of sorts (Tanackovic et al. 2014).

Windows were found to be important both for views and for natural light; several studies also mentioned students' desire to bring nature into the library (e.g., plants and water features). Higher floors were preferred by some, either for the views afforded or for being further away from the noise and distractions typically found on lower floors. Partial privacy was a common theme (18%, 11): students generally did not want to be completely removed from the company of others, but still valued the privacy and lack of distractions afforded by spaces such as study carrels, which were mentioned as being popular in a number of cases (18%, 11). Unsurprisingly, access to electrical outlets was very important to students, being cited in 45% (28) of studies. Access to food and drink was valued (31%, 19), whether this was in the library's study space or a separate café or vending machines.

Part Four: UX and other studies

User Experience (UX)

In addition to the case study literature, in the last few years a new strand of writing has emerged, increasingly under the UX banner (Priestner & Borg, 2016). While not wholly different in purpose, these studies do take a different starting point from the case study literature and so use different methods. Like the case studies, they typically examine the use of space at one institution, but, critically, they take a broader view, seeking to decentre the notion of the 'library user' and understand library use in the context of the whole of student lives. They also often consider both the material and digital experience. For example, Delcore et al. (2009) note the diversity of the modern student body and the impact of this on students' needs and behaviours, including 'variations in age, ability and disability, the need to work off campus, busy home lives, the struggle to find space and time for the school-related tasks and the pervasiveness of cars and commuting'. (p. 20). Studies by Asher (2016) and Asher et al. (2018, 2017) also seek to place students in a wider 'taskscape', examining the relationship to the library in the context of their whole academic and personal lives. Implicitly, UX is an approach to designing space driven much more by close examination of user behaviour and experience than top-down planning, and often involves small iterative changes to spaces, rather than major redesigns.

The different approach is reflected in a wider range of data collection methods. While UX studies do use surveys and observation, they also use less conventional techniques somewhat inspired by ethnography, such as:

- Touchstone tours – walking with students around the library and discussing their experience of space (Appleton et al. 2016).
- Reflective journals – students note their learning and studying behaviour over a set period, capturing different behaviours and preferences (Appleton et al. 2016).
- Coordinate mapping – learners drawing on a map where they had been or planned to go that day (Turpin et al. 2016).
- Photographic mapping – learners taking photographs of preferred spaces based on a list of questions (Turpin et al. 2016).
- Co-design exercises and workshops – students creating designs of their ideal spaces, sometimes using materials such as Lego (Priestner & Marshall, 2016).
- Iterative prototyping – creating sample spaces of different types, observing their use, and obtaining feedback on them (Priestner & Marshall, 2016).
- Graffiti walls, comment cards and suggestion trees – setting up whiteboards, flipcharts or suggestion boxes for library users to add comments, suggestions, criticisms of the library space (Foster & Gibbons, 2007; Wisher, 2017).

- Student-created short films – asking students to film their chosen spaces and add narration based on prompts, e.g. why they like the space, how they would improve it, etc. (Cowan, 2012).
- Day mapping – providing students with blank campus maps, disposable cameras, and notebooks, then asking them to fill in the map with their movements, take pictures of significant things around campus, and record their thoughts (Delcore et al. 2009).
- 'Floating reference' – a roleplay activity where a reference desk is set up and passing students are called upon to interact with it (Delcore et al. 2009)
- Mini-ethnographies – extended studies of individual students, asking them to take photographs and then following up with an interview conducted in their home (Delcore et al. 2009)
- Theatre workshops – researchers presenting a situation and asking student participants to script and direct sketches based on it (Delcore et al. 2009)
- 'Dating profiles' – students can swipe left or right to indicate support or lack of support for service innovations, or create their own profiles for loved or hated services (Wisher, 2017)

Such an array of methods produces a large amount of rich and often unconventional data that offers a new perspective on students' use of the library. Foster and Gibbons (2007) highlight the value of such techniques in discovering students' needs and wants more effectively. For example, after conducting design workshops with students it was found that their desired furniture layouts were quite different from those created by designers. In a room with large windows and natural light, designers had placed comfortable sofas, but students universally wanted these spaces populated with formal, spacious study tables; they saw these tables as spaces where they would spend extended periods of time and therefore wanted them in the most desirable location.

While many of the findings of UX studies align with those of the case study literature, they do tend to produce new insights, more from a user point of view. For example, Priestner and Marshall (2016) identify the notion of 'perceived occupancy'. This refers to whether a user feels there is room in a space for them, regardless of how many spaces are actually available. The amount of personal space available influences this, so the obvious suggestion to add more chairs does not always equal higher occupancy. The same study stresses the need for an intuitive zoning approach rather than defining spaces by signage.

Another example of how UX studies throw a different light on user understanding of library space is Dodd (2017), who found that there is a subset of students who do not consider themselves library users, although they certainly are. They perceived a division between 'pre-turnstile' and 'post-turnstile' space, and if they only used the former (for example, for printing facilities), they did not deem it as library usage.

UX findings deepen our understanding of patterns found in the case study literature. As well as the need for varied spaces that is created by the requirements and characteristics of a diverse student body, UX studies suggest that the same user may prefer certain environments for particular tasks or times of day (Lamb et al. 2016). Priestner and Marshall (2016) found that users chose spaces based on three factors: their working activity; the intended length of their visit; how they feel at the time. They also suggest the idea of an 'intensity gradient'. Study spaces vary in 'intensity gradient'; the degree of intensity perceived by users is manifested in the ambience and atmosphere; this is defined by the number of other people in the space and users' perceived exposure to them, furniture type and layout, noise levels and 'humanising' features such as plants, flower arrangements or blankets, all of which reduce the sense of intensity. Spaces with different levels of intensity are chosen at different times, and the choice of space impacts on students' productivity and endurance as well as suiting different tasks better. 'Relaxed but serious' was a popular level of intensity with students in this case. Another finding of the study was to differentiate 'destination spaces'

and 'convenience spaces.' Destination spaces are those where students would purposely visit and settle in for extended periods, as opposed to those where they would stop in between classes or to perform a quick task (Cowan, 2012; Priestner & Marshall, 2016). Westbury (2016) found that students sometimes had strong emotional associations or memories relating to particular spaces, and that this influenced where they chose to study.

Library visits were influenced by the time of day, the stage in the semester, and even the weather (Dodd, 2017). Postgraduate students sometimes timed their visits for less busy periods (Dodd, 2017), and academic staff surveyed in one study (Blake et al. 2018) felt more able to increase their library usage in vacation periods, as they felt under pressure not to take library space away from students during term times.

Several UX studies have found that students' use of library staff was lower than expected or hoped for. Priestner and Marshall (2016) state that 'Users chiefly regard the library as a study environment equipped with convenient and relevant print and electronic resources, rather than as a place to seek support and expertise' (p. 38). Foster and Gibbons's (2007) study of student behaviours found that many students did not make use of librarians for reference assistance or help with assignments; they were often unaware of librarians' information skills, and indicated that they would only use staff for practical queries such as finding books or technological help. Students in Cowan's (2012) study backed this up, stating outright that they did not know what reference staff did. However, in a different phase of this study it seemed that personal, direct one-to-one help (whether face to face or via live chat online) was effective in helping students; they were open to the idea of getting help or using resources via the web or mobile devices, but only if this help was 'uninvasive and of high quality' (p. 32).

This is an important finding, paralleled in the case study literature where use of library services as such was not a major driver of library use. Many practitioners may disagree with this claim, but the data does seem to suggest this.

A student in Foster and Gibbons's (2007) study (p. 52) summed up perceptions of the library: 'Library is really the center of everything you do. It's where you go between classes, it's like... it serves as the function of your [dorm] room'. The authors further noted (ibid.) that students 'want a place to study, to check their e-mail, to meet their friends, to read, to write their papers, to kill time between classes, and to eat. Their ideal library would allow them to do all of these things easily under one roof.'

Part Five: Other studies

There is a small body of other relevant literature. These studies focus on a particular user group or aspect of library space.

Two studies address issues around library usage for students with parenting responsibilities. As student bodies diversify, the needs of this group should be considered; Keyes (2017) cited a figure of 26% of undergraduate students in the US having dependent children. The figures may be a lot less in the UK, but it is a consideration across the whole student body. However, academic libraries are sometimes perceived as unwelcoming environments for families. The same study found that half of the libraries studied had no clear policy on this, while for those with policies, many were brief, neutral, and occasionally overtly negative. Others were more positive and welcoming, but even in these cases, this was only apparent in the policy wording and did not extend to the library making tangible efforts to accommodate or support children or families. An intervention to provide a parenting-friendly space in one academic library was popular with parents (Godfrey et al. 2017).

Other specific groups of students examined included commuter students (Regalado & Smale, 2015). These students were found to value the library 'as a distraction-free place for academic work, in contrast to the constraints they experienced in other places… For them the library was a place to seek a transformative experience' (pp. 899, 903). These students appreciated the opportunity to find a space for individual study, with appropriate lighting and noise levels; the sense of 'being at school' seemed important as separate from their home or working lives. This could be seen as a more intense version of the preference for a space dedicated to study seemingly found among all students.

Use of individual study rooms was the focus of one study (Ruleman & Kaiser, 2017). Students preferred these spaces for the quiet, privacy and concentration they afforded; 73% of respondents frequently studied alone in the rooms, although 56% frequently used them for group study. Of those surveyed, a reasonably high number were considered 'power users' by the authors: 38% used these rooms 1–3 times per week, and 15% used them 4–7 times per week. In common with other studies, technological provision was very important to users of these spaces; however, while 89% of respondents used computers in the study rooms, use of more peripheral technologies such as webcams and microphones was much lower than expected.

The issue of 24/7 access (or 24/5) has also been addressed in several studies. These initiatives were generally driven by student needs, and in one study students felt strongly enough about the issue to actively protest it when it was withdrawn (Johnson & McCallister, 2015). It was clear that while not all students made use of night-time access, for those who did it was an important service, although Scarletto et al (2013) note that 'perception of use may be more important than the actual numbers, thereby making the library seem more indispensable to the library users' (p. 375). Studies found that late-night usage increased as the semester progressed, peaking as final exams approached. Perhaps unsurprisingly, individual study usage was much higher than for group work or social / leisure activities. Scarletto et al. (2013) found that the late-night library was serving patrons with higher than average academic performance measured by their grades and retention rates when compared to university averages, but who otherwise represented a reasonable cross-section of the university community in terms of subject, gender, etc. Concerns around 24/7 opening included cost, staffing and service

levels, cleaning and security / safety provisions (including the library's immediate surrounds as well as the building itself). The presence of security staff and the tendency of students to self-regulate their behaviour reduced antisocial behaviour in one study (Johnson & McCallister, 2015). Staff participants in workshops conducted by Ravenwood et al. (2015) expressed concern for student wellbeing and suggested that 24/7 opening might put pressure on students, disrupting their work–life balance, and was an unrealistic expectation of what their future working lives might be like.

Another study focussed on the specific issue of noise. McCaffrey and Breen (2016) chart a programme of work over seven years to manage noise levels in an Irish academic library, from a noise policy, to rearranging furniture to refurbishment.

Discussion

There is now a substantial body of LIS literature relating to use of library space. Although it is predominately about US libraries, many conclusions appear to be plausible for the UK too.

It is interesting to note that only one study we found directly examined staff experience of using library space (Blake et al. 2018). In fact it concluded that their motivations were similar to those of students and that they valued the opportunity for serendipitous browsing, escape from the office and its administrative distractions, and the chance to 'participate in a shared, scholarly environment that stimulates thinking and creativity' (Blake et al. 2018, p. 3). But it is telling that studies of library space assume that they are studies of students.

Part Six: SCONUL Library data

Methodology

In phase two of the project we examined reports and data from university libraries in the UK and Ireland which had been collected by SCONUL. In the summer of 2019 SCONUL made a request to member libraries asking them to share data from their local studies of library space from the last ten years. Libraries from seventeen universities responded to share data: 16 from England and one from Ireland. Often they shared data from multiple studies. Two of these related strongly to published works that had already been considered in the literature review and so were excluded. Three provided data which was not usable, e.g. because it was simply turnstile data relating to a particular period in the year. This left us with data from 38 discrete studies conducted in fifteen institutions (see Appendix 2). The data is very varied, from in-depth reports of qualitative studies to one-off UX exercises to spreadsheets. Most of the studies themselves drew on multiple sources of data.

Having examined the data, the approach to analysis was twofold. Firstly, a content analysis was conducted using the framework developed for summarising the case study literature. Secondly, the more in-depth qualitative studies were re-read for any additional insights they might contain.

Whereas published case studies were typically based on questionnaires, observation or perhaps focus groups, and usually used just one or two methods, many of the library studies were based on quite complex data collections, and often using creative methods influenced by UX. The purposes of the studies were also quite varied. Whereas the case study literature tends to be reporting on fairly comprehensive studies of library use, more often the SCONUL data focussed on a particular issue or problem. For example, study 3 was an investigation of overnight library use based on log-in data. Given the data type and specific focus, this study would not touch on many of the topics in our framework. This reduces comparability within the SCONUL data set and between this set and the case studies. All but three of the 38 studies had been conducted by the library, two being conducted by consultants and one by an academic department.

Who uses the library

As with the case study literature, there was very little data differentiating the experience of particular user groups, e.g. student groups by level, department, faculty or gender. Sometimes quantitative data such as gate counts or loan data was broken down by faculty, etc., but without context it is not always possible to interpret the significance of apparent patterns. There was hardly any qualitative data differentiating specific user groups. This mirrors a similar absence within the case study and UX literature.

When the library is used

Again, there were low levels of data for temporal patterns of usage in the library. What data there was echoed the case study literature for the most part, with many students reported as visiting several times a week (16%, or six out of 38) and staying for extended periods (11%, 4). Afternoons were found to be the busiest time in several studies (18%, 7). Some studies give data on usage over vacations, loan data or general gate counts, but without more context these are hard to interpret.

What users do in the library

Usage of desktop / laptop computers (68%, or 26 out of 38), other technology such as printers, etc. (66%, 25) and print materials (58%, 22) ranked highly among reported uses of the library. Group work was also a common activity (45%, 17). Eating and drinking (39%, 15) and non-work activities such as using social media, gaming, watching TV, etc. (26%, 10) also featured. Generally this reflects similar percentages as in the case study literature, with a slightly higher percentage for use of print materials (56% v. 47%) and use of technology such as printers (64% v. 55%). There was surprisingly little mention of conversation / socialising (18%, 7) compared to the literature (40%). This might be because most of the case study literature is based on US libraries (69%) and perhaps there is a different perception in the UK of how acceptable it is to socialise in the library. It could also be a question of methodology, e.g. conversation might be evident in observation studies (which featured in 56% of the case studies, but in only 25% of the SCONUL data) but not from the kinds of methods used more commonly in this data (mapping, graffiti boards, diaries, etc.).

Why users prefer to study in the library

Interestingly, friendly, helpful staff featured in this set of data (18%, 7/38) as one explanation for why the library was popular, whereas this was not mentioned in the case study literature. Again, it is possible that this is a function of methodology: the qualitative studies might elicit this, especially if the studies are conducted by librarians themselves. More 'objective' methods commonly used in the case studies, such as observation, would be less likely to observe this as a factor.

Silent / quiet spaces were identified as important to students (58%, 22/38) and there were lots of comments about noise in the qualitative data. Capacity was also something that concerned students with 37% (14/38) mentioning the library being too busy or not being able to find a space. 'Seat saving' by leaving belongings to protect a space came up more than in the case study literature (21%, 8/38 v. 10%). Group study spaces were popular (45%, 17/38, slightly more than the case study literature 35%). Access to electrical outlets was predictably important (47%, 18/38). Convenience (i.e. being the closest place to where students are on campus at a given time) ranked more highly than in the case study literature (21%, 8/38 v. 8%). This could be because of differences of methodology, because in the Sconul library data, studies often considered the overall student experience (for example, following a typical day) or the campus as a whole. So they had a stronger focus on choice of location than the case study literature. Access to food and drink was extremely important (63%, 24/38); this is interesting, as in the case study literature this figure was only 32%. It is possible that US libraries have more relaxed attitudes to allowing food and drink. Many comments in this set of UK data were from students requesting permission to bring food and drink into the library where it was currently not allowed. However, 'eating and drinking' activities actually noted (15/38, 39%) were at similar levels to the case study literature (33%).

In-depth studies

A close reading of the five more in-depth studies (Studies 2, 4, 20, 21, 35) revealed a number of interesting themes that go beyond our existing framework.

One issue that came up in a number of studies is the problem created by ambiguous spaces. The report of one study (Study 2) suggested that students dislike areas where use is ambiguous, for example, between socialising and quiet study:

> *If students do not understand what a space is for… their natural reaction is to give up on it… if the rules about a specific area are unclear, students feel let down and annoyed. They would like to see some demarcation between spaces. We tend to assume that students will work things out for themselves, but on the whole, they do not want to spend the time doing that.*

Leisure space and working spaces should be clearly separated (Study 20). In a point related to this, another study (Study 21) suggested the need to have a consistent signage, branding and policy for different types of study space across the whole of campus.

> *There is a very mixed economy in relation to the nature of permanent study space provision across campus. Spaces range from the very large dedicated library sites, with substantial associated services, to very informal areas, often located adjacent to, or forming part of, cafes. Spaces may be managed and maintained centrally, or by Faculty or School. With the exception of IT clusters (which were not assessed by the study), there is no discernible common standard or branding associated with all study spaces. Quality levels, as assessed by the project audit, vary considerably.*

A potentially related point is about what constitutes library use. One person in Study 20 considered themselves a non-user as the only services they used were printing and group study rooms.

Several studies pointed to the importance of the relation of different types of designated space. Thus a designated quiet space could not be close to a busy thoroughfare because of the noise this generated. In addition, the impact of clear boundaries between areas is important. For example, space before the turnstiles is recreational; once past turnstiles, students' behaviour and demeanour change (Study 20).

Study 35 focussed particularly on foundation students doing a pre-degree course. What was notable in shaping their experience was the way that, feeling themselves as outsiders, they struggled to understand and were rather passive, expecting to be given a lot of guidance. They often experienced the library as overwhelming. They also seemed to experience fairly basic barriers to using the library, such as forgetting their library cards or finding it hard to locate a book. The noisy behaviour of other students did not fit into their idea of a library. But they did like to study alongside other students to try and learn expectations of behaviour. This study offers an intriguing hint into the variety of experience of library space, a topic not much dealt with in the case study literature we looked at.

Reflections on the data

There are a number of reflections to be made on the SCONUL libraries dataset as a whole. Any comments have to be qualified by acknowledging that our sample might not be representative of all the studies that have actually been conducted. Most studies that were shared were from the last three years. If library space were investigated as part of a much wider project, it could well have not been considered sufficiently relevant to share. The same might apply if a consultant or third party led the project.

As has already been mentioned, the purposes of the studies in the SCONUL data were often much more focussed and specific than the case study data, reducing comparability. Further, the wide variety of methods in the SCONUL data, while a testament to the rich variety of research tools in use in this area, also reduces potential comparability.

As is apparent from the analysis above there are strong parallels with the published case study literature. Many of the main questions being asked and the findings seem to echo those of the case study literature. As in the case study literature there is a lack of differentiation among student populations and relatively little data on when the library is most used. The main uses of the library seem to be common across the study.

There was a very wide range of methods of data collection in use, many explicitly UX inspired (15/38), but also many questionnaire- or interview-based studies. The emphasis in what was shared with us was on qualitative data. Turnstile and log-in data was also being used, but mostly just to study temporal patterns of use.

Some of the data seems weak from a methodological point of view in terms of capturing opinions, but without any real context for those opinions. Some of the UX methods might be considered more fun and engaging than rigorous.

Many of the studies have quite a specific purpose, often to evaluate use of space post-refurbishment. Consistent with this, most of the data was from studies conducted over a short time frame, with some exceptions such as the study of a student year or the series of investigations over a number of years that made up Study 36. Thus there is a lack of longitudinal work.

Most of the studies (35/38) had been conducted by a library team, seemingly not within the context of a wider study of campus use as a whole or in the spirit of the 'library in the life of the user'. There were exceptions, e.g. Studies 21 and 36, that had been conducted by an academic department. However, most studies specifically focussed on a particular library building and how it was used. This suggests that research about library space is still not conducted with a contextual sense of where the library fits into the campus as a whole or in partnership with estates management or management of other functions. This could possibly be simply a feature of what was shared with us, but it is also a feature of the published literature.

Few of the studies seemed to have had a strong engagement with the literature, except UX methodology literature. Again this could be an impression created by our sample or what was shared with us. However, it does suggest a potential lack of reliance on the literature as a source of guidance on local decisions.

Part Seven: Future trends

There is every reason to suppose that the logic presented above in Figure 1 will continue to play out shaping library space for the foreseeable future. While not yet fully developed, there are a number of current trends that are likely to impact spatial design and use in the next few years, though they are more likely to affect it within the current envelope than increase or decrease spatial use.

One key new trend is the notion of the smart or intelligent campus (JISC, 2018). The basis of this is artificial intelligence (AI) applied to campus management, using learning analytics and other big data, such as from sensors, combined with massive computing power. The potential impacts have been summarised as 'wide and deep' (JISC, n.d.). Indeed, a diverse range of potential applications are explored by the JISC intelligent campus blog. In their review of a number of international campus projects, Valks, Arksteijn and den Heijer (2018) found that key drivers for the smart campus are varied, from efficient space management, to sustainability, through to improved wayfinding. As it happens, most Dutch university smart campus projects are directed to more efficient space management. The smart campus will allow much closer monitoring of use of space (Hoy, 2016). Smart tools offer potential for greater efficiency in use of space in line with the general driver for the rationalisation of space management, in the context of increasing student numbers and decreasing public funding per student (Valks, Arksteijn and den Heijer, 2018). Other applications could include, for example, control of heating, lighting, etc. in real time to save energy. Equally, on the other hand, AI offers potentially better student learning experiences through mass customisation of tutoring and support. Quite apart from the technical issues such as interoperability and security, current debate in the social sciences identifies that there are acute issues of ethics and data justice produced by AI: around privacy and surveillance; transparency and intelligibility; and issues of equity and bias arising from the way the data industry works (Campolo et al. 2017; Whittaker et al. 2018). These might be seen as particularly problematic aspects given the values associated with the notion of the library (Schöpfel, 2018).

The current concern with the decolonisation of the university is also likely to prompt a rethinking of library space. Decolonisation suggests that the curriculum, research agenda and staff body need to be refashioned to make more inclusive institutions and narrow the performance gap for BAME students. Among other factors shaping BAME students' experiences is the campus as a place. Some work (in the USA) has already examined how library spaces implicitly instantiate white privilege. For example, Beilin (2017) points to the potential association between classical or gothic style with white monoculturalism. Brook et al. (2015) identify 'environmental micro-aggressions' such as choice of décor including celebrations of patrons, typically white males. All these factors impact on the sense of welcome that BAME students might feel in library spaces (Stewart et al. 2019). This continues similar types of argument reflecting on how the campus is experienced as alienating by other groups, such as those based on class (Costello, 2002).

Surprisingly little of the literature dealing with disabled users considers the impact of space; it almost exclusively focuses on web accessibility.

Another growing imperative is a concern with student wellbeing. The library already offers a safe, supportive environment within which to study. However, it is likely that there will be more work around creating spaces that specifically support student wellbeing, for example by accommodating more space in which to relax, such as through nap stations (Wise, 2018), or to become more active, by using standing desks and fitness equipment (Clement et al. 2018). Clement et al. (2018, p. 166) found that 'users

find mental and physical health value in the "active learning space" and many would find value in the expansion and improvement of the space'. Finding ways for students to leave the library, to take a break, but keep their place may be beneficial. That students value having everything in the same place may drive service design, but it might not necessarily be a good thing for their wellbeing.

Sustainability is also of growing importance in shaping spatial design (Lamis, 2003). As was apparent in Part one above, it is already established as a key driver for overall campus management. It will impact new building, but at a micro level will impact furnishing, lighting and heating choices, and daily practice (Spodick, 2016). Given student commitment to sustainable values, students may be a key driver for this increasingly important priority (Afacan, 2017).

Part Eight: COVID-19

This report was largely completed prior to the start of the COVID-19 pandemic. From the perspective of January 2021, when this section is being added, it is too early to guess the length and shape of the immediate crisis or its medium- or long-term impacts, but it is important to begin to reflect on the potential implications of the pandemic on the use of library space.

The beginning of the pandemic forced the closure of academic libraries in the UK in spring 2020. They were gradually reopened with reduced capacity due to social distancing during the summer of 2020. The use of space was shaped strongly by new requirements such as book quarantining, social distancing and new cleaning regimes. Access to the print collection was often restricted to click and collect services. Nevertheless, library provision of COVID-secure study spaces remained a reason for students to come to campus.

COVID-19 was a rapidly impacting disruptor with many strong twists and turns, pivots and mutations, but it might also be:

- a long-lasting disruption, the impact of which we will be working with for years and a prompt to make institutions more flexible in the future (Breeding, 2020);
- the trigger of an economic downturn that could shape responses;
- a stress test that exposed existing problems;
- 'an amazing experiment' in the relation between physical and digital (Marmot, 2020);
- an acceleration of existing trends (AUDE, 2020; Dempsey, 2020; Frederick & Wolff-Eisenberg, 2020);
- 'a catalyst of change' (Greenhall, 2020) and a prompt for reassessment of strategies (Dempsey, 2020).

These changes will impact the role of library space.

The pandemic forced a pivot online, thus strengthening the long-term trend towards reliance on digital content and the wider digital shift in library services and operations (Greenhall, 2020; LIBER, 2020). One immediate impact of COVID-19 was the suspension of print book purchases (Greenhall, 2020). The transition to digital-first purchasing policies has been accelerated. There also emerged a perceived need to reset licence agreements with publishers which are still partly premised on physical use. Pressure on library budgets may also force a reconsideration of licensing approaches. Thus COVID-19 could mark a further move away from print as defining the identity and processes in the library (Dempsey, 2020). It could lead to more collective management of the print collection (Dempsey, 2020). It may have also accelerated progress in open access, e.g. through more pre-print publication and the implicit admission by publishers that subscription models block scientific knowledge-sharing (Kiley, 2020). It could also lead to more digitisation of the unique content in special collections, which were particularly badly hit by lockdown (Warren, 2020). If these further shifts towards digitisation prove to be long-term effects, they would be likely to further diminish the stress on the library physical space as primarily a place to house print collections. Yet the pandemic also exposed weaknesses and inequalities in access to the digital. Access to content was more dependent on access to library buildings than had been appreciated before, e.g. where access was based on secure terminals (Greenhall, 2020). Copyright and licensing conditions meant much content was impossible to supply digitally. Even if these issues are addressed, the findings of this report show that the value of the physical space of the library has not been lost in the digital shift.

The use of library space will also be impacted by wider shifts prompted by COVID-19. The pandemic may lead to a long-term re-evaluation of some forms of face-to-face teaching. Forced to teach online, many lecturers have discovered the positive affordances of digital learning for the first time. Perhaps it sounds the death knell of the large lecture. However, it seems unlikely that universities will not continue to place high value on quality face-to-face interactions, e.g. for student group work, and the library remains an important venue for this. Face-to-face learning experiences may be harder to offer, but they are likely to continue to be valued, perhaps with even greater emphasis on the quality of space provision to support this. AUDE (2020: 10) suggests:

> *Learning spaces need to be 'more like homes' with kitchen table-like discussion areas. We need to 'design against isolation', working against loneliness and real or perceived lack of contact hours.*

Indeed, the growth of awareness of wellbeing and loneliness as an aspect of the pandemic may reinforce the value of library spaces because they offer a form of social learning experience. Social distancing may make this hard to offer at the same level for some time. It may require more coordination with others who are managing other campus spaces. Indeed, some of this experience may need to be reinvented online (Warren, 2020). COVID-19 prompted more experimentation in providing virtual library experiences (Wolff-Eisenberg, 2020), as ways were sought to create third spaces online, as some public libraries have sought to do (Riggs, 2020). But there was also an awareness of the damaging effects of too much screen time and the limits of online communication that suggest that face-to-face interaction will remain an essential aspect of the student learning experience. So it is hard to see a decline in the perceived value of the library as a social learning space.

Despite the digital shift prompted by COVID-19, according to Frederick and Wolff-Eisenberg (2020) most US library directors still see the library space as critical to their long-term plans. A similar sentiment is quoted by LIBER (2020: 19):

> *Discussions on the hybrid and blended forms of future education as well as libraries. Space and Place are still very important as part of libraries, as well as the competencies of library staff. It's the combination of digital and physical libraries that are the future.*

Most of the long-term shifts discussed in this report suggest the continuing importance of library spaces to student experience.

Part Nine: Conclusions and recommendations

Why are there more students than ever in the library?

The starting point for this report was the observation that prior to the COVID-19 pandemic the numbers of students using libraries is stable or rising and the realisation that this is not very coherently explained in the literature. This report concludes from the literature that the key factors are:

1. There are more students in total.
2. Students are using the library because departmental space is occupied more intensively as a result of centralisation of campus space management.
3. Trends in pedagogy favour a style of student-centred, active learning that is somewhat independent of the teacher, but is resource-intensive and often based on connecting to other learners. Because teachers are less central, being physically in the home department building is less important.
4. Libraries have adjusted both the design of space and rules of behaviour in their spaces, to offer a variety of places where this kind of learning can happen. They continue to balance the value of quiet removed spaces that are good for concentration with spaces suitable for collaborative work. The decline in space devoted to printed stock has enabled this rebalancing, yet students still value the book stock as a learning resource.
5. Students value a space that is dedicated to learning and has good resources and cues prompting learning and reducing prevarication. The library is seen to have fewer distractions and to be quieter than other places on campus or student accommodation; the behaviour of others can be moderated or controlled by staff. Having a place dedicated to study is a key driver for students to attend the physical library; they value the sense of the 'gravitas' of the library (May & Swabey, 2015) and other cues that are picked up when they are in the library, such as:
    a. being around others who are working;
    b. being in a place dedicated to study: this is a cue for them to work, which is not evident in other places around campus or accommodation;
    c. feeling like a part of something bigger, 'inspiration'(Andrews et al. 2016).
6. While ICTs create the possibility of pure e-learning, supported by entirely digital resources, in reality students prefer blended learning experiences and continue to value printed collections.
7. Access to technology in the library is also an important factor in its popularity – students very often bring their own laptops but also use printers, desktop PCs (including access to specific software that is only available at the library, and valuing access to more powerful PCs to run it), scanners, etc.

8. At a basic level the library is seen as convenient (HEDQF, 2019).
9. Space dedicated to group work is increasingly important to students, and the library provides this, while other spaces on campus do not. It is more convenient and comfortable for group work than working elsewhere, such as in students' accommodation.
10. Students want to work alongside their friends.
11. There is no strong indication that library services offered face to face are a strong motivation for students to visit the library.
12. Academic staff are implicitly not seen as a key user group; however, their use of the physical library has been little studied.

The COVID-19 pandemic has had a dramatic immediate impact on use of library space. At the time of writing, it is too early to be sure of the longer-term effects. There are strong indications that it will reinforce the digital shift. Yet to date the digital shift has not undermined the value placed by students on library space. Most of the points made in the previous section continue to hold true.

Reflections and directions for future research

1. There is a wide range of methods now in use to study library space, from log-in and turnstile data, surveys and focus groups, through to more creative UX methods. This gives spatial studies a very rich toolbox from which to draw.
2. There is already much sharing of insights, e.g. through conference presentations and informal professional networks. However, many useful studies are undertaken that could be more widely shared. While many studies have very specific purposes, there does seem to be value in synthesising the results of local studies.
3. The framework developed in this study (Appendix 1) is a useful starting point for planning studies because it identifies themes that may not be immediately obvious.
4. Relatively few of the SCONUL studies seem to draw on the literature, suggesting a focus on local issues, when in fact there are some fairly strong patterns across this literature that are highly relevant. It is true that the US-dominated published literature does tend to have a few differences in emphasis, judging by the SCONUL studies.
5. Gaps in both the case study literature and the SCONUL data suggest the value of more studies of specific populations and how they use the library.
6. Studies of library space tend to neglect the wider picture of how the library fits into campus use. Yet as SCONUL Study 21 identifies, some branding, policy and wayfinding matters would benefit from a campus-wide approach.
7. Future studies will be needed to reflect on the short- and long-term impact of the COVID-19 pandemic.

Appendix 1

		Frequency in case study literature	Percentage of case studies	Frequency in SCONUL library data	Percentage
Who	Males use library more than females	5	8%	0	0%
	Under-25s use library most	5	8%	0	0%
	Undergraduates use library most	4	6%	3	8%
	Users self-report generally good grades (but frequency of visits unrelated to GPA)	3	5%	0	0%
	Most study alone	20	32%	3	8%
	Study alongside others ('alone together')	11	18%	6	15%
	Female users prefer more visible areas	1	2%	0	0%
	Male users prefer social spaces	1	2%	0	0%
	Female users prefer closed group study areas	1	2%	0	0%
	BAME students visited more than white students	2	3%	0	0%
	Chinese students borrow fewer items, use fewer e-resources	1	2%	0	0%
	European (non-UK) students borrow more, use more e-resources	1	2%	0	0%
	Asian students prefer quiet spaces	1	2%	0	0%
	Mature students make more use of e-resources	1	2%	0	0%
	Country of domicile influences behaviour more than ethnicity	1	2%	0	0%
	Business students use more	2	3%	0	0%
	Humanities students use less	3	5%	0	0%
	Law students use very little	1	2%	0	0%
	Arts students use less	1	2%	0	0%
	Arts and humanities students use more	0	0%	0	0%

Table continues overleaf

		Frequency in case study literature	Percentage of case studies	Frequency in SCONUL library data	Percentage
Who ctd.	Social sciences students use more	1	2%	0	0%
	Sciences students use more	2	3%	0	0%
	Sciences students use less	0	0%	0	0%
	Postgraduates value 'information control'	3	5%	0	0%
	Undergraduates value 'library as place'	3	5%	0	0%
	Postgraduates value individual study spaces more than undergraduates	1	2%	0	0%
	Undergraduates value open group spaces more than postgrads	1	2%	0	0%
When	Visit several times a week or more	10	16%	6	15%
	Visit for extended periods of time (several hours plus)	14	23%	4	10%
	Peak occupancy 11am¬–4pm	2	3%	2	5%
	Monday–Thursday busier	13	21%	1	3%
	Evenings and late afternoons busier	8	13%	2	5%
	Mornings busier	1	2%	0	0%
	Afternoons busier (1–4pm)	3	5%	7	18%
	End of semester busier	4	6%	3	8%
	Fall semester busier than spring	1	2%	1	3%
	Use of study carrels higher at end of semester	1	2%	0	0%
	Individuals in day; groups in evening	1	2%	0	0%
	Come before / between classes or in evening for individual work; printing	1	2%	1	3%
	Come between classes for group work, socialising	1	2%	1	3%
	Spaces used more / less at different times of day	2	3%	0	0%
	Quieter spaces more popular in evening	1	2%	1	3%

Table continues overleaf

		Frequency in case study literature	Percentage of case studies	Frequency in SCONUL library data	Percentage
What	Usually multiple reasons for visiting	14	23%	0	0%
	Using desktop or laptop computer	55	89%	26	67%
	Use of print materials	29	47%	22	56%
	Technological use (computers, printers, scanners, etc.)	34	55%	25	64%
	Conversation / socialising	25	40%	8	21%
	Low usage of service desk	6	10%	1	3%
	Group work / collaborative work	39	63%	17	44%
	'Chilling' (e.g. watching movies, gaming, texting, social media)	12	19%	10	26%
	Eating and drinking	17	27%	16	41%
	Multi-tasking with multiple devices	13	21%	7	18%
	Low use of point-of-need learning services	1	2%	0	0%
	Partnership with other campus services	2	3%	0	0%
	Cultural / outreach / fun events	2	3%	2	5%
	Sleeping	7	11%	3	8%
	Taking a class	3	5%	0	0%
	Prefer to access help / service online rather than in-person	1	2%	0	0%
Why	Library-specific attributes (staff, behaviour enforcement, quiet space)	14	23%	4	10%
	Different settings for different activities	16	26%	11	28%
	Value the 'gravitas' of the library	6	10%	2	5%
	Feel like part of something bigger / inspiration	4	6%	5	13%
	Visual cue of seeing others work / social pressure to work	6	10%	5	13%

Table continues overleaf

		Frequency in case study literature	Percentage of case studies	Frequency in SCONUL library data	Percentage
Where	Silent / quiet spaces important	36	58%	22	56%
	Crowded, hard to find a seat / room – necessity over preference	19	31%	14	36%
	Students have a favourite place	8	13%	2	5%
	Windows are important for light and views	8	13%	11	28%
	Background atmosphere / ambiance important	15	24%	10	26%
	Group study rooms or workstations are popular	20	32%	17	44%
	Higher floors are preferred	6	10%	0	0%
	Flexible space, able to be configured to students' needs	16	26%	5	13%
	Carrels popular with students	11	18%	8	21%
	Electrical outlets important	28	45%	18	46%
	Flexible / integrated technology valued	5	8%	0	0%
	Variety of furniture and seating types important	20	32%	8	21%
	Nature and natural light important	10	16%	3	8%
	Low traffic, lack of distractions desired	7	11%	2	5%
	Partial privacy	11	18%	6	15%
	Modern, new, open, clean aesthetic preferred	4	6%	2	5%
	Access to food and drink valued	19	31%	25	64%
	Like space to spread out	17	27%	7	18%
	Comfort / cosiness important	23	37%	5	13%
	Convenience is critical (i.e. closest place to where they happen to be for other reasons)	1	2%	8	21%
	Use computers near entrances and info desks	1	2%	0	0%
	Leave / abandon belongings (to save their spot)	5	8%	8	21%
		62		39	

Appendix 2

	Date	Purpose	Methods used	Wider study? Librarians / researchers?	UX study?
Study 1	2018–2019	Routine study of library use	Survey (closed and open questions)	Library	
Study 2	2017	Potential future improvements	Observation of locations visited; focus groups; mapping; touchstone tours	UX team at library	Yes
Study 3	2018–2019	Evaluation of use of the building overnight	Count of wi-fi connections and PC logins (8pm–7am)	UX team at library	
Study 4	2018–2019	Capture data and insights through first-year undergraduate journey	Diaries kept by users (questions, tasks, mapping, 'love letters', photos, card sorting, reflective writing)	UX team at library	Yes
Study 5	2018–2019	Evaluation post-refurbishment	Head count; observation; questionnaire; PC login count; charging locker usage data; feedback on whiteboard; short self-service survey on touchscreen monitor	Library	Yes
Study 6	2017	Analysis of signage and wayfinding in one building	Contextual enquiry (asking users to perform tasks, objective and subjective observation); card-sorting (placing suggested features in order of importance)	UX team at library	Yes
Study 7	2012	Consultation pre-refurbishment	Survey (closed and open questions)	Library	
Study 8	2015	Consultation pre-refurbishment	Survey; interactive display to vote on design features; graffiti whiteboard; suggestions box (with blank floor plans); open meeting	Library	
Study 9	2018	Library space usage	Survey (closed questions)	Market research company	
Study 10	2019	Insight into current situation	Love letters / break-up letters	Library	Yes
Study 11	2017	Evaluation of refurbished areas	Exit interviews; survey; graffiti wall; observation; design exercises	Library	Yes

Table continues overleaf

	Date	Purpose	Methods used	Wider study? Librarians / researchers?	UX study?
Study 12	2017	Evaluating usage over Christmas	Gate count; head count; email enquiry count	Library (security staff)	
Study 13	2018	Evaluating usage over Christmas	Gate count; head count; email enquiry count	Library (security staff)	
Study 14	2018	Evaluation post-refurbishment informing future refurbishment	'Rate or hate' exercise; observations; touchstone tours and mapping	UX team at library	Yes
Study 15	2019	Evaluation post-refurbishment	'Rate or hate' exercise	UX team at library	Yes
Study 16	2017	Inform decisions about study space during building works; shape future decisions about library study space design	Touchstone tours; observations; insights board	Cross-library group	Yes
Study 17	2018	Post-refurbishment evaluation; inform future	Touchstone tours; observations; suggestion poster	UX team at library	Yes
Study 18	2015?	Evaluate current situation; inform future decisions	Observations; interviews	UX team (Imperial College London and Bodleian Library Oxford collaboration)	Yes
Study 19	2018	Evaluation of library space as a whole	Cognitive mapping	Library	Yes
Study 20	2019	Evaluate current situation; inform future decisions	Survey kiosks; study space audit; interviews; micro pop-up survey on website; head count; 'life pulse' survey;	Campus-wide evaluation	
Study 21	2017	Evaluate current situation	Diaries; touchstone tours; interviews; focus groups	Master's students in anthropology	Yes
Study 22	2014	Improve quality and provision of current space	Workshops; various surveys? e.g. NSS survey, etc.; collection management data; printer usage; visit data	Library	
Study 23	2015	Improve quality and provision of current space	Workshops; various surveys? e.g. NSS survey, etc.; collection management data; printer usage; visit data	Library	

Table continues overleaf

	Date	Purpose	Methods used	Wider study? Librarians / researchers?	UX study?
Study 24	2016–2017	Produce business case for major refurbishment and expansion	Workshops; various surveys? e.g. NSS survey, etc.; collection management data; printer usage; visit data; benchmarking	Library	
Study 25	2017	Assess viability of library	Focus groups	Student services directorate	
Study 26	2018	Post- occupancy assessment	Occupancy data; 'feedback'	Library	
Study 27	2018–2019	Inform future strategy	Comment boards; online padlet; open meeting; meeting with HoS / administrators	Library, sponsored by Student Services	
Study 28	2019	Evaluate current situation	Love letters / break-up letters	Science and Engineering Library Teaching and Learning Team	Yes
Study 29	2017	Evaluate current situation, discover ideal study space	Draw ideal study space; daylight modelling; focus groups; survey	Library, architecture student	
Study 30	2014–2015	Understand how library is used	Interviews	Library	
Study 31	2011–2012	Evaluate usage (v. academic performance), inform future decisions	Gate count; loan data; degree results	Library	
Study 32	2013–2015	Measure usage	Gate count; PC login count; loan data	Library	
Study 33	2016–2017	Measure usage of collection	Loan data	Library	
Study 34	2017–2018	Measure usage	Gate count; PC login count; loan data	Library	
Study 35	2018	Understand how used by foundation level students	'Ethnographic' observations	Student project	Yes
Study 36	2016	Inform design; evaluate post occupancy	First impressions survey (online; graffiti boards); headcount; observational study; student narrative accounts	Library / learning and teaching staff	
Study 37	2010	Evaluate current situation; inform design	Observation; survey	External consultant	
Study 38	2017		Workshops	Library	

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