"I feel like I sleep here": How space and place influence medical student experiences

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Abstract

Introduction

Buildings and learning spaces contribute in crucial ways to peoples' experiences of these spaces. However, this aspect of context has been under-researched in medical education. We addressed this gap in knowledge by using the conceptual notions of space and place as heuristic lenses to explore the impact of a new medical school building on student experiences.

Methods

We carried out an exploratory case study to explore the impact of a new medical school building on student experiences. Data were collected from: archived documents (n=50), interviews with key stakeholders (n=17) and focus group data from students (n=17 [participants]); to provide context and aid triangulation. Data coding and analysis were initially inductive, using thematic analysis. After themes emerged, we applied the concepts of boundary objects, liminal space and Foucault's panopticon to provide a framework for the data.

Results

There was a specific vision and intentions for the place (the location) and space (the facilities) of the new medical school building (e.g., positioned to facilitate flow between educational and clinical settings). However, the unintentional consequences of the planning were that students felt disconnected from the wider university, trapped on the healthcare campus, and under pressure to behave not like students but in a manner that they believed was expected by clinical staff and patients.

Discussion

Despite much effort and a focus on creating an idyllic space and place, the new medical school had both positive and (unintentionally) negative impact on student experiences. These findings highlight the importance of reflecting on, and exploring, how space and place may influence and shape students' learning experiences during the formative years of their professional identity, a necessary consideration when planning new medical school learning spaces or changing these spaces.

Introduction

Rather than being "just" a background setting, (1) buildings and spaces contribute in crucial ways to peoples' experiences of these spaces. (2–6) In the clinical arena, wall maps, signage, artwork and directional footsteps act as landmarks to ease patient's navigation through hospital physical spaces. (7) How wards are spatially configured impacts on the relationships and interactions between patients, their carer's and staff (8). Space is also important in terms of the learning environment (9,10) for example, the function and influence of informal spaces where students continue to learn outside the classroom (café's, students' social spaces and staff coffee rooms within hospital wards) are significant arenas for breaking up formal hierarchies. (11,12)

Moreover, space is not just a background against which students (and teachers) perform, and neither does it just function as a static repository in which to pour or contain them. (13) As space is filled with people acting out their lives, (14) the human experience of a place adds an essential - and location/context - specific dimension to understanding the implications of activities and relationships within a physical space. (3,15) For example, the corridor spaces within the hospital environment act as an important conduit for exchange of clinical information (16) and act as passageways for the 'hidden curriculum of productive corridor conversations' and informal teaching opportunities. (11: p.28)

Place can have various meanings: ranging from a particular space (as above), to a social setting (e.g., everyday life activities, such as a medical school, a home or place of work), and to geographical locations (e.g., a building, city and country). What makes a place outstanding is not only its material form, but also how it is understood, interpreted or experienced; the meaning and value that people associate with it and attach to it. (4,9,17) For example, a house is more than a building, it is (hopefully) a place of security, comfort and family life, imbued with memories. Therefore, as well as being a location in space, place is fundamental to a sense of belonging, and as a locus for identity. (6)

Our knowledge of the space and place literature highlighted that, while there is an emerging body of scholarly literature on the topics of space and place in medical education, (18–21) this is a relatively new field of inquiry and one in which there are important gaps. One such gap is research looking at the impact of medical school buildings on students' learning experiences and the development of professional identity. Many medical schools are situated in aged, historically-important buildings. Other medical schools are investing in new buildings and spaces to meet the demands of contemporary medical education. (22,23) Whatever the nature of the buildings, these will be crucial contributors to students' learning and social experiences, (9,10,19) actively providing social meaning and sense of belonging. (1) The design of medical school buildings and where they are situated will contribute to professional socialisation and professional development. As a consequence, the way in which physical spaces become specifically educational or learning places, how they are established in ways that enable or inhibit learning, how they create inequities or exclusions, or create unintended consequences on contemporary ways of thinking about learning spaces, requires in-depth consideration. (13)

In response to calls to look more critically at how students experience both their medical school learning environment and university life, (24) we draw upon the conceptual notions of space and place as heuristic lenses to interrogate and understand how space and place may affect, and be affected by, the people who inhabit them. (24) We were presented with the ideal opportunity to do this when a new medical school teaching building was planned in one of our Universities. Our specific focus was to identify and examine the intentioned and unintended impact of a new medical school building on student experiences and practices.

Methods

Study Design

We used an exploratory case study design to examine how a medical school building/facility supports student experiences and professional development. A case study is described as "an empirical inquiry that investigates a contemporary phenomenon in depth within its real-life context", (25: p.23)and is particularly useful when the boundaries are not clear between phenomenon and the context. (25) Using a case study approach allowed us to answer "how" and "why" type questions and to explore experiences and perspectives of those involved in commissioning, designing and using the building.

The Setting

The setting for the study was a medium-sized (approximately 180 students per cohort), state-funded medical school in the UK, with a 5-year undergraduate medical programme (MBChB). To provide context, a brief history and comparison of the "old" and the "new" medical school teaching facilities is outlined in Box 1. The building is used largely for teaching the early years of the MBChB programme and a small number of Physician Associate (PA) students. The building also hosts MBChB students in later years, professional development courses and undergraduate as well as postgraduate medical assessments.

Box 1   The "old" versus the "new" medical school

Until 2009, undergraduate medical teaching was spread across three campuses and a variety of buildings. For example, one building, on the periphery of the healthcare campus could support small group teaching but not large groups or lectures. These were delivered on the main university campus (approximately 3 kilometres away). Anatomy teaching was delivered on a third site (again, about 3 km away, but in a different direction to the main university campus). Students spent much time travelling between sites, and there were few places in any of the buildings where they could congregate or study between classes. Several of the buildings were in an advanced state of disrepair and there was some urgency in moving teaching out of them to enable demolition and/or major renovation.

The new medical school building was commissioned to bring all teaching (large group, small group, anatomy) into one, contemporary teaching facility placed centrally on the healthcare campus. Concurrent with the design and implementation of the new teaching centre was a curriculum reform, one aim of which was to maximise the potential of the new building. For example, the alignment of the new build and the new curriculum enabled a move from a 'traditional' pre-clinical/clinical format to an integrated, systems-based curricula using more student-centred and 21st century teaching processes (such as simulation and three-dimensional anatomy).

The new Centre is a five-storey, timber-clad building, with 6500 square meters of internal floor space and a central atrium which allows natural light into the heart of the building. It houses a variety of amenities and departments providing teaching and training facilities (e.g., anatomy, a simulated ward area, a large lecture hall, a conference room), areas for social interaction (e.g., a café used by medical school staff, students and members of the public), and flexible teaching, training and meeting rooms. Each floor has dedicated functions (e.g., anatomy, clinical skills) and also includes office space for staff associated with these core teaching and training functions.

With reference to designing spaces for the networked learning landscape (or learning environment), (26) this study is set within the domains of building and campus scales**.**

Data Collection

We utilised three data sources: (i) archived documents relating to the vision, intentions, design and planning of the new Centre; (ii) interviews with key stakeholders involved in the Centre planning and purpose; and (iii) focus group data from users (students). A triangulated approach was used as a means of seeking convergence and corroboration through the use of different data sources and methods. (27) By triangulating data, we attempted to provide 'a confluence of evidence that breeds credibility' (28: p.10) and guard against our findings being an artefact of a single method (29) and the concomitant lessening of the conceptual generalizability and transferability of the findings (30) that might inform the design of medical education learning spaces elsewhere in the future.

Document sources were from the architect reports, building project proposals and medical school executive summaries of building plans. Approximately 50 electronic and hard copy documents were reviewed by the first author. These were arranged in context and chronological order and coded for analysis (see later).

Using a criterion based and volunteer sampling strategy, (29) we purposefully targeted stakeholders who were central to the vision, planning and commissioning of the new Centre, with the view that these individuals fulfilled our criteria of being able to provide credible information about the development of the learning space. (30) They included: senior medical school faculty, physicians, scientists, social scientists and medical school faculty in leadership roles.

The recruitment of participants was conducted via email. Positive responses were followed up by email. This included further information about the study, and a time (and place) for a semi-structured, individual interview. Questions were designed to explore participants' perspectives on the aims, objectives, vision and intentions behind commissioning a new medical school facility. Some key individuals also took part in a follow-up interview four–six months later, to explore in more

detail the themes from the initial interviews. In total, seventeen individual interviews were conducted with eleven senior Faculty (six men and five women) representing a diversity of backgrounds. When we report this data we identify the participants as FSM (faculty staff member) 1, FSM 2 and so forth, to protect their anonymity. The median interview length was 43 minutes (ranging from 26 – 55 minutes), giving approximately 11 hours of interview data.

Finally, focus group interviews were undertaken in order to gain a rich understanding of student experiences and views of their space and place of learning. (31) The semi-structured focus group questions were developed from the space and place literature, particularly studies with specific relevance to undergraduate medicine, (10,18,20,24,32,33) and were also informed by our findings from the archived documents and key stakeholder interviews. Again using a criterion sampling strategy, we purposively targeted the two groups of students whose courses were delivered in the building (medical students and PAs). (29) Recruitment was as per the interviews above.

Two focus group interviews were carried out with students. Focus group 1, with medical students, had eight participants (one male, seven female: three Year 1 students, two Year 2 students and one student from each of Years 3, 4 and 5). Focus group 2 involved nine PA students (two male, seven female). When we report this data we identify the focus group participants as FGMS 1 (Focus group medical student number 1), FGPA 2 (focus group PA student number 2) and so forth, to protect their anonymity. The medical student focus group lasted 64 minutes. The PA student focus group lasted 82 minutes.

Data Analysis

Documents were subjected to a directed content analysis, (34) in order to contextualise the vision, intentions and plans for the new medical school space (35) and to illuminate and give insight into diversity of meanings and understandings; from the intentions of the key designers to the

experience of the targeted subjects of that design, the students themselves. We identified themes

and highlighted illustrative data and exemplar quotations. All interviews were audio recorded with

participant permission and transcribed for analysis. Transcripts were entered into NVIVO Version

11.0 (QRS International Pty Ltd, Doncaster, Vic, Australia) qualitative data analysis software

programme. Data coding and analysis of transcribed interviews was performed inductively using

thematic analysis to generate an initial coding scheme, and to look for themes and patterns in the

data. (36) Preliminary theoretical notes and memos were made to record first impressions, and

further thoughts. Codes were then sorted into categories based on how different codes were related

and linked. These categories were used to organise codes and to group them into meaningful

clusters. (37) The analysis of transcripts was conducted iteratively until saturation was achieved (i.e.,

no new codes or themes were generated).

Sensitising Concepts: Boundary objects and liminal space

When themes were identified we moved beyond preliminary thematic analysis to a more directed

approach in order to critically analyse how the intentions and vision for the new school facility

translated into practice. After much discussion of the data, we identified two sensitising lenses.

Together these provided a framework to organise and interpret the data. First, we used the concept

of boundary objects. (38) Boundary objects refer to objects that serve as an interface between

different communities of practice and that can hold different meanings and values for different

people. (38) Boundary objects play a vital role by establishing a shared context between different

parties and by allowing members of different groups to find common ground and to interact

productively. (39,40) They 'act as anchors or bridges, however temporary'. (40: p.414) Thus,

boundaries are important because they connect communities and offer learning opportunities in

their own right. However, 'boundaries can create divisions and be a source of separation

fragmentation, disconnection, and misunderstanding. Yet, they can also be areas of unusual

learning, places where perspectives meet and new possibilities arise.' (41: p.233)

In relation to this, we also drew on the concept of liminality. A liminal space (42) is a transformative state in the process of learning in which there is a shift from one frame to another. This 'betwixt and between space', or 'neither here nor there', can be experienced as vulnerable but also as an opportunity for transformation. (42,43) Liminal space is defined as a space that is 'at the boundary of two dominant spaces, which is not fully part of either'. (44: p.238) Liminal spaces stand in direct contrast to dominant spaces (e.g. spaces which are defined by normal uses that typically have clear boundaries and where the practices within them are woven together with routines and social expectation (45)).

Methodological rigour was ensured in a number of ways. (46) To ensure continuity, all interviews were undertaken by the first author. We considered our relationships and positions with the data continually and critically; (47) in light of our different disciplinary backgrounds (nursing, psychology, medical sociology) and research perspectives (often working from different methodological and theoretical preferences) and how these might have shaped our co-construction of the data. Furthermore, interpretative rigor was ensured through researcher triangulation whereby all researchers (authors) were involved in the analytical process of the study. (30) As a group, we met at regular intervals to discuss and carefully challenge the emerging interpretations through critical questioning. Preliminary data analysis was shared and discussed with colleagues outside the research team to whether or not the findings appeared credible and reasonable, and to further crystallisation of the data analysis process. (48)

Ethics Approval

Ethical approval from the Aberdeen University College of Life Sciences and Medicine Ethical Research Board and appropriate institutional consents were obtained in advance of primary data collection. Participants were provided with verbal and written assurance of anonymity, confidentiality and data security.

Results

We identified three inter-relating themes from the interview and document data. These were: (1) the intentions of the architects and building designers (2) the emergence of boundary objects and liminal identities, (3) the unintended consequences of separation from the wider university community. These are presented below.

The intentions: a new heart for the healthcare campus

The new medical school building was envisioned as a significant and valuable asset; in terms of its location and with respect of the facilities provided by the space and the activities made possible.

The Architects' design proposals revealed that the facility was intended to be an important focal point for the medical school community, and its commissioning aimed to give a new lease of life to the healthcare campus:

> 'The new building offers a tremendous opportunity to provide a new heart to the campus… this in turn means that [it] should act like a Village Hall or Church to anchor this heart.' (Architects Design Plan)

> 'A full-square building within a village green… A dignified object… [that would] symbolise a civic relationship to the surrounding institutions and form a hub.' (Architects Report)

This nostalgic notion of the village hall or church is a form of material culture that has significant meaning in the UK context. A village is a small settlement of houses and associated buildings usually situated in a rural setting. (49) Villages are self-contained community settlements of people clustered around a central point, most often a church, a village hall or open public space, with the latter often referred to as a 'village green'. The village green or hall has been described as the

physical and ideological centre of the community it serves, functioning to bring the local community together, to interact and create community within that place. (50)

This 'heart' metaphor encapsulates the envisioned context and positioning of the medical education facility and is the key principle from which the overarching objectives of the architects' and key stakeholders stem. The architects intended not only that the new facility to be centrally important and prominent in its place on the healthcare campus (in terms of both stature and in function), but also a facility where those who study thereto have a sense of belonging to the (healthcare) community (Fig. 1).

Figure 1: The medical education facility – at the heart of the healthcare campus

The key stakeholders also expected the centre to become much more than just a locus of teaching and learning activity:

'[It] was going to be the kind of geographical centre of everything that we were trying to achieve. So, I think we were all, indeed, geographically, and almost spiritually, basing the new curriculum within the new building. So, it was both a geographical location as well as a home.' (FSM 8)

The school building was built on a large tertiary healthcare campus. The campus encompasses several large separate hospital buildings housing different services (e.g., maternity, children, adult, cancer centre, in-patient and outpatient facilities, administrative services) all belonging to the UK's National Health Service (NHS). As Box 1 indicates, the previous medical school building had been located on the periphery of this campus, whereas the new one was positioned centrally, thereby supporting the analogy of a 'hear'" and representing a stronger relationship between the medical school and clinical environment:

'The [school building] will forge important links between medical teaching and clinical practice, ensuring the University… retains its long history of excellence in health education… At the heart, [a] building… which acts as the physical and symbolic meeting point of the two institutions…' (Architect Report)

This statement highlights two different, but related points. The location of the building was purposeful, and was intended to encourage close connections between medical training (university) and the workplace (hospitals) and to provide a closer connection between students and patients. This would be supported by the location, in terms of the practicalities of '… ease of access for clinical staff and patients who may be involved in teaching…' (Medical School Executive Planning Paper).

The place of the medical school building and the building as an organisational structure, enabled it to play the role of a boundary object, the intention of this is to enable multiple practices (such as, the

theoretical and simulated learning activities provided in the medical school facility), to negotiate their relationships and connect their perspectives (41) to the real-life world of the clinical settings. More broadly, the school building was to 'act as a bridge' between the University and the NHS Clinical Teaching Facility, in order to connect these communities and where learning opportunities can occur and in which students can interact with patients early in their careers. (38,51) However, there were unintended sociocultural consequences in terms of the learning experiences of students and their formation of the identities of both a medical professional and university student.

Neither here, Nor there: liminal spaces, liminal identities

Just as the architects and planners had imagined, the locality of the healthcare campus and its proximity to the hospital helped some students feel part of the medical community: 'You [are] often walking past actual doctors and that makes it nice and more real to be in medical school… there [is] the hospital right there… and you [are] part of that community of healthcare…' (FGMS 4). Yet, for others, being situated so close to the hospital made them feel that they could not 'just' be university students. Instead they felt pressured to conform and conduct themselves in a manner they believed was expected by clinical staff and patients:

> '[there is an] expectation put on us, you can [not] have the same uni experience as most
> people. If you did you [would] be risking your learning, so I think from the beginning there is
> a difference, to be honest…' (FGMS 8)

> '…so many patients walking around the site, even looking at medical students they expect
> them to be dressed a certain way…' (FGMS 5)

It seemed that close proximity to the hospital clinical environment had a direct effect on shaping students' professional identity and their sense of belonging to the medical community (whether they

felt ready for this or not). This illustrates the importance of location: it matters and is closely connected with students' identity formation. (6,9,15)

The new building allows teaching to be delivered in one place, rather than students being split between campuses as had been the case previously (Box 1). However, an unanticipated or unintended consequence of this was that students felt disconnected and isolated from the wider university. For example, although students acknowledged the convenience of having everything on one site, many went on to express concerns about not being part of the main university community and 'missing out' on having a full university experience:

> 'I think it [is] really nice to be in a purpose built environment and you get the feeling that this building has been built for us… it [is] really nice to be in this building all the time and have all the facilities here.' (FGMS 1)

However, this student then went on to say:

> '… I think it [is] a shame… you lose some of the university experience that you would have got if you were [doing] a few courses [on the main campus]… A lot of people can be very, I do [not] want to use the word narrow minded, but you get very channelled into your own [medical] degree… and you miss out on those experiences that other students get when they [are] at [main campus] mixing with other things and other students…' (FGMS 1)

Not being part of the mainstream university student culture influenced students' sense of belonging and group identity:

'…it does [not] feel like we [are] Uni students, it feels like we [are] NHS or [medical school centre students], and I think that [is] symptomatic of being away and separate from the main university…' (FGPA 2)

'…for us the [medical school] Centre… is our Uni.' (FGMS 2)

As per the concept of liminality, students felt both physically and symbolically separated from the wider university and betwixt two worlds. (42)

It seemed that the medical school building, designed implicitly as a boundary object connecting the two major institutions/communities of the University and the NHS, was partially successful in doing so. Yet, in the landscape of the communities and boundaries, the students identified strongly with the local medical school facility but rather tenuously with the wider university. Rather than feeling like 'university' students, they felt like 'medical' students, surrounded by, and friendly with, only their 'own kind': (52)

'I do [not] feel connected to the [main] Campus at all… I think most medical students meet people from the rest [of the] university just through flatmates, which is great if you [have non medic] flatmates… As a result I do [not] have any friends that are [not] medics… I do [not] really know anyone from the university. So I just do [not] talk to anyone that [is] not a medical student… it [is] very separate.' (FGMS 8)

This quotation illustrates how place (location) provides a strong sense of 'belonging' (6) and can be understood by the meaning and value that people associate with it and attach to it. (9)

Some students perceived that the isolation had benefits in terms of encouraging close friendships among medical students:

>'Medical students are away from other… University students who are [at] the main campus… so I think it [is]… like a family almost [here].' (FGMS 5)

Yet, like being in any intense family environment, sometimes it all got a bit much for some:

>'I think it can send you a bit crazy sometimes, because some days you [do not] actually set foot outside the [school building].' (FGPA2)

Furthermore, some students felt trapped in the building:

>'…a lot of the time my entire week is spent on [this] campus. I never leave, I feel like I sleep here… It would [be] nice to just get away from here sometimes.' (FGPA6)

Panopticism and disconnection

This sense of isolation and entrapment can be viewed through Foucault's notion of the panopticon. This refers to a social and physical design that enables the control of its subjects (prisoners, patients, students) through separation and constant observation. (53) One of the key functions of the panopticon was to instill self-regulatory behaviours in a given population. (54,55) This is reflected in the following quote, when a respondent discussed that they had no choice, but to fit within the medical/doctor mould:

'It reinforces the whole, as a doctor you have a certain identity, and that starts from when you [are] a medical student, whether you like it or not. So you have to fit in with that mould.' (FGMS 1)

Panopticism was also reflected in students' experiences of being in the shared social space of the building's café. Many described it as a place to which they would not choose to go for lunch, to relax or to catch up with friends. They expressed feeling restricted and guarded in conversations, even fearful of being watched and overheard sharing stories that could be misinterpreted and judged as not reflecting behaviour acceptable in a medical student:

'If we [are] sitting in the café having a conversation… we have to say, oh no wait, we should [not] be talking about that, because there are patients [here] … it [is] quite hard because you [are] sitting in the café just talking to friends about a funny story and you [are] like, oh no, we should move somewhere else.' (FGMS 2)

This quote illustrates that although the provision of social space, a café, had been planned as a positive feature (e.g. '… connectivity and… informal interaction… [is] an important component of learning… reinforced by… the café…' (Architects Design Plan)), the café was not experienced as such by students. Instead, it was somewhere they felt under surveillance and in which they had to self-regulate their behaviours. (54) Ironically, the building's panoptic function had the effect of achieving what the building could not; it served to connect the students to the university by pushing them to its 'heart', the main university library on the main campus. The library was the one place in which students felt connected to the wider university community and were able to escape form the medical:

'You see different faces, a fresh change… you can just feel… [in the medical school facility] everything [is] getting a bit too much…' (FGMS 5)

'[At the medical school]… there are stressing medical student's everywhere… Oh goodness, I do [not] want to be like that, so I go to [main library] instead.' (FGMS 2)

While the library was a place of study, it was also the 'bridge' between medical students and the wider university community:

'[it] is probably what ties a lot of medical students to [main] campus…' (FGMS 5)

Discussion

We report on a setting in which there were a number of specific good intentions for the place (the location) and space of a new medical school building. However, the reality as experienced by the students did not wholly align with the intended vision of producing a physical and ideological centre. Students recognised the benefits of close proximity to the hospital, were aware that the medical school connected them with the hospital community of the local NHS (thus acting as a boundary object), and appreciated the convenience of having everything on one site and the modern facilities provided by the new medical school building. However, there were tensions between these advantages and being disconnected from the rest of the undergraduate student community, missing out on the wider university experience and needing to act as a doctor as an early years medical student. (56) This led to some students feeling isolated and trapped, and fearful of being watched and negatively judged. This unintended effect of the new medical school structure and spatial location reflects anthropological analyses of the construction and lived experiences of village life, in which the inhabitants have been portrayed as largely isolated from the outside world and stifled to the point of suffocation. (57–59) In this sense, it could be argued that the intentions of the architects to simulate a village atmosphere were actually quite successful. However, in focusing on the purely positive aspects of a 'village green' effect, the architects and building planners did not step back and consider the potential negative, unexpected impacts of their design.

Student adaptation to this 'insulated life' (60) included behaving in certain ways in the confines of the medical school and finding their own boundary place/object in the form of the university library on the main campus. This provided an intersection between two worlds, those of being, respectively, a medical student and a university student. In short, it seemed as if students were caught in-between two identity performances in two different spaces that afforded them differential opportunities to become and feel like a university student, or a trainee doctor. (61,62)

Lovell (52) also found that geographical separation from the university campus led to an enforced isolation for students, but, in his study, students perceived such isolation as positive and self-sustaining (e.g., by supporting the establishment of peer support networks). These different findings may reflect differences in the respective student populations: Lovell looked only at final year medical students, those who were embedded into the clinical years in a traditional preclinical/clinical programme, whereas the majority of our own student participants were from early years groups, which spend more time in the medical school than in clinical environments and are further away from 'becoming a doctor'. (63)

Nordquist & Laing (19) suggest that the most important step to the creation of a new learning environment is the successful communication of the educational vision contained within the curriculum to the architect. Our document analysis indicated that educational faculty staff and architects had worked together on the design, plans and vision for the school facility. Unfortunately the views of an important stakeholder – the student body - were lacking. Whether there inclusion would have changed things is unknown but we would urge that others consider involving students when planning and evaluating the formation of learning spaces. What was also lacking was a sensitisation to the sociocultural aspects of both material building design and medical education, particularly when they are intertwined. Buildings are a form of material culture (64) they both represent and provide the conditions for the (re)production of community and individual identity,

particularly in medicine. Without this sensitivity, we will continue to create unintended consequences such as those outlined in this study and will be blind to them and their potential adverse effects on professional identity formation processes amongst medical students. (65)

This study raises interesting questions over how medical students and future medical practitioners are shaped by space and place. We propose that learning in a silo may lead to problems in interprofessional working further down the line. (24) Moreover, it may be that physical distance and isolation from the wider university reinforces a perception that medical students are in some way different or special. (52) Could such separation and learning space siloes contribute towards the influence of the hidden curriculum? (66) We are also concerned about whether students are subject to unnecessary mental health stressors that relate to their management of the liminal identify linked to this enforced separation. Medical students experience higher rates of depression than the general population. (67–69) Might this be related to the very location of medical learning spaces? Are these potential issues outweighed by the advantages of close proximity to healthcare environments? What are the effects of a lack of exposure to the diversity of a student community on campus, and the development of social competence with people from other backgrounds? Moreover, does being separate from the milieu of the broader university life affect students' ability to work with other professions and to gain life skills in dealing with cultures other than that in to which they are being inculcated? Does this also impact on their professional identity formation, and, if so, in what ways? Furthermore, what impact would this have on students' effectiveness in their patient encounter skills? We cannot answer these questions but we invite others to consider them in future studies.

The case study approach allowed us to explore the impact of a new medical school building on student experiences. (25) Our study was carried out in one context, which may limit its generalisability. (70) However, the purpose of the single case study is to expand and generate theory, rather than to proving theory or 'statistical generalisation'. (25,71) Methodological and data

triangulation allowed for the development of a deeper understanding of the phenomena, rather than a potential bias resulting from the use of a single method, (30,25) to check interpretation and to reveal and verify alternative meanings. (71) The sensitising concepts of boundary objects and liminality illuminated certain aspects of the data; (72) another lens might have emphasised different aspects of the problem, such as identity formation, and the nature of the power relationships and social dynamics between the architects and those commissioning the medical school.

Conclusion

The current study joins an existing conversation on the topic of the space and place of learning in medical education. (10,20,24,52,73,74) Our empirical data expands this conversation, providing insight into the process of implementing the vision of a new learning space and the resultant experiences and perceptions of students studying in that place. We have shown that 'place is remarkable, and what makes it so, is an unwindable spiral of material form and interpretative understandings or experience'. (4: p471) We urge those involved in planning medical school spaces to continue this discussion by considering how reflecting on, and exploring, how space and place may influence and shape students' learning experiences.

References

1. Kuntz A. Time place and participants. In: Savin-Baden M, Major CH, editors. Qualitative research : the essential guide to theory and practice. Abingdon: Routledge; 2013. p. 569.

2. Lefebvre H. The Production of Space. Oxford: Wiley-Blackwell; 1991.

3. Kearns RA, Joseph AE. Space in Its Place : Developing the Link in Medical Geography. 1993;37(6):711–7.

4. Gieryn TF. A Space for Place in Sociology. Annu Rev Sociol. 2000;26(1):463–96.

5. Cummins S, Curtis S, Diez-Roux A V., Macintyre S. Understanding and representing "place" in health research: A relational approach. Soc Sci Med. 2007;65(9):1825–38.

6. Agnew J. Space and place. In: Laing A, Bacevice PA, editors. Handbook of geographical knowledge. Thousand Oaks, CA: SAGE; 2011. p. 316–30.

7. Adams A, Theodore D, Goldenberg E, McLaren C, McKeever P. Kids in the atrium: Comparing architectural intentions and children's experiences in a pediatric hospital lobby. Soc Sci Med. 2010;70(5):658–67.

8. Curtis P, Northcott A. The impact of single and shared rooms on family-centred care in children's hospitals. J Clin Nurs. 2017;26(11-12):1584–96.

9. Poland B, Lehoux P, Holmes D, Andrews G. How place matters: Unpacking technology and power in health and social care. Heal Soc Care Community. 2005;13(2):170–80.

10. Nordquist J, Kitto S, Peller J, Ygge J, Reeves S. Focusing on future learning environments: Exploring the role of space and place for interprofessional education. J Interprof Care. 2011 Nov 20;25(6):391–3.

11. Bleakley A. The dislocation of medical dominance: Making space for interprofessional care. J Interprof Care. 2013;27(S2):24–30.

12. Nordquist J, Sundberg K, Kitto S, Ygge J, Reeves S. Future learning environments: the advent of a "spatial turn"? J Interprof Care. 2013;27(sup2):77–81.

13. Fenwick T. Spatiality and temporality: Understanding cultural geography. In: Fenwick T,

Edwards R, Sawchuk P, editors. Emerging approaches in educational research : tracing the socio-material. New York: Routledge; 2011.

14. Griffiths MJ, Johnston RJ. What's in a place? An approach to the concept of place, as illustrated by the British National Union of Mineworkers' Strike, 1984–85. Antipode. 1991;23(2):185–213.

15. Bleakley A, Bligh J, Browne J. Medical Education for the Future. Identity, Power and Location. Springer; 2011.

16. Long D, Iedema R, Bonsan BL. Corridor Conversations: Clinical Communication in Casual Spaces. In: Iedema R, editor. The discourse of hospital communication : tracing complexities in contemporary health care organizations. Hampshire: Palgrave Macmillan; 2007.

17. Laing A, Bacevice PA. Using design to drive organizational performance and innovation in the corporate workplace: implications for interprofessional environments. J Interprof Care. 2013;27 Suppl 2:37–45.

18. Shochet RB, Colbert-Getz JM, Levine RB, Wright SM. Gauging Events That Influence Students' Perceptions of the Medical School Learning Environment. Acad Med. 2013 Feb;88(2):246–52.

19. Nordquist J, Laing A. Spaces for learning - A neglected area in curriculum change and strategic educational leadership. Med Teach. 2014;36(7):555–6.

20. Nordquist J. Alignment achieved? The learning landscape and curricula in health profession education. Med Educ. 2016;50(1):61–8.

21. Wasson LT, Cusmano A, Meli L, Louh I, Falzon L, Hampsey M, et al. Association Between Learning Environment Interventions and Medical Student Well-being. JAMA. 2016;316(21):2237.

22. Nordenström J, Kiessling A, Nordquist J. Building for change: University hospital design for future clinical learning. J Interprof Care. 2013;27(S2):72–6.

23. Wessels Q, Rennie T. Reflecting on interprofessional education in the design of space and place: Lessons from Namibia. J Interprof Care. 2013;27(S2):69–71.

24. Kitto S, Nordquist J, Peller J, Grant R, Reeves S. The disconnections between space, place and learning in interprofessional education: an overview of key issues. J Interprof Care. 2013;27 Suppl 2:5–8.

25. Yin RK. Case study research : design and methods. Third. Applied social research methods series ; Sage Publications; 2003.

26. Nordquist J, Laing A. Designing spaces for the networked learning landscape. Med Teach [Internet]. 2015;37(4):337–43. Available from: 59X.2014.1001349

27. Denzin NK. The research act: A theoretical introduction to sociological methods. Chicago: Aldine Pub. Co; 1978.

28. Eisner EW. The enlightened eye : qualitative inquiry and the enhancement of educational practice. Toronto; 1991.

29. Patton M. Qualitative Evaluation and Research Methods. Sage. Beverly Hills, CA: Sage Publications; 1990.

30. Kitto SC, Chesters J, Grbich C. Quality in qualitative research. Med J Aust. 2008;188(4):243–6.

31. Morgan DL, Krueger RA. When to Use Focus Groups and Why. In: Morgan DL, editor. Successful Focus Groups: Advancing the State of the Art. Thousand Oaks, CA: SAGE Publications, Inc.; 1993. p. 6–7.

32. Shochet RB, Colbert-Getz JM, Wright SM. The Johns Hopkins Learning Environment Scale. Acad Med. 2015 Jun;90(6):810–8.

33. Skochelak SE, Stansfield RB, Dunham L, Dekhtyar M, Gruppen LD, Christianson C, et al. Medical Student Perceptions of the Learning Environment at the End of the First Year. Acad Med. 2016;91(9):1257–62.

34. Hsieh H-F. Three Approaches to Qualitative Content Analysis. Qual Health Res. 2005;15(9):1277–88.

35. Bowen GA. Qualitative Research. Qual Res. 2008;8(1):137–52.

36. Braun V, Clarke V. Using thematic analysis in psychology. Qual Res Psychol. 2006 Jan;3:77–

101.

37.   Patton MQ. Qualitative research and evaluation methods. Sage Publications; 2002.

38.   Star SL, Griesemer JR. Institutional Ecology, `Translations' and Boundary Objects: Amateurs and Professionals in Berkeley's Museum of Vertebrate Zoology, 1907-39. Soc Stud Sci. 1989;19(3):387–420.

39.   Carlile PR. A Pragmatic View of Knowledge and Boundaries: Boundary Objects in New Product Development. Organ Sci. 2002;13(4):442–55.

40.   Lindberg K, Walter L, Raviola E. Performing boundary work: The emergence of a new practice in a hybrid operating room. Soc Sci Med. 2017;182:81–8.

41.   Wenger E. Communities of Practice and Social Learning Systems. Organization. 2000;7(2):225–46.

42.   Turner V. The ritual process : structure and anti-structure. Abingdon, Oxon: Routledger; 1995.

43.   Van Gennep A. The Rites of Passage. London, UK: University of Chicago Press; 1960.

44.   Dale K, Burrell G. The spaces of organisation and the organisation of space: power, identity and materiality at work. London: Palgrave Macmillan; 2008.

45.   Shortt H. Liminality, space and the importance of "transitory dwelling places" at work. Hum Relations. 2015;68(4):633–58.

46.   King N. Interviews in qualitative research. SAGE; 2009.

47.   McMillan W. Theory in healthcare education research: the importance of worldview. In: Researching Medical Education. Chichester, UK: John Wiley & Sons, Ltd; 2015. p. 15–24.

48.   Richardson L. Writing: A method of inquiry. In: Denzin NK, Lincoln YS, editors. Handbook of Qualitative Research. 2nd ed. Thousand Oaks, CA: SAGE; 2000. p. 923–48.

49.   Tyler K. The Racialised and Classed Constitution of English Village Life. J Anthropol Museum Ethnogr. 2003;68(3):391–412.

50.   Lupro MM. Preserving the Old Ways, Protecting the New: Post-War British Urban Planning in The Kinks Are the Village Green Preservation Society. Pop Music Soc. 2006;29(2):189–200.

51.   Wenger W. Communities of practice: Learning, meaning and identity press. Cambridge: Cambridge University Press; 1998.

52.   Lovell B. "We are a tight community": social groups and social identity in medical undergraduates. Med Educ. 2015;49(10):1016–27.

53.   Mason, M K. Foucault and His Panopticon [Internet]. 2017 [cited 2017 Dec 2]. Available from: http://www.moyak.com/papers/michel-foucault-power.html

54.   Foucault M. Discipline and punish : the birth of the prison. London: Penguin Books; 1979.

55.   Kitto S. Translating an Electronic Panopticon Educational technology and the re-articulation of lecturer-student relations in online learning. Information, Commun Soc. 2003;6(1):1–23.

56.   Stubbing E, Helmich E, Cleland J. Authoring the identity of learner before doctor in the figured world of medical school. Perspect Med Educ. 2018;7(1):40–6.

57.   Strathern M. The village as an idea: constructs of village-ness in Elmdon, Essex. In: Cohen AP, editor. Belonging : identity and social organisation in British rural cultures. Manchester: Manchester University Press; 1982. p. 247–78.

58.   Taylor TG. Urban geography : a study of site, evolution, pattern and classification in villages, towns and cities. Abingdon, Oxon: Routledge; 2007.

59.   Steur L. Traveling models of indigenism and Kerala's emergent "adivasi" politics. Anthropol Notebooks. 2011;17(2):91–109.

60.   Lempp H. Medical School Culture. In: Brosnan C, Turner BS, editors. Handbook of Sociology of Medical Education. London, UK: Routledge; 2014. p. 71–88.

61.   Thompson C. Making parents : the ontological choreography of reproductive technologies. Inside technology. MIT Press; 2005.

62.   Cussins C. Ontological Choreography: Agency through Objectification in Infertility Clinics. Soc Stud Sci. 1996;26(3):575–610.

63.   Frost HD, Regehr G. I am a doctor: Negotiating the discourses of standardization and diversity in professional identity construction. Acad Med. 2013;88(10):1570–7.

64. Hodder I. The Interpretation of documents and material culture. In: Denzin NK, Lincoln YS, editors. The handbook of qualitative research. 2nd ed. Thousand Oaks, CA: Sage Publications; 2000. p. 155–75.

65. Monrouxe L V. Identity, identification and medical education: why should we care? Med Educ. 2010;44(1):40–9.

66. Hafferty FW. Beyond curriculum reform: confronting medicine's hidden curriculum. Acad Med. 1998;73(4):403–7.

67. Schernhammer ES, Colditz GA. Suicide rates among physicians: A quantitative and gender assessment (meta-analysis). Vol. 161, American Journal of Psychiatry. 2004. p. 2295–302.

68. Rotenstein LS, Ramos MA, Torre M, Segal JB, Peluso MJ, Guille C, et al. Prevalence of Depression, Depressive Symptoms, and Suicidal Ideation Among Medical Students. JAMA. 2016;316(21):2214.

69. Slavin SJ. Medical Student Mental Health. JAMA [Internet]. 2016 Dec 6 [cited 2017 Dec 2];316(21):2195. Available from: http://www.ncbi.nlm.nih.gov/pubmed/27923076

70. Sarantakos S. Social research. 3rd ed. New York: Palgrave Macmillan; 2005.

71. Stake RE. The art of case study research. The art of case study research. Sage Publications; 1995.

72. Bordage G. Conceptual frameworks to illuminate and magnify. Med Educ. 2009;43(4):312–9.

73. Isba R. When I say … micro learning environment. Med Educ. 2015;49(9):859–60.

74. Pololi LH, Evans AT, Nickell L, Reboli AC, Coplit LD, Stuber ML, et al. Assessing the Learning Environment for Medical Students: An Evaluation of a Novel Survey Instrument in Four Medical Schools. Acad Psychiatry. 2016;1–6.