Habits in Habitats: school architecture and teachers' interactions with space in Manchester and Copenhagen

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Abstract

When we think of urban architecture, it seems we rarely think about secondary schools and their design, despite their ubiquity in cities. Architects who have considered school buildings have been too blithe in their focus on the ways in which the spaces they construct are used, reused and reconstructed by those within: teachers and students. This research plugs this gap by approaching school architecture and spaces from a multidisciplinary perspective to assess the complex ways in which teachers' relationships with space are embedded in the school context, with a particular focus on the patterns that have emerged in different schools according to their architectural or physical form in two locations: Manchester and Copenhagen. Uncovered here is the Deweyian way in which teachers value primarily the instrumentality of their environments: older cellular schools are somewhat restrictive for implementing today's mix of pedagogies that require a diversity of spaces. Yet nonetheless, this research shows that teachers do interact with spaces in seemingly to employ seemingly incongruent pedagogies: flexibility in the standard classroom and surveillance in open-plan environments. Finally, secondary schools are fit into their geographical context to reveal the impact of international, national, urban and internal cultures upon the myriad ways that teachers produce space in the schools.

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Introduction

'If you really want to shift a culture, it's two things: its habits and its habitats-the habits of mind and the physical environment in which people operate' Sir Ken Robinson (cited in Learning Ecologies Design Studio, 2013).

It is indisputable today that schooling at all levels across locations spanning the whole globe is increasingly an urban phenomenon, 'if only because increasing proportions of the world's population are becoming urban' (Hentschke, 2012: 205). This is hardly something new: the birth of compulsory schooling has been directly linked to the synchronous processes of urbanisation and industrialisation by many economic historians (see: Simon, 1974): often it is portrayed as a disciplinary response to the need to manage growing populations in increasingly urban contexts (Deacon, 2006). Although this has been more recently contested by academics tending towards more multifaceted explanations related to ideology, culture and educational reforms (see: Green, 1990; Boli & Ramirez, 1992), school building today is primarily an urban phenomenon in Europe. Yet when we think of urban architecture it seems that we more often conjure up images of skyscrapers, street design and transport hubs than secondary schools. From the relative paucity of multidisciplinary research that has been devoted to the practical and symbolic impacts of school buildings, it would seem that architectural and spatial research has also been blind to its importance (Higgins et al., 2005).

Although there has been a focus on the methods used to teach and educate students ever since the one room schoolhouse was largely abandoned in the mid nineteenth century, often such considerations have ignored the school building itself (Dudek, 2000). This reflects the bounded nature of research: pedagogical research has concerned educational studies, school design has been part of architectural studies, and the impact of the building on students' attainment largely restricted to environmental psychology: three disciplines approaching from three different angles. This does not reflect reality: pedagogy and architecture are inherently interconnected, from the monumentalist nineteenth century school and authoritarian approaches to clustered educational spaces and differentiated teaching today. More recently however, awareness has grown of the environments in which teaching takes place, and how they reflect, and may support or hinder, different pedagogical approaches and ways of learning[1].

[1] Consider the widespread attention given to the Building School for the Future project in the UK or the international interest in the link between pedagogy and architecture at Ørestad Gymnasium, Copenhagen.

Indicating a middle ground between monumentalist, authoritarian spaces and the radical, though far from ubiquitous, open spaces of the 1960s and 1970s, newly built schools combine defined open and closed spaces built to encourage teachers to use pedagogies such as differentiated, personalised learning and team teaching. However, older buildings, perhaps incongruent to these pedagogical ideas, live on amongst newer ones: teachers continue to teach in school buildings that reflect approaches to education from a different era. Old ideas of what a school building should look like and how a teacher should teach also persist: the former Danish Prime Minister Andreas Fogh Rasmussen spoke in 2003, for example, of the way in which the traditional learning of academic skills had been tarnished by accusations of rote learning and memorisation and thus had been wrongly supplanted by sitting in circles and asking what others what they thought (stm.dk, n.d.). Today what is left is a confusing mix of school buildings and pedagogies: monumentalist nineteenth and early twentieth century schools; standardised, cellular post-WW2 designs; open-plan schools; recently built schools aiming to satisfy educational demands of the twenty-first century; and finally many schools which are a physical hybrid of designs after being updated, renovated and expanded in different time periods. This research will look at the way in which teachers interact with this mix of architecture and educational spaces to ask the following question:

How do different educational spaces in Manchester secondary schools and Copenhagen gymnasia influence teaching practices and vice versa?

Note the double-sidedness of this question: this research begins from the Lefebvrian (1991) basis that space is both physically and socially produced and that teachers are part of this process. A focus will be applied to *time and place*: the architecture in question will reflect varying time periods from the early twentieth century until today in schools located in different areas of Copenhagen and Manchester. Tendencies will be uncovered in the ways that different architectural forms and spaces inhibit or empower teachers and in the ways that teachers perceive, use and produce such spaces. In particular, consideration will be given to the extent to which (and the means by which) teachers continue to use cellular spaces for didactic, teacher-oriented practices. Likewise, I will uncover the extent to which newly designed school environments are perceived and used by teachers in ways congruent with twenty-first century pedagogical ideas of personalised, differentiated learning. Through this focus, a secondary question can be formed:

To what extent and in what direction is there a "lag" between architecture and teaching methods in Manchester secondary schools and Copenhagen gymnasia?

To use the terminology of Martin (2002), it should become clearer, in which type of spaces teachers feel *free* to employ whatever teaching method they desire, and which spaces leave teachers feeling more *confused* or worse *imprisoned* by the environment around them. The ways in which teachers can or cannot overcome spatial limitations that arise from the architectural design of the school will be understood. When functionality is concerned, only spaces in which teachers use or could potentially use to teacher are considered, in order to maintain a degree of focus in the research. Nonetheless, where the symbolic nature of the school architecture appears to have a relationship with the teacher's pedagogical methods, the school will be looked at from a much wider frame.

Space and Schools: Extending the academic field

'Considering that it is almost axiomatic that space as the physical environment of a school will affect the teaching and learning within it, there has been surprisingly little research on this' (McGregor, 2004a: 2).

For far too long the subject of space in schools has been fragmented across different bounded disciplines: architects have focused on the physical form of school buildings; the impact of the environment on users has largely been the subject of environmental psychology; social science has tended to own notions of space and spatiality; and pedagogy is often understood separately to all of these considerations by educationalists alone. This research is an attempt to transcend these disciplines by approaching the topic from an understanding that architecture spatiality and teachers' pedagogical methods are interconnected.

Despite some attention to the school environment during the 1960s and 1970s at the peak of the open-plan movement, Weinstein (1979: 577) wrote in the late 1970s that, the dominant assumption amongst educationalists has been that 'the child's learning depended solely on pedagogical, psychological and social variables', rather than any consideration for the actual environment in which these variables and the physical bodies of teacher and student are situated. As recently as 2002, it has been attested that serious understandings of the potential impact of school buildings on learning and teaching had only just materialised and schools buildings had hitherto been articulated simplistically as 'places where school is 'kept'' (Clark, 2002: 9). Perhaps this reflects a wider ignorance of the socio-spatial production of space that reflects upon it as merely an empty vessel waiting to be filled by certain actions (Massey, 1992).

Although with technological developments there has been a more recent influx in the number of studies into educational architecture, many have focused upon the correlation between building design and student performance, with 'little attention paid to qualitative perceptions of students and teachers about their learning environments' (Fisher, 2004: 37). Where focus has been applied to the context of the physical environment in teachers' work, they have often been vague, concluding with little more than the importance of more space or a "decent" space in which to work (Siegel, 2002). This research will provide a much more detailed understanding of how teachers are empowered and inhibited by certain spaces and how this is reflected in their behaviour and pedagogical approach.

Attempts to connect pedagogical approaches to the physical environment are often ideologically-driven and assume an underlying need in education to move from formal to informal learning spaces – a perspective frequently presented as 'obvious and unproblematic with the concept of informal linked in a relatively simplistic way to associated ideas such as personalised learning and social networking' (Boys, 2009). Rather than reflecting the voice of teachers, a way of imagining learning spaces is adopted that uses the tautological language of architects and policy-makers: formal and informal learning should be considered as binary opposites; informal learning is inherently good because 'it is social, personalised, and integrates physical and virtual environments'; and formal learning is inherently bad because 'it is a one-way transmission of factual knowledge from teacher to learner' (Boys, 2009). Despite the merits of these new pedagogies and their assumed educational environment, analyses often ignore the experiences of teachers or students. My research will plug this gap by not assuming an inherent connection between architecture and teachers' methods; instead I will uncover the ways in which teachers understand and use space of different styles and eras from students' and their own perspectives.

This research expands upon current studies of school design in a few other significant ways. Firstly, there have been no recent, detailed studies that make significant assessments of secondary school designs in both Denmark and the UK, nor more specifically in Copenhagen and Manchester. Secondly, despite a recent construction boom of gymnasia in Copenhagen (three schools in this study are recently renovated and one newly-built) and secondary schools in Manchester under the Building Schools for the Future (BSF) programme (one school in this study is newly built and all others have been renovated), much more focus has been given to the design of primary and elementary schools[2]. This research will contribute to a better understanding of how the environments created by both of these building booms are being utilised by teachers, and will thereby contribute to any evaluations of

[2] It should be noted here that the author's grasp of the Danish language is limited. Efforts have been made to translate articles in Danish, or other languages.

their successes and failures in achieving pedagogical aims. From these findings, in the conclusion of this work there are suggested ideas and considerations for the entire process of designing future secondary schools and gymnasia to enable pedagogical principles to be realised.

An Architectural and Pedagogical Chronology

The following review of the literature aims to cover the changes – internationally and more specifically to Denmark and the UK – in both school architecture and dominant pedagogies. Beginning from the historical perspective of the 19th century, it shows how we have arrived at an approach to school building and teaching today that combines traditional notions of cellular design and didactic teaching with more radical open learning spaces and pedagogies of differentiated and personalised, student-directed learning. Contributions reflect the multidisciplinary nature of the topic and come from historians, architects, educationalists and authors amongst others.

Schools in the 19th century

Many descriptions of 19th century school architecture have focused upon the way in which the school layout, with its "bells and cells" model of clearly segmented time and space, reflected the industrialisation of the period. The typical school by the 19th century, had, according to the OECD (2011a: 20), 'become an institution designed to drill people for the economy of the machine age which depended on a reliable and productive workforce'. Schools were supposed to prepare students for workplaces that emphasised uniformity, conformity and mass production. The architectural ramifications are well described: (OECD, 2011b: 25):

'*There was a time and a place for learning and this was at school; school was detached from the community and the classroom was detached both visually and physically from its external environment; hence the standard industrial era classroom design and the transmission model of teaching.'*

Large spaces had become segmented into what today seemingly remains as the standard classroom type, itself a product of a teacher-centred and hierarchical pedagogy. Within the four walls of the sanctified classroom the prevailing approach was didactic, whereby the teacher controlled and directed processes of learning and discipline in schools upon passive students (Dovey & Fisher, 2014).

The school as a form of disciplinary technology

Prior to the birth of the cellular classroom, students were predominantly taught in one large room in huge groups in a somewhat militarised fashion, symbolised by the Bell-Lancaster method - a monitorial system of primary school education devised by British educators Andrew Bell and Joseph Lancaster that spread across Northern Europe in the early 19th century. One teacher would be able to teach up to one thousand students simultaneously by employing and instructing monitors – older students who would teach a group of approximately ten students. This method held a disciplining function: 'it resembled a mass military service with multiplication tables, phonetic method reading, and so on' (Florin & Johansson, 1997: 52). It also marked the introduction of a process of spatialising pupil performance known as 'place capturing' (Paechter, 2000), whereby students were organised and placed in different locations in the schoolroom by teachers according to their ability. Although initially shelved by Copenhagen school directors, this pedagogical method was subsequently widely introduced across Denmark, owing something to the comments of Danish Physicist, Hans Christian Ørsted who noted its disciplining effects after visiting Manchester in the 1830s (Christensen, 2013: 403):

'*For the last fifteen years they have introduced schools according to the Bell-Lancaster method. You know by this method large groups can be taught in a short time. This is important to industry. It has been found that among those educated in this way, no crimes are being committed and only rare offences'.*

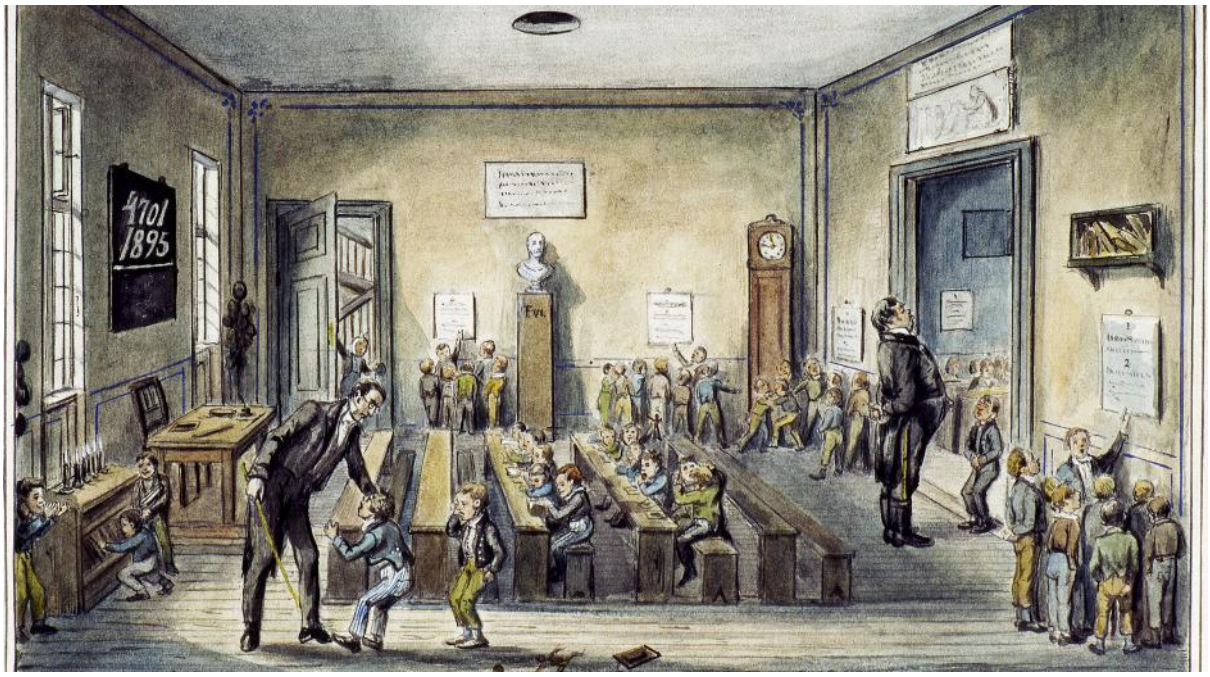


Figure 1: A drawing from around 1870 shows how teaching would take place in a Copenhagen school before 1850. The uniform ranks of students are complemented by mutual learning guided by student monitors – a clear hierarchical structure at play. (Source: Mikkelsen, 2014)

From this regimented style, the school would become, through a combination of architecture and pedagogy, what Foucault (1995) terms a form of *disciplinary technology* designed to produce obedient yet useful bodies under relentless observation. Indeed, it was a school - *École Militaire* – that first instilled in Jeremy Bentham's brother the idea of the Panopticon (Bentham & Božovič 1995: 87). Cell-like rooms distributed along corridors, windows implanted into the walls separating classroom from corridor and raised seating in the dining halls for inspectors of studies all allowed the building to be used as an apparatus for 'supervision of the smallest fragment of life and of the body' (Foucault 1995: 140). In this sense, "epistemological power" was exercised by the school upon students and teachers, both of whom were constantly under observation, and without any explicit use of power, still felt its presence (Tan, 2012). Architectural features allowed these disciplinary techniques: *enclosure* – students are easier to discipline when they are all living in the same closed-off reality, that is, the separate, monumental school; *partitioning* of disciplinary space into sections, often cellular, so that the location of students was always known to teachers and other adults (McLaren 2002: 88; Foucault 1995). Students would be separated in this partitioned space by rank, age, performance or behaviour.

The spatiality constructed in classrooms has to this day continued to uphold unequal teacher-student power relations. The teacher's desk, for example, has almost always been positioned at the front of the room as a 'symbol of authority and a point of surveillance' – untouchable to students, whose own desks don't confer the same status (McGregor, 2004b: 15). Knowledge is still often transmitted didactically from behind the desk that forms a teacher-student barrier (ibid.), and row seating separated by gender or ability remains prevalent. It can thus be argued that today's spatial arrangements inflict a disciplining of bodies that is not wholly dissimilar to a 19th century school. The extent to which the cellular classroom design has been an "epistemological power" held *over* teachers however is somewhat contested by McGregor (2004b), who noted their independence and relative freedom from surveillance granted in such an insulated, closed-off space.

The British & Danish Context

Most British schools in the early 19th century consisted of only a single classroom wherein most instruction was guided by discipline: Lancasterian methods or religion (English Heritage, 2011). As such, there was no coherent approach to school building prior to the Elementary Education Act of 1870, which made education compulsory for children aged six to eleven (Dudek, 2000). Suddenly,

expanding industrial areas needed schools and there came a greater focus on the buildings themselves. Guided by E.R. Robson – the chief architect of the London School Board – a Prussian system would be copied, consisting of a central communal hall with separated surrounding classrooms, in which one would find rows of desks with circulation space for the teacher who would predominantly be at the front (Dudek 2000: 13). This new style, often described as "Queen Anne revivalism", was eminent both at primary and secondary level, and was revered by some for its aspirational form, such as Sir Arthur Conan Doyle, who exclaimed, *'Lighthouses! Beacons of the future! Capsules, with hundreds of bright little seeds in each, out of which will spring the wiser, better England of the future'* (Banerjee 2010). These buildings were however born as much out of necessity as pedagogy, in a desperate attempt to improve upon the cramped, tall buildings in urban, industrial areas.

From the adoption of Lancasterian methods in huge classrooms in the first half-century, the same authoritarian, teacher-centred and disciplined fashion was to develop in Denmark thereafter, leaving a legacy of monumental schools organised like factories. Pedagogies were linked to long corridors and bounded classrooms where children would be educated in batches at tables and desks in uniform ranks. These schools were built for authority and discipline where students' experiences of alienation were reflected in their destruction and vandalism (Jellingsø, 1987: 45).

Schools in the 20th Century

The 20th century saw a slow transformation in school architecture marked by the persistence of the modular school design and the later influence of more open schools with greater spatial types and modes of adaptations that came from a new focus on student-centred learning (Dovey & Fisher, 2014). Key to this transition was the American educational reformer, John Dewey –a man who has been referred to, albeit controversially, as the 'elder statesman of the progressive education movement' (Albjerg Graham, 1971: 249). Belonging to the international *New Education* movement based on the philosophical concept of 'progressivism' (Biesta & Miederna, 1996), Dewey pushed forward what Radu (2011) terms a "Copernican revolution" in pedagogy that promoted child-centred learning environments and learning through discovery as opposed to an accumulation of thoughts transmitted from the teacher. Dewey (1915: 51) metaphorically expressed his vision:

'The change which is coming into our education is the shifting of the centre of gravity. It is a change, a revolution, not unlike that introduced by Copernicus when the astronomical centre shifted from the

earth to the sun. In this case the child becomes the sun about which the appliances of education revolve; he is the centre about which they are organised'.

At his University Laboratory School, Dewey developed an educational setting which placed in close proximity activities in workshops, textile rooms, laboratories and academic study to create 'a feeling of the subtle interplay of science, technological invention' (Wirth & Bewig, 1968: 83). This reflected his rationale that a school that is internally consisting of incoherent parts will always be inept – 'all waste is due to isolation' (Dewey, 1915: 60). As such, Dewey's "ideal school" is one where subjects are united and divisions between higher and lower education are removed by situating learning in the concrete world: 'the teacher will not have to resort to all sorts of devices to weave a little arithmetic into the history lesson, and the like. Relate the school to life, and all studies are of necessity correlated' (1915: 80-81). Out of such principles came his later *project method*[3]*,* promoting investigations that transcended academic disciplines.

According to Dewey (1966: 19), 'we never educate directly, but indirectly by means of the environment' – a term that he conceptualises broadly to encompass everything from physical objects, social actions and immaterial phenomena (Dewey, 1998). The environment for Dewey takes on the role of an *intermediary* through which both students and teachers come and go: a space whose importance lies in its efficiency (Ream and Ream, 2005). The role of the educator is to interact with the environment in order to shape experiences: 'above all, they [educators] should know how to utilize the surroundings, physical and social' (Dewey, 1998: 35). Constructing an educative environment of habit-formation is not the purpose of a teacher, but instead, she should create "experientially-driven learning" (Gislason, 2007: 10) based on the interactions that occur in the environmental *situation*. If we understand that teachers and pupils live *in* these situations, 'the meaning of the word "in" is different from its meaning when it said that pennies are "in" a pocket or paint is "in" a can. It means, once more, that interaction is going on between an individual and objects and other persons' (Dewey, 1998: 41). This understanding of the school environment as produced by interactions between the physical, social and immaterial is in sharp contrast to those monitorial schools of which he was so critical where the large classroom was an empty container-like vessel.

According to Dudek (2000: 18), Dewey's idea that learning was a social and interactive process over which students should have a degree of control 'revolutionized educational practice in the USA, Europe and Asia' during the 20th century. By the 1960s, the more general concept of school itself was

[3] See: Dewey (1933) *How we think.* Boston: Heath

being scrutinised, and there was pressure, in this instance, from the Council of Europe symposium, to evolve 'from being a set of classrooms of equal size to one that regards the whole surface area of the school as a continuum of related educational spaces' (Pfromm et al. cited in OECD 2011a). Neither teaching nor learning, they argued, should be confined to didactic classroom spaces, and like Dewey and other constructivists, suggested that learning would be understood as primarily a social or interpersonal process – ideas that according to the OECD (2011a) were far from marginal, and were reflected in the growing optimism of the time that the end was near for the standardised classroom and timetabling. Innovative school architecture was produced across Europe and the US to match these pedagogical ideas. Architects began to respond to demands for more flexible infrastructure that could be used in varied models of education by designing a significant number of open-plan schools. These schools denoted a structural openness with a dominance of movable elements that could be used to fit the teacher's needs (Kromann-Andersen, 1994: 76).

However, open plan schools across the western world were widely considered unsuccessful, and by the 1980s, were mainly being constructed with partitioned walls, defeating the very point of an "open space". One problem, according to the OECD (2011a: 21), was that teachers were neither adequately trained to teach in these spaces nor were they often involved in the planning process, and therefore 'did not feel much incentive to live up to a concept that might have been promising in theory, but did not perform in everyday life'. This viewpoint is supported by Lackney (2009: 28), in his uncovering of the history of American education, where he explained that because of inadequate systematic training for teachers in the philosophy of open education, 'teachers continued to teach applying traditional direct instruction methods'.

20th century UK

The extent to which Dewey's ideas revolutionised educational practice in the 20th century in the UK remains highly contested: Darling and Nisbet (2000: 41) suggest that *in early 20th century Britain the ideas of Dewey were barely assimilated into either practice or theory as they were often incongruent with the intellectual climate. Scotland (1969: 262-3) provides some explanation in a study of Scottish education:* 'in a country with a strong tradition of Platonic idealism, Dewey's pragmatic attitude could hardly expect to be welcome, nor could a doctrine which stressed the need for the learner to do the work appeal in a system where the dominie (teacher) was king'. At a time when the UK ruled large parts of the globe by means of privately-educated men, a self-confidence prevailed in citizens who believed that they lived in an ideal society that did not require social progress in terms of education,

least of all from former colonies such as USA (Darling & Nisbet, 2000: 45). Traditional forms of learning and its associated architecture remained prevalent until at least the 1930s.

After the Second World War, Dewey's ideas became more influential on an international level (Radu, 2011: 88) and in the UK, where, like most European countries by the 1960s, there was *a 'waning of deference to authority' in the field of education increasingly marked by* a deeper and more questioning approach to teaching and its environments (Darling & Nesbit, 2000: 51). Architecture and pedagogy were seen as tools for social change rather than the solidification of the maintaining social order. Schools would be based on scientific principles with a democratic philosophy which held that 'children developed best through social interaction with their peers, both inside and outside the classroom' (Dudek 2000: 25). New buildings were imagined as "cities of education" instilling in modern architecture a much freer approach, recognising not only the social aspect of learning, but also a multiplicity of learning methods for different children. Light and air was still regarded as crucial to good education, and many of the schools were located at the edges of vastly expanding suburbs with attached gardens, marking the importance of health considerations in the architecture.

No matter how much Dewey's thoughts became embedded in primary schools, his ideas were not well accommodated in the secondary sector where they were imbued with British individualism and an acceptance of the subject-based secondary school – a discrepancy that still remains today (Darling & Nesbit, 2000: 51). The identity of secondary school teachers is still today thought to be tied to a subject-specific classroom (Bissell, 2004a: 58-9). Not having one's own subject-specific classroom has been found to remove any sense of ownership over space, but more pragmatically, in doing so, has made teachers feel that they could not modify and arrange the classroom in whatever way they see fit (Siegel, 2002: 86). Clearly, there are still obstacles to embedding Dewey's ideas in British secondary schools.

According to the historian Andrew Saint (1987: viii), a new school was built every day in the UK between 1950 and 1970, constituting what he describes as 'the biggest and most radical adventure ever undertaken in the history of British architecture'. School buildings were built not for the few, but for all: 'no more ambitious, disciplined, self-conscious or far-reaching application of the concept of architecture as social science can be found in any western country (1987: ix). This bold historical orthodoxy that new buildings benefited the whole nation is disputed by Lowe (1988: 652) who quotes an influential local Manchester councillor explaining that whilst new schools were built in new housing estates, 'in the town centres and old suburbs old buildings suffice and parity at secondary level is a mockery for want of new buildings'. The post-war buildings themselves have been criticised for being

standardised and cheap (Lowe, 1988) and for being bureaucratic and without character – traits that Banham (1981) has related to the self-righteous enforcement of "form follows curriculum" at the time. Middleton (2014) applies to these schools Lefebvre's conceptualisation of the functionalist tower blocks of the Parisian suburbs as *dominated spaces* – habits brought into being by state bureaucracy. She argues that the expansive comprehensive school system constructed after the Second World War in the UK resulted in sterile and functional spaces that were products of a kind of capitalist technocracy – spaces which were unlikely to inspire teachers.

Innovation and investment in school buildings had practically disappeared by the 1980s and 90s (Horne, 1998). Deteriorating school infrastructure was consistently 'pushed down the educational agenda' in a period marked by prolonged disinvestment in school buildings (Clark: 2002: 3). Not only were many post-war school buildings reaching the end of their lifespan, but during the years of the Thatcher government, there was a national neurosis regarding behavioural problems, for which school teachers and school buildings were to take much blame (Dudek, 2000). A dual shift in architecture and pedagogy occurred: architectural designs became reminiscent of prison-like school structures, and particularly after the implementation of the National Curriculum in 1988, dominant pedagogical ideas moved away from task-based activities, towards 'forms of learning which would be assessed and…delivered by way of paper and pencil tests, thereby overwhelming teachers in bureaucracy (Dudek 2000: 47). The impact is still felt today when somewhat paradoxically, it is expected that the school environment allows students to direct their own learning yet also suit a rigid content-based curriculum. Dudek (2000: 50) himself asks:

'How does one make simplistic decisions about the design of a classroom environment when, at one point in the day, the curriculum implies that children should be organized on an individual basis and, perhaps ten minutes later, as a whole class?'

It's an interesting question posed by Dudek, but one that I would like to rephrase for my own research:

How does the teacher interact with the environment provided to her effectively if she is to be guided not by her own intuition, but by the rigid demands of a standardised curriculum?

Of course, neither a straightforward shift in school building nor pedagogy occurred in the 20th century as contrasting ideas persisted of 'on the one hand, the urge to impose discipline and control through

a resolute set of spaces; on the other, the emerging desire to encourage individual creativity by the production of buildings which were not enclosing and confining' (Dudek, 2000: 5). The hegemony of the modular school design might best be understood through an examination of the "mass produced", standardised schools consisting of traditional classrooms that were built quickly and cheaply as part of school construction programmes to cater for the expansion in school numbers in many countries after the Second World War (Dovey & Fisher, 2014)

20th Century Denmark

The early 20th century in Denmark it appears followed a fairly similar progression in terms of pedagogy and school architecture: on the one hand, from the 1920s there was an emerging challenge to the educational orthodoxy and authoritarian character of social relations in schools, and on the other hand the so-called "aula schools", built in the 1930s and inspired by German schools, were not, with their multi-storey structure and an assembly hall in the centre, radically different to what came before (de Coninck-Smith 2010). What followed as the century progressed mirrored that in England and Sweden: child-centred educational reforms, and the universalisation of the 'cultivatable' nature of the child by the so-called enlightened pedagogues of the time, who had the symbolic power to monopolise and spread such beliefs (Øland 2010: 62). The 1945 *Emdrup Plan* for schooling, although never implemented, paved the way for the *1958 Education Act* which institutionalised ideas that had been growing since the 1920s, including accentuating the importance of 'individual instruction according to the child's own nature' and "developmentality" with a more diverse range of teaching and learning methods (Øland 2010: 58). These ideas were not inclusive to Denmark and in fact many ideas in the 1950s about "design through research" or design to reflect educational principles, emerged from collaborations between Danish and English architects.

The Danes, wishing to manage space rather precisely and rationally, sought inspiration in the modernisation and centralisation of the post Second World War educational landscape in the UK (Burke, 2010). In particular, Danish architects were impressed by the way in which British schools 'openly addressed the needs and psychological development' of students through the creation of single-story primary schools with a more intimate scale and an emphasis on natural light (de Coninck-Smith 2010: 729). Less clear, however, is the extent of transnational collaboration in secondary school design, though as the preponderance for small schools faded somewhat, in both countries they were replaced with solid, often modular constructions that were able to be constructed quickly and cheaply in the expanding suburbs. In fact, between 1936 and 1966, the number of primary and secondary

school actually decreased from 4500 to 2800, simply because their size was increasing so significantly at the same time (de Coninck-Smith, 2010: 727).

From the middle of the 1960s a host of open-plan schools were constructed in new towns surrounding Copenhagen and other cities. Such suburban locations of these and many other more typical schools built at the time owes itself to the combination of high birth rates and migration to suburban municipalities as well as a growing desire to link nature and education (Kromann-Andersen, 1994: 81). Here one can see, just like in the growing suburbs of the UK, that the secondary school became part of rational city planning. According to Jellingsø (1987: 55), an increasing emphasis on teaching and learning outside of traditional spaces meant that 'the classroom became the dirty word'. Other ideas such as allowing a degree of child autonomy in the classroom, thereby domesticating the school environment somewhat, came not just from Dewey's belief that school should not be paradigmatically different to the child's wider social environment, but also from study trips to England and USA. However, much like in the UK, the progressive architecture and pedagogy of new primary schools was often unmatched in secondary schools, as 'older children were still taught in more traditional class room settings' (de Coninck-Smith, 2013: 5).

Either way, the time period marked a shift in focus from teacher-centred to student-centred methods and generally an increasingly sophisticated awareness of the relationship between school environments and pedagogy. The role of the teacher would become more withdrawn and advisory than didactic – something which due to its unfamiliarity, 'placed great demands on the teacher's entrepreneurial ingenuity', requiring a degree of adaptation (ibid.). Greater flexibility was thus sought in learning environments, such as *Kolding Gymnasium*, built in 1975 with movable outer walls and a move away from subject-specific rooms towards a kind of 'classroom as home' where the majority of children spent most school hours in their own classroom. This school was an early example of differentiated learning: a common area existed for group work; furniture was versatile and movable; movable walls separated teaching spaces; and closed classrooms existed for subjects that required more silence (Jellingsø, 1987: 59-60). But, according to Jellingsø, this wasn't a clear success, for the need for peace in teaching was greater than expected and exam requirements and professional isolation were still regarded as "sacred cows" (ibid.: 60).

Given that 'teachers were thrown headfirst into the physical environment' of which they had little design input, it is unsurprising that a lag existed: open-plan schools came first and pedagogic changes came limping in afterwards (Kromann-Andersen, 1994: 82). Some teachers were also resistant to

change: they were 'absolutely not enthusiastic about building educational opportunities', evidence for which being their use of beer crates to create temporary walls to separate themselves and their students in the communal spaces of the school (ibid.: 83).

The open plan movement in Denmark reached its peak by the mid-1970s, when there were forty open plan schools of around 1700 total schools in the country (de Coninck-Smith, 2013: 5). Although it has been considered unsuccessful, the architectural and educational influences in gymnasia were clear: no longer were monumentalist, Cathedral-like secondary schools being constructed (Jellingsø, 1987: 61), and, although in some cases subject classrooms remained, architects predominantly recognised a more child-friendly approach in the "classroom as home" style. Students in the new buildings would be considered as 'adult self-employed people who can manage leisure hours, breaks and maybe also different forms of work' (Jellingsø, 1987: 61-2).

The 1990s and "21st century school"

'The self-contained classroom can no longer provide the variety of learning settings necessary to successfully facilitate 21st century learning' (Lackney, 2000: 15).

Since the 1990s, there has been a growing international consensus towards smaller schools and the creation of "schools within schools" from the restructuring of older school buildings (Lackney, 2009). The idea of smaller schools is in part based upon a mass of research that, while ignoring the way teachers interact with spaces, has shown that they tend to affect student happiness, examination results and participation in school life positively (see: Cotton, 1996; Fowler, 1995; Wasley et al., 2000). The idea of "schools-within-schools" is to create a kind of "house" pattern for a "family" of students and teachers where a more close-knit and intimate learning atmosphere can prevail. Lackney (2000: 8) suggests a maximum of 600-800 students in a secondary school, and secondly, if it must be larger, to 'decentralize the facility…into a village, campus, or multi-faceted building comprised of a series of interconnected schools-within-a-school for a maximum of 400 students'. His ideas are partly based upon the German *Koln-Holweide* school, where teachers don't work in isolation, but in teams constituting a "school within a school" of six to eight teachers responsible for around ninety students – one aim being the diminishment of the anonymity of a large school (Ratzki & Fisher, 1989). This decentralised building plan has been implemented elsewhere under different names, such as a "pod school", or a "self-contained classroom community", though essentially they are variations on the

same theme (Lackney & Moore 1994). The OECD (2011a) has largely supported this shift, emphasising the need for "spaces for teams" – communities of teachers and students within a school community within a neighbourhood community - to better correlate with increasingly flexible work and office spaces.

The OECD (2011b: 26), continually promoting the creation of "learning environments for the 21st century", argue for a push 'beyond the simplicity of flexible open space' that was seen in the 1960s and 1970s, towards the incorporation of special purpose spaces, multipurpose spaces and ultimately the creation of a physical form where learning can take place anywhere, by any means, and at any time (2011b: 26). These ambitions are seen in the widespread shift towards clustered instructional areas, catering both for traditional and multidisciplinary teaching, with movable partitions and movable modular furnishing to maximise flexibility and cater for multi-age groups and varied modes of learnings. Some classrooms have been subdivided to create "well-defined activity pockets", functionally limited to one activity, but not entirely closed off from the rest of the classroom, so that supervision can still occur (Perkins & Raymond 2010: 40). According to Lackney (2000: 14), these clustered spaces 'provide the opportunity for the greatest flexibility for pedagogical goals and educational program changes'. Unlike the open-plan designs of the 1960s and 1970s, where teachers often described being distracted, clustered spaces should be open but also have areas of enclosure for more specific activities, thereby ensuring the possibility of differentiated learning and diversity in teaching methods. Neither is the "21st century learning environment" a return to modular classrooms. The OECD (2011a: 23) concede that the 'spatial arrangements best suited […] have yet to be found', but the aim is clear: to create a setting that can inspire creativity and self-expression where students are guided by a "master learner" (OECD, 2011b). The emphasis is on Deweyian experiential learning in settings far removed from the industrial era classroom.

Many newly regenerated and newly built schools do not embrace the perceived need for flexible learning spaces. Nair (cited in Clark, 2002: 33) concluded that new school spaces that fail to recognise such demands could be obsolete before they're even built and Clark (2002: 33) likewise has predicted that 'the 'one size fits all' classroom dominant in schools today will cease to exist' in the future. Perhaps an opinion somewhat blithely adopted given the short-lived nature of the previous open-plan movement and the fact that, in the UK at least, current political currents lead back towards more traditional school architecture. The previous UK Conservative-Liberal government scrapped the ambitious, albeit costly, Building Schools for the Future programme and announced a ban on curved walls, glazed walls and internal partitions in guidelines designed to produce no-frills, low-cost,

standardised schools across the country (Booth, 2012). This couldn't make the point clearer: trends in school design come and go as they reflect changing dominant pedagogies, ideological positions, economic situations and public consensus. The way in which these changes impact on the role of teachers and their use of the environment is something that this research will uncover.

21st century British schools and the BSF

'The prize is great. We must ensure we have a standard of school that our young people deserve, inspirational well-designed schools to motivate teaching and learning, and up-to-date facilities to enable us to compete as a world-class economy in the 21st Century.' David Miliband, Former School Standards Minister (cited in Campion, 2004: 39).

During the last two decades, there has been a process of *educational Transformation* in policy discourse (Horton and Kraftl, 2012). Across Europe and beyond, 'flagship' education policies have proliferated, seeking to ''transform', 'renew', 'turnaround', 'future proof', 'regenerate', (re)build' or '(re)design' schools and schooling, often 'for the twenty-first century'' (ibid.: 115). The title of one OECD (2011b) report referenced in this research – *"Transforming spaces for learning"* – conveys this sense the 'buzz' and deep impact that seems promised for future generations.

The Building Schools for the Future (BSF) programme is one example of this process of educational transformation in the UK. This 'flagship' policy, ran between 2003 and 2010 with an aim to rebuild, remodel or refurbish all 3,500 secondary schools in the UK (DfES 2004: 21; National Audit Office, 2009). New schools would be built but also a concerted effort would be made upon 'developing effective pedagogies in existing buildings' (Campion, 2004: 39): students directing their own learning; personalised learning in a diverse curriculum; more flexible schooling away from traditional timetables; the possibility for mixed-age teaching; and greater flexibility in learning styles; the teacher as a facilitator (see: DfES 2002; DfES 2004). These all combined 'to provide some very different approaches to the notion of a teacher at the front of serried rows, pouring wisdom into empty vessels' (Heath, 2015: 137). Students and teachers were partially involved in the design process of BSF schools that would, reflecting such ideas, create many spaces of varied sizes including large, flexible classrooms and spaces separated by movable partitions (DfES 2002).

Horton and Kraftl (2012) came to rather critical conclusions in terms of the impact of BSF policies upon teaching methods. They found as many continuities as transformations in teachers' methods with

many teachers suggesting that 'little had *actually* changed (and nor should it have) in terms of their day-to-day work' and in fact, 'many teachers had been practising forms of pupil-participation, child-led learning and dialogue that have been part of pedagogic approaches since at least the 1960s' (Horton and Kraftl 2012: 131). It might also be the case that some teachers engage in a kind of pedagogical inertia, comfortably stuck using space in order to continue teaching didactically and with an emphasis on discipline and control.

All five of the Greater Manchester schools that are case studies in this research have had BSF involvement (see appendix (a) for case studies). A case study conducted into BSF Manchester listed the given aims of the projects in the city, and while much attention was given to sustainability, ICT and recapturing potential students from other school districts, there was no mention of the expected improvements to teaching or learning processes, or any expressed link with pedagogy (National Audit Office, 2009). This is not to say that the aim was not to improve the teaching and learning process, but it is to wonder whether their focus was perhaps more technological or physical than pedagogical.

The BSF scheme was scrapped by the incumbent Conservative-led coalition government because of dysfunctionality, delays, poor management, high costs, and also because there was an increasing consensus that 'the idea that shiny, new glass palaces could transform educational opportunities was a red herring' (Rustin, 2013). The emphasis since has since been on teaching as key to raising levels – teaching that is seemingly seen as separate to the environment in which it takes place. As such, today, the UK government allows free schools, exempt from local council regulations, to be built in converted office buildings, disused fire stations, terraced cottages and former aerodromes. Noting the potential impacts of the current enslavement to cost cutting in British school construction, Moore (2013) asks, 'at what point, if ever, will it be thought worthwhile to spend on a better environment?'

21st Century Danish Schools

21st Century education laws in Denmark have embraced innovative and diverse styles of teaching, with new curricula emphasising teamwork and collaborative learning. The impact on new school buildings is clear. At the infamous *Ørestad gymnasium*, classrooms have been replaced with "study zones" and borderless teaching areas, to reflect, according to the architects *3XN*, the desire for students to gradually take responsibility for their own learning, being able to work in teams as well as individually (3xn.com). The resulting new generation of schools in the country appear to be leaving traditional spaces, such as the classroom, behind, although of course many schools are still in transition both in terms of pedagogy and architecture.

Persistence: Old school buildings and "old school" pedagogy

Any strict idea of a particular "style" or "period" of architecture is problematic for it involves 'a far greater degree of contestable abstraction than the relatively simple concept of the building type' (Trachtenberg, 1988: 220). Although this research uses architectural time periods as a structure, I accept the socially constructed nature of particular "styles" or "periods" that presents buildings in this simplistic, arbitrary, yet "scholarly" way: firstly, many physical and socio-spatial characteristics of schools are herein identified that transcend time periods; secondly, the very nature of this study casts a critical eye on constructed notions such as the "21st century school" or "school of the future" and contests what this means in reality for teachers.

For Walden (2009), the "school of the future" is one where learning processes and pedagogy are inseparable, where architects don't use aesthetic imagery and their own expertise as their guide, but instead create a school which facilitates social learning, offers individual and team activities and exists as a place for encounter and sensory experiences. However, it is contestable that such schools even exist today in a time when, in the UK for example, 'many children…are still expected to learn in ageing structures that were never sound in the first place' (Heath, 2015: 136). Old schools built for different pedagogies remain, and even some newly-built schools reflect a move back to 19th and early 20th century ideas: completely open-plan schools have come and to some extent gone, and frequently, the spatial structure of divided and functionalised space has survived. The OECD (2011a: 20-1) found that the classroom, whilst a little lighter and more spacious, remains a highly controlled spatial setting that is physically and cultural engrained: *'the classroom-based school has not yet been replaced by a new globally accepted model that together would constitute the 21st century school. There isn't such a thing as "the 21st century school'.*

According to Santa Ana (2007: 100), U.S. state education remains conceptualised by a 150 year old mechanistic metaphor: *school as factory* consisting of **batches** of students who need **drilling** with information in an **effective** school that produces a good **product**[4]. Perhaps as Santa Ana suggests, the socio-spatial assemblage of the school is little removed from that described in Charles Dickens' (1979: 1) novel *Hard Times*:

[4] For a more detailed account of the way in which metaphors such as "school as factory" and "learner as a participant" are used in order to understand the role of both teachers and students in the school, consult Northcote and Fetherston (2006).

''Now, what I want is Facts. Teach these boys and girls nothing but Facts. Facts alone are wanted in life. …You can only form the minds of reasoning animals upon Facts: nothing else will ever be of any service to them.' …The speaker, and schoolmaster, and the third grown person present, all backed a little, and swept with their eyes the inclined plane of little vessels then and there arranged in order, ready to have imperial gallons of facts poured into them until they were filled to the brim'.

The role of the teacher in these metaphors is to implant knowledge in students or, in other words, to 'mould lifeless lumps of clay into something shapely, beautiful and human' in a strictly controlled time-space environment (Donahy, 1986: 103). This research will examined the extent to which this idea is still pervasive in Copenhagen and Manchester and how this is reinforced or resisted by the architecture itself.

Theoretical Considerations

Lefebvre and the Spatial Turn

The social sciences have, in the latter part of the 20th century, undergone a "spatial turn" that comprises the 'reassertion of space in modern critical theory' (Soja, 1989). Critical to this introduction of space into a wide array of subjects is the work of Henri Lefebvre and his expansive viewpoint that encompasses far more than physical space. Urban space, for Lefebvre (1991), is not a given, but is constantly produced and reproduced by the social relations which it also shapes. This socio-spatial dialectical process of production constitutes three key dimensions: "conceived space", "lived space" and "perceived space". Conceived spaces refer to the spatial representations of dominant groups such as planners, architects, scientists and so on: 'space as a mental construct, *imagined* space' (Elden, 2004: 190), that in school architecture is the space as conceived by designers, architects and the school themselves. Representations of these spaces may be objective, but they are inexorably revised in line with changing ideologies and knowledge: they are 'shot through with a knowledge (savoir) – i.e. a mixture of understanding (*connaissance*) and ideology - which is always relative and in the process of change' (Lefebvre, 1991: 41). Educational spaces are consistently reimagined in this way as "21st century spaces" or "schools for the future" – concepts presented as objective yet reflective of political and ideological moods. This *imagined* space sits in contrast to the rather similar lived and perceived spaces. Lived space is the experienced 'space of 'inhabitants' and 'users' – space that is continually produced and modified over time as it becomes invested with symbols and meaning (Lefebvre, 1991: 39). For Elden (2004: 190), this is space as *real-imagined*. Perceived spaces are very much *real*,

referring to spatial practices, or 'the way in which space is produced and reproduced in particular locations and social formations' (Savin-Baden, 2008: 9).

In the field of education the "spatial turn" is still in its infancy (McGregor, 2004; Gulson & Symes, 2007). There has so far been insufficient acknowledgment that the school environment is not just an empty vessel in which learning occurs but a space produced by the interactions that exist between the physical and the social – an idea that is conceptualised by *spatiality*. It is, according to Massey (1992: 70), this spatial organisation of society that plays such a huge role in how it works. Architecture and space in this sense is best not understood through some magical semiotic alchemy: meaning is 'based in everyday life, in dwelling' whereby 'representations are not simply 'read', but are constructed through interaction' (Dovey, 1999: 51). School spaces are thus not something static, but are relational, configured by socio-spatial relations that allow it to be remade and changed. An open-plan school may embody openness physically, but this may not be reflected in the way in which the space is continually remade by teachers who interact with it on a daily basis.

Deleuzian theory and the production of smooth educational spaces

The physical and material contexts of the school have been brought to life through the application of the ideas of Gilles Deleuze to school environments in a way to re-think how we might unwrap the over-coded striations of schools and their territorialised spaces. As the material world becomes part of the same network of relationality as the human world, physical contexts are, as a result of this spatial turn, 'given power…[and]…understood as having effects' (Davies et al. 2009). In short, 'architecture becomes pedagogical and pedagogy becomes architectural', as architecture itself becomes an actor in the same network in which students and teachers interact (Ellsworth 2005: 48). According to Davies' (2009) application of Deleuzian theory, neither architecture, spaces and their uses, nor students and teachers in schools, should be separated according to differences, but instead there should be a kind of fluidity of categories - a shift from difference to differentiation. This involves the banishment of striated learning spaces and the creation of smooth ones.

The regulated, standardised, dull classrooms of the past are those striated spaces where 'nothing new seems possible', where the 'over-coded striations take hold of memory and imagination seeming to leave no space for the emergent possibility of new ideas, of movement and of becoming' (Davies et al. 2009: 135). They should be banished for they reflect the complete abandonment of effective teaching and learning: 'the room which is bleak and chill permeated her [the teacher's] body and mind, making her feel as blank and numb as the walls themselves. The new ideas generated elsewhere, the

life of ideas, cannot make it over the threshold' (ibid.: 136). Teacher creativity and innovation will always be restricted in striated learning spaces that are characterised by their boundedness, overwhelming sense of organisation and the subordination of students to the power of the teacher-as-expert (Savin-Baden, 2008).

Instead, what we must seek in our schools today are smooth spaces with open, soft and movable features, where borders that once existed between classroom and corridor, teacher and student, and subject and object are removed. The classroom itself must function 'not as a place of semination, but as an agora, a meeting place, with exchanges going on all the time, in various corners of the room' (McMahon, 1996: 17). Spaces should be created that are 'open, flexible and contested' in which students are encouraged to develop their own stance towards knowledge (Savin-Baden, 2008: 13-4). The teacher-as-expert is replaced with the teacher-as-analyst who allows the students' flows and connections in the educational space to take precedence over any discourse (McMahon, 1996). Rather than the production of learning spaces being subjugated to curricula and examinations, the teacher would ask, 'is there any way in which the enthusiasm of the student for this task and course requirements can be brought together?' (ibid.: 17).

The production of a smooth space might also involve the physical or psychological removal from a typical learning environment to prompt 'new ways of seeing issues, providing opportunities for reflection and presenting challenges to current ways of thinking' (Savin-Baden, 2008: 8). Both the teacher and the student should experience some kind of 'shift or reorientation in their life world' – a notion developed by Husserl (1937/1970) and later Habermas (1987) to refer to the culturally transmitted and often taken-for-granted perspectives and interpretations of the world around us. The implication is such that in these smooth, unbounded spaces, teachers are able to re-evaluate their own role, methods and perspectives and reflect upon the ways in which they are producing learning spaces.

Smooth and striated spaces cannot simply be understood in isolation to one another: 'smooth space allows itself to be striated, and striated space reimparts a smooth space' (Deleuze & Guattari, 2008: 537). However, the idea that teachers are easily able to create smooth teaching/learning spaces within the striated space of either a cellular school design or traditional school culture is problematic: 'there is a sense that whatever one does to subvert striated spaces, routines and rituals will still be enacted and re-enacted' (Savin-Baden, 2008: 15). For example, Bayne (2005) discovered that even in the innovative visual learning environment of webCT, the logo of a small, white grey-haired professor

reinforced linear and "positioned" users towards traditional notions of teaching. Teachers may be powerless to change space that is ordered by a combination of the timetabling, curriculum, school culture and architecture – the production of space can imply control and power over those who use it in a Lefebvrian (1991) sense. Smooth spaces and their physical and pedagogical characteristics may seem incompatible to a culture and wider environment that teachers relate to and understand; teachers can become plagued by a sense of disjunction that results in a "troublesome learning space", which like "troublesome knowledge", she argues, seems incoherent, counter-intuitive and alien. Any attempts to instigate a flexible environment can be 'increasingly subsumed by busyness and accountability in a performative academic culture' (Savin-Baden, 2008: 14). As Deleuze and Guattari themselves write, 'never believe that a smooth space will suffice to save us' (2008: 551).

Studies on the interactions between the environment and the teacher

A comparative study by Itoh (2001) showed that in Danish schools, teachers primarily interacted with space in a *functional* way: 'space was used as a tool in response to practical needs for the activity' such as quiet acoustics or more room (ibid.: iv). In Japanese schools, teachers interacted with space in a *symbolic* way, using it 'to communicate a message to the children by changing the atmosphere' (ibid.). In Denmark, children would be allowed to sit where they liked when the task required; in Japan this was to demonstrate the children's freedom. The result in Japan was often an incongruence between pedagogy and spatial practice as open plan schools were being used for 'competitive, programmatic learning in a seemingly open atmosphere' (ibid.: 12).

Martin (2002) identified three types of teacher based on how emancipated or inhibited they feel in their environment: the *imprisoned* whose environment is not sufficient for their desired teaching methods; the *confused* who contradict themselves regarding to what extent they do or don't take the environment into account when teaching; and the *free* who feel that nothing is impossible in their environment. For Martin this is a reflection on how teachers *feel* more than how restrictive the environment actually is: *'when teachers realise that they have control, they can feel empowered by the same environment that once would have defeated them'* (Martin 2002: 154). Many studies outlined below do however emphasis the way in which some school environments have restricted teachers spatially and pedagogically; others have focused more heavily on this autonomy that teachers have over their interactions with the environment.

Restrictions of a traditional, modular environment

In a detailed study of two large, British suburban comprehensive schools, Bissell (2004a: 2) found that for all teachers, the physical classroom was the most important component of their day-to-day work: the majority of teachers employed traditional work patterns of didactic classroom instruction with students sat in rows facing them. Often, modifying the cramped, traditional environment would involve implications for time and resource management, and even teachers with non-traditional orientations to teaching would 'settle for what they have and make compromises in terms of what and how they teach' (Bissell, 2004a: 30). Conversely, 'for teachers with traditional work patterns the standard classroom presents an almost ideal work environment', as it allowed them to more effectively control students' movements and teacher-student interactions (2004a: 59). This supports Adam and Bibble's (1970) findings that smaller, crowded classrooms restricted potential modification of seating arrangements[5], leading to an uneven spatial distribution in effective learning geared towards an "action zone" in the front-centre of the classroom.

The architecture of the school may also restrict the spatial and pedagogical freedom of teachers through its connections with the organisational structure of the school. For example, a study of six Californian high schools found that a physical and organisational separation of teachers into subject departments in different buildings or wings of the schools generally precluded any interaction that might transcend typical departmental boundaries, thereby reinforcing subject subcultures (Siegel, 2002). Limited time and vast distances in large schools limited opportunities to forge multidisciplinary relationships, leaving teachers somewhat isolated and disillusioned (Siegel, 2002: 81). Hansen (2011), in a study at Gefion gymnasium – one of the schools in this research – also found that teachers' dynamism and ability to use space to collaborate was impeded upon by long corridors and walled classrooms that created greater social and physical distance between them.

Teachers' autonomy to modify environments

Despite finding that the classroom was often restrictive to teachers, Bissell (2004b: 32) conceded that even the most traditional spaces are modified and used differently: *'architects and others involved in the planning and design of school buildings do not create learning environments. Teachers create learning environments'*. Irrespective of the visions of designers or architects, teachers might engage

[5] Being able to implement "sociopetal" seating arrangements encouraging social interaction has also been linked to teacher satisfaction (Douglas & Gifford). For more information about satisfaction of teachers in different environments consult Canter & Stringer (1975).

in a process of *adaptive redesigning*: 'every teacher becomes a designer, responsible for preparing the environment to achieve his or her educational objectives' (Horne, 1998: 213). The architect merely provides a "finished beginning" – a point from which teachers can begin determining how they will use or manipulate the environment to teach. Good classroom organisation by the teacher can also compensate for deficiencies in the environment (Follows, 2000). This might be especially true in crowded classrooms, where Fagot (1977) concluded that teachers often modified teaching plans and methods and took a more directive approach towards the students' use of space, frequently assigning them to specific areas of the room to play. Martin (2002) also found that, although they were restrictive to student-led learning, in dense classrooms, teachers compensated for students' inability to move by actually moving more frequently around the room. In this case, the teacher finds a way around her inability to control a "hard" feature – the physical size of the classroom; environments with "soft" features such as moveable walls and tables seemingly offer greater freedom to teachers to manipulate their environment (Horne, 1998).

Teachers configure and reconfigure spaces through their positioning and movement that allows them to realise a kind of "spatial pedagogy" (Lim et al., 2012). Specific physical spaces are constantly redefined in different periods of the lesson according to use to become one of four types of space: *personal, authoritative, supervisory* and *surveillance* (ibid.). Behind the teachers desk for example can be in one moment a *personal space* where the teacher prepares for the following part of the lesson; it can then be reconfigured as an *authoritative space*, becoming a position from which she disciplines (ibid.: 238). A *supervisory space* occurs when the teacher paces around the room "patrolling" to ensure students are on task, whereas a *surveillance space* is more of an extreme form of power and control based in "invisible" monitoring of students.

Modification of the space is sometimes a necessity because the environment restricts a teacher's ability to easily implement their chosen pedagogical approach. In more open-plan schools, teachers may alter methods to compensate for the increased noise and distractions in the environment (Gifford, 2007). This is, for Gifford (2007: 348), a violation of *synomorphy*: 'the principle that physical and social aspects of the setting should fit together well', that might be exacerbated by poor teacher training or a reluctance to depart from more traditional methods. On the contrary, more open-plan schools have also been found to induce self-control in students' behaviour by quietening down the lesson as necessary, thereby not necessitating an authoritarian role from the teacher (Itoh, 2001).

The need for teachers as "placemakers"

To avoid a passive acceptance of poor environments that Horne (1998) discovered that teachers should be both connected to the design of classrooms but also instilled with greater environmental awareness in their training - something which would require acknowledgment that the teacher rather than the building 'creates the learning environment within an architectural facility' (Martin, 2002: 140). This is perhaps most critical in new, unfamiliar spaces: in a study at the Tate Modern Gallery, without the formal transmission model of teaching/learning typical in a classroom or lecture hall, the gallery instilled uncertainty and stress in its users (Ross et al., 2004). Unfamiliarity in new teaching environments and an oft-perceived lack of efficacy over older environments could be overcome through training teachers to become 'environmentally competent "placemakers" (Lackney & Jacobs, 1999). At present, rather than becoming "placemakers", there is a kind of spatial silence amongst teachers who, largely removed from the design process, have subjugated space to the subconscious (Fisher, 2002). It is perhaps unsurprising then that the immutability of the two hundred year old classroom remains: 'teachers in all educational sectors will continue to resist change and revert to the time-tested concept of the classroom' (Fisher, 2004: 37).

Methodological Approach

Please see APPENDIX (A) for information about the case studies used in this research.

The approach taken in this research borrows heavily from descriptive, relational and observational traditions within environmental psychology (Nagar, 2006): descriptive in that I identify "how things are", or, how teachers interact with different environments; relational in that I uncover how patterns in teachers' behaviour are related to the type and style of architecture/space without aiming for strong conclusions of causation; observational as where possible I engage in *naturalistic observation* of some lessons and as I walk around the school. Establishing a precise causal relationship between school architecture and teachers' methods and use of space is not the aim of this research as the effects cannot be "unequivocally isolated" to show a law-like relationship (Walden, 2009: 2): architecture is just one of many factors that impact upon how teachers behave and use spaces and importantly, this study is guided not by any objective reality but by researcher judgment: 'deliberate selection is necessary at all stages – sampling, observation, field notes' (Powney & Watts, 1987: 11). The aim is thus more realistic: to identify certain *tendencies* in the way that teachers use and produce space in different school buildings in these two cities.

The two cities were selected for this study for similar reasons: Greater Manchester because there has been an influx in school building construction, reconstruction and renovation under the BSF

programme throughout the whole area; Copenhagen as there has been a great deal of attention paid to innovative school architecture in the city of late, particularly Ørestad Gymnasium and Nærum Gymnasium. In order to acquire a depth of understanding of the complex ways in which teachers interact with school spaces, a largely ethnographic approach was taken: semi-structured interviews and focus groups were conducted with teachers, some students and two architects, and observations took place in lessons and throughout the school generally. In *appendix (b)* please find two detailed tables outlining the chosen methods in Copenhagen and Manchester.

As accessing schools proved difficult – in Manchester for example after initially contacting over sixty schools by email, I received only three replies - case studies were selected rather indiscriminately, not based on any perceived relevance to the study. While on the one hand this excluded potentially very interesting schools such as Ørestad in Copenhagen (who demand payment for visitation), it has removed any element of sampling bias. Even when a gatekeeper's approval was acquired, full cooperation upon arrival at the school was not guaranteed: '*access* and *cooperation* are often used interchangeably to describe these two distinct processes' (Wanat, 2008: 191). At some Manchester schools for example, because of their busy timetables, contact with interviewees before arriving was impossible, making me reliant upon gatekeepers to liaise on my behalf. Often I would have to be adaptable and flexible in both methods and timing: ad hoc interviews with teachers who have a spare fifteen minutes and having to return to the school another day because nobody was available to talk were both not uncommon experiences. In other schools, I was sometimes required to interview before having chance to walk around and see the different spaces in the school. While this didn't give me an opportunity to reflect upon the space beforehand and modify topics for the interview accordingly, by adopting a semi-structured interview style, I was able to allow teachers to direct the conversation towards spaces in the school that are important for them.

As respondents could influence the thematic direction of the interview, the semi-structured interview process allowed for this 'strong element of discovery' (Gillham, 2005: 72), thereby eliciting from teachers what *they* considered to be important elements of the way they interact with different spaces. The esoteric interpretations of teachers that offer far more valuable data than any so-called "expert" reading of spatiality from myself. *Retrospective inspection* and *attunement* were likewise ensured by open-ended questions that evolved conversations beyond the superficial (Chirban, 1996: 3). Interviews were not however entirely unfocused as an interview guide made sure that themes crucial to the research were explored, and became particularly useful when conversations ground to a temporary halt (Ellen, 1984: 233). Although the audio recording could not record salient somatic features of interaction (Hutchby & Wooffitt, 2009: 71), it did allow for repeated examination of responses, and thus a greater level of understanding of their contextual meanings (Bryman, 2001:

321). Where possible, interviews and focus groups were transcribed within twenty-four hours of their completion so that a process of learning from one interview to the next could ensue (Gillham, 2005:124), and so that reflections on the data could begin whilst still fresh in my mind. After transcribing key sections of all of the interviews, the data was coded under categorised themes that respondents (who shall remain anonymous) communicated – an act which helped create a logical macrostructure to the writing process (Alasuutari, 1995: 179).

The data produced, because of the relatively small sample size of participants, will not 'continually lead to the same measurements or results and therefore lacks *quixotic reliability* (Kirk & Miller cited in Flick, 2002: 219-220). It must be acknowledged that classroom observations were rarely possible and in some schools I was only able to formally interview one or two teachers whose interactions with the space might differ significantly from that of other teachers. However, the aim of this research is neither a detailed, immersive study into each school nor is it generalisability or synecdochic persuasion; this is a qualitative analysis of teachers' interactions with different spaces across two different locations, and can only be used to show *tendencies* according to the type of school building and the location.

It is important to acknowledge both the teacher's and my own position to the research process and how this has been accounted for and overcome. At Gefion, both interviewees were aware that their emphasis on surveillance could be interpreted and criticised from a Foucauldian perspective, with one responding to a question about discipline by saying, *'I can't stop thinking Foucault'*. This self-awareness brought about by the perceived sociological expertise of the researcher may have led teachers to modify their answers, thereby giving me a false impression of their behaviour. Discrepancies might also exist between teachers' conceptions of their own role and their actual practices, perhaps owing to the impact of school curricula, time availability and the behaviour of students (Duffy, 1977). It is for this reason that, where possible, students have also been interviewed, for they are able to provide a less self-conscious reflection on how they are taught in the school and in which spaces. Furthermore, as participants in the lessons of many teachers, they have been able to give a better overview of the varied ways in which they are taught; individual teachers are less likely to offer this perspective as they rarely have chance to observe the lessons of other teachers.

Throughout this research, it is important to recognise that, like any researcher dealing with space, I am approaching the topic in a particular way that reflects how I am "situated" within a national and ideological context (Bourke, 2014; Gulson & Symes, 2007: 103-4; Rose, 1997). While I do not have an insider/outsider status in terms of the teaching community, my own background as a northern, white, British male certainly gives me a relative "inside" status in research in Manchester, whereas a lack of

understanding of Danish language and culture an "outside" status in Copenhagen. This has inhibited access to Danish literature and may have affected the responses of interviewees, causing miscommunication and misunderstanding, and impacting upon my ability to intuitively empathise with what was said in interviews. On the other hand, being a cultural "outsider" may have allowed for a more objective detachment and reflection on responses in Copenhagen. Similarly, having been educated in a comprehensive British school and education system, my "insider" status may have allowed for a more intuitive understanding and rapport with interviewees or potentially created a less impartial researcher status[6].

The impact of my own positionality and status upon the research encounter is made more complex as some participants were children in schools. In order to protect the students and myself, I have adopted what Cameron et al. (1999) describe as "cautionary practice": where possible, focus groups and interviews with students took place in open, visible environments; full explanations of the purpose of the research was always given alongside reassurance; and consent was always sought beforehand. In Manchester, at some schools I was required, because of a grey area of legal consent, to receive a signed consent form by a parent or guardian before accessing students to interview[7]. This, coupled with the fact that I was not able to hold focus groups alone with students without securing a criminal background check beforehand, has meant that fewer students took part in the research in Manchester. Furthermore, where student interviews did take place, sometimes they were in the presence presence of a teacher or supervisor. The impact that this has upon the openness of students' replies regarding the methods their teachers use is unknown but also completely unavoidable.

According to Homan (2012: 24), 'in educational research…it is frequently the case that the principle of informed consent, which is central to the ethical control of all social research, is directed not at those whose behaviour is the subject of an enquiry but at one who takes a decision on their behalf. Although I have used gatekeepers to get permission to access the school itself, I have avoided any such shortcoming by satisfying four key elements inherent in *informed consent* (Holman, 2012)*:* (1) *informed:* the interviewees were assured about the process; (2) *consent:* teachers and students were able to make a rational judgement about their participation; (3) *time out:* I showed as much flexibility and reasonableness as possible in order that the research did not encroach upon time allocated for

[6] Consult Rabe (2003) for a more detailed understanding of the fluid "insider" and "outsider" statuses in social research.

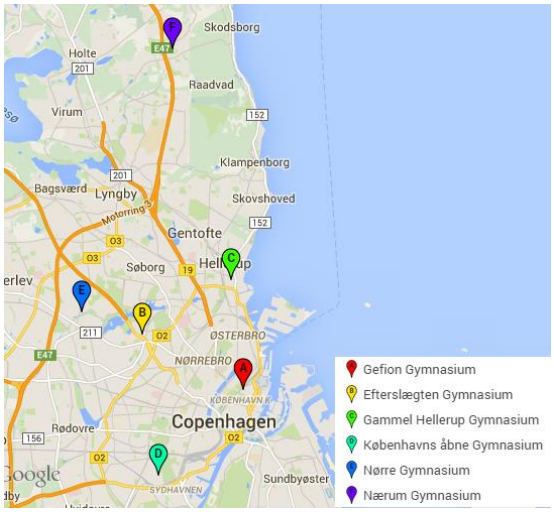
[7] See Masson (2004) for the complex legal situation regarding interviewing with children and how this relates to "competence".

teaching; (4) *voluntariness:* teachers and students were aware that their participation was voluntary and that they may stop at any time.

Geographical Context

Different scales of geographical context will be reflected upon in this study: the international scale of globalised trends in architecture and pedagogy; the impact of the national cultures of Denmark and the UK; and considerations of the situation of schools within the wider urban area and neighbourhood.

The two maps below show the predominantly suburban locations of the schools in this study. This is typical for the time period in which most were constructed: from the 1920s onwards, and particularly after the Second World War, schools in Denmark and the UK were increasingly part of rationally planned suburbs (bygningskulture2015.dk, n.d.; Franklin, 2009). In both countries, these were typically low buildings that showed strong concern for climatic-hygienic and scenic requirements: large windows for abundant sunshine, open-air environments, proximity to nature and in quiet and peaceful surroundings (Roth, 1966; Franklin, 2009). The influence of these features upon the way in which teachers use space in the suburban schools that dominate this research is considered in the analysis.



Above: maps showing the predominantly suburban location of the schools in this research (source: maps.google.com)

When the socioeconomic situation of the schools is considered, it becomes clear that Manchester and Copenhagen are not cities of the same ilk: Manchester, the birthplace of the industrial revolution, is a

city marked like most of the UK by high socioeconomic inequality and compared to the rest of the UK, generally low socioeconomic status and poor standards of educational attainment; Copenhagen, a capital city frequently identified as having one of the highest standards of living in the world, has lower levels of inequality, a generally wealthier population, and good educational standards within Denmark. The urban deprivation that manifests in the neighbourhoods around the schools in Manchester is worth noting for its extremeness:

The area of Greater Manchester comprises ten metropolitan boroughs, three of which are home to schools in this study: The City of Manchester, the City of Salford and Rochdale borough. Of 326 boroughs in England ranked according to levels of multiple deprivation, all three are in the top 30 most deprived: fourth, twenty-sixth and twenty-ninth most deprived (Department for Communities and Local Government, 2011). On a neighbourhood level, all of the case studies are situated in the top 16% most deprived wards in England, and of particular note, MCA is located Harpurhey – of the 32,482 wards in England, the 10th most deprived (ibid.). This compares with the province of Copenhagen which incorporates large parts of the city's suburbs, where the average family income in 2013 was currently at DKK 822,387 or approximately 110,192 euros (Statistics Denmark, 2013). This isn't to say that all schools in Copenhagen are situated in especially prosperous areas of the city: Efterslægten Gymnasium for example (KAG) is situated in Bispebjerg, North West Copenhagen – a predominantly working class area of the city.

Data Analysis

Section 1: The persistence of two 19th century ideas

The immutability of the cellular classroom

Just as with Bissell's (2004a) research, this study has discovered that for almost all teachers the cellular classroom continues to play an important role in teaching. Most classrooms continue to be separated from corridors by impermeable walls and teachers still modify seating in order to maintain surveillance and a didactic style of teaching persists to some extent. Of course, there is a certain inevitability given that at all of the schools, possibly with the exception of the three built in the 21st century, there simply aren't many teaching spaces available except the classroom. However, even when this is not the case, like at Middleton Technology College, where there is a newly-built communal space in the sixth form block, teachers opted to remain in the classroom, even during group work:

'The 6th form has got the conference room which can be made into two rooms or one. It's got a variety of desks that you can use. But to be fair, because every single teacher has got their own classroom [in the 6th form block]...people generally stay in their rooms. And if they want the kids to work in groups, you'd be more likely to get them to do this [move tables]' (teacher, Middleton Tech).

Above: teachers at Middleton Tech under-utilise this new 6th form social learning space, preferring the classrooms alongside it.

At many schools, when asked what improvements they would like to see, teachers often suggested more classrooms: *'I think that's the main problem. There's not enough classrooms'* (teacher, Loreto Chorlton). A matching statement was uttered at the much more open-plan environment of Ellesmere Park: *'I would still have a couple more classrooms on certain floors'*, and at Abraham Moss: '*the priority of the money has to go to classroom teaching'*.

Discussed below are three identified reasons why teachers continue to appropriate symbolic and practical value to modular classrooms.

The teacher is able to create a calm and academic atmosphere

It appeared at all schools that teachers felt that they could interact with the classroom in a way that would bring about a calm environment with few distractions. Even at Nærum Gymnasium, the most luxurious school in terms of diversity of teaching spaces, two teachers emphasised this whilst discussing the impracticalities of a far more open environment:

Teacher 1: *'The ideas [of the completely open environment at Ørestad Gymnasium] of course were great to a certain extent...*

Teacher 2: *'But you also need peace and quiet'*

Teacher 1: *'And you need to be able to like shut your door'*

For some, this enclosure was symbolic, in that it separated the sanctified classroom as an academic space from everything outside its walls, as a teacher at Gefion Gymnasium explained: *'I like the fact that we are in a classroom where we are closed off from the world. This is our holy temple of knowledge and science in some way'.* During the lesson observations at Gefion Gymnasium, I most certainly felt a clear contrast between the kind of serenity of the classroom – walled and without windows into the corridor – and the liveliness of crowded narrow corridors in a city centre school with limited space. This matches Hansen's (2011: 63) analysis of Gefion, where he found that the school layout helped to 'maintain the idea and the notion that teaching and learning is something that primarily takes place in the classes behind 'closed doors''. If, as Jellingsø (1987) suggested, the classroom had become, by the 1960s, the "dirty word" in a Danish society encouraging learning outside of traditional spaces, this is certainly not the case today, at least amongst teachers.

Many teachers feel at ease in the classroom space

For many teachers the traditional, modular classroom was a space in which they felt most at ease, regardless of whether the school was old or modern. At Gammel Hellerup, where students told me that they were almost always taught in classrooms, one teacher explained the feeling of familiarity he has with the older classroom spaces: '*the old buildings I find to be easy to work with. It's square rooms, white walls, table and chairs...you know what you're getting into'*. This feeling was also expressed at Efterslægten when I was receiving a tour around the older, modular classrooms, as a teacher told me, *'you know you're at a school when you're here'*. What is recognised as a familiar educational environment in the minds of many teachers remains the standard classroom.

Teachers often described how a greater feeling of comfort would be ensured if they had their own classroom – a space that could be an expression of their identity: *'I sometimes think it might be cool if I had my own classroom […] because then I could plaster the walls with posters of studies'* (Teacher, Nørre G). This also satisfied a practical need, as a teacher at Abraham Moss explained: *'I'll be in Maths and Science and Art and you then have to...you then alter the style with which you teach and the curriculum to fit that room'.* Teachers were further restricted using other teachers' rooms as they felt unable to modify the seating arrangements '*one class I teach them in four different classrooms so I've got four different seating plans for this class'.* Many teachers clearly feel that they can acquire greater control over their environment and thus flexibility when they are allocated their own classroom that can be fit to their needs.

Large classrooms good, small classrooms bad

While classrooms alone can be restrictive (see section two of analysis), teachers often identified, particularly at newly-built schools, that in large classroom they had greater flexibility to differentiate their teaching:

'The classrooms are far bigger [than in the old school building]. You've got that flexibility where you can do those types of [less didactic] activities, so I'm finding that I'm much more willing to put those in to my lessons. I don't have to really think about the logistics of it in the same way' (Teacher, Ellesmere Park)

The classrooms were noticeably larger in the three newest schools and in renovated or reconstructed spaces in older buildings. In general, in the older schools teachers were restricted in their methods by the simple lack of space. At Nørre G for example, a student described how because of the small classroom size, *'the whole class cannot sit in one horseshoe'* and the teacher was unable to move around the room easily. This contrasts with Martin's (2002) findings that teachers move more in cramped classrooms to compensate for students' inability to move: *'you're squishing around all the desks like this and you can't get round and see every child apart from the fact that you trip up over the bags'* (teacher, Abraham Moss).

Left: a cramped classroom at Abraham Moss. Right: same seating arrangement but far more room for the teacher to move around in a new classroom at Middleton Tech.

Small, modular classrooms evidently inhibit teachers in the practical implementation of their desired methods. In spite of this, for most teachers, modular classrooms are fundamental to their teaching offering a degree of comfort and identity, and in larger classrooms, flexibility. This is summed up most

aptly by a teacher at Nærum Gymnasium – the school with by far the widest range of teaching spaces outside of the classroom:

'The idea of having a classroom as such to some people seems a bit old-fashioned. And there are ideas that we should try to get out of the classroom a lot more, to leave the classroom and the restrictions of the room - me personally I sometimes think that it can become a bit too much sometimes...it can be like this trend or even a fad […] I might be old-fashioned and quite conservative […] but I still feel that my teaching is performed really well in a classroom, and in terms of this building that gives me so many options.

The school as a site of disciplinary technology

For Foucault (1995: 141; 143), discipline proceeds from the spatial distribution of individuals that often comes from a combination of: *enclosure* - 'the specification of a place heterogeneous to all others and closed in upon itself'; and *partitioning* – 'disciplinary space tends to be divided into as many sections as there are bodies or elements to be distributed'. Below I show how in the more traditional modular schools, the design of the bounded classroom enabled teachers to know the spatial location of students and to regulate their behaviour (see: McLaren, 2002). But also shown is the way in which *exposure* rather than enclosure creates a site of disciplinary technology in recently built, open plan schools.

The classroom as a space of enclosure

An important feature of the 19th century classroom was that students would be visible to the teacher – an idea which persists today: *'to me a classroom is just a classroom. It's just a square room. All I need is to be able to see my students and see that they are directing their attention towards me. Then I'm satisfied'* (teacher, Efterslægten). Teachers frequently interact with the classroom to produce a surveillance space: *'I like it so they're all facing the front. I can see them and they can see me. I can see what they're doing and I know that they're looking at what I'm doing'*. Although seating arrangements in classrooms were varied throughout the schools, the surveillance opportunities of row seating were often made clear, particularly at older, modular schools: *'[with row seating] I see every child, they're facing me, I know if one child is talking to one behind them exactly what they're doing. I know if they're not writing in their book, I know if they're pulling a face'* (teacher, Abraham Moss).

21st century schools: The teacher as observer and observed

In recently built schools with more open spaces, it is *exposure* and the lack of physical portioning that allow the school to exercise surveillance upon both teachers and students, both of whom are seemingly "on show" for most of the day. At Ellesmere Park, the lack of physical separation between the departmental areas for teachers and the open learning spaces exemplifies this well:

'Because we have these open spaces where teachers are working on a regular basis, there's always kind of a member of staff there. So, kids aren't getting up to what they would do in the old building because […] they're always kind of being watched all the time […] they're always on the lookout for teachers' (teacher, Ellesmere Park).

At Nærum, in an environment of large, open curved spaces and glass walls providing few hiding places, students are seemingly conscious of the potential visibility of their actions and regulate their behaviour accordingly: *'everything you does everyone sees it [sic]…so you kind of have to behave really grown up all the time'* (student, Nærum). Unsurprisingly, at these more open schools, teachers felt the architecture already afforded them the ability to regulate the environment, without the need for CCTV cameras: '*it wasn't felt like we needed them as much […] like I said there's not the hiding space that there used to be'* (teacher, Ellesmere Park). This is also the case in newly-built glass-walled classrooms in older schools such as Gefion and KAG, where one student was asked about the reasoning behind the construction of the classrooms: *'it's obvious. Everybody gets to look at them [students/teachers] inside the class'*. The "epistemological power" of the school is built into the transparent walls as much as in the wholly enclosed space of the bounded classroom.

Left: an open learning space at Ellesmere Park. All action is clearly visible from the teachers' working space behind. Right: curved glass walls and wide, open spaces give no escape from being observed at Nærum.

Left: the new, glass-walled classrooms at KAG.
Right: the same glass walls leave both the students and teachers observable in the newly-built DELTA wing of Gefion Gymnasium.

It is not simply a case of behavioural self-regulation by students knowingly or unknowingly under the watchful eye of teachers, but also of teachers being observed by colleagues and students. At Ellesmere Park teachers are supervised by superior teachers in the new open spaces: *'it [the open space] helps me keep an eye on what's going on in my faculty area in a far better way that I was ever able to in the old building'* (teacher, Ellesmere Park). Being constantly under the potential gaze of other teachers at MCA requires a greater show of self-discipline, particularly from older teachers:

'I think the older teachers find it hard when they first come […] it's like the minute you come in through the front door you're on show. You don't go into the classroom and collapse and have a fag [cigarette] like you might have done in the past'.

In Bentham's Panopticon, self-disciplining behaviour was ensured by restricting the inhabitants' awareness of when exactly they were being watched. Foucault (1995: 201-2) writes that the Panopticon 'is a Discipline machine for dissociating the see/being seen dyad', where in the outer ring, 'one is totally seen, without ever seeing', compared to the control tower where 'one sees everything without ever being seen'. The surveillance produced in the interactions between teachers, students

and the open spaces of MCA, Ellesmere Park and Nærum is different because often the observer is known and seen by the observed due to the openness of the space:

'When we have people walking by here and they can watch in, I can always see them. So I think that's a doubleness in it that makes it less threatening (teacher, Nærum).

'If you have your shoes on the table he'll just come and stare at you until you just stop' (student, Nærum).

This supports an ethnographic study by Gallagher (2010) where he found that students in a primary school regularly looked to see if the teacher was watching and changed their behaviour accordingly. Unlike the prison watchmen, the teacher was not constantly observing, but had a discontinuous gaze: I witnessed students secretly using laptops for social networking in all schools, and then, when the teacher glanced over, revert back to the work they were supposed to be doing. While there are elements of surveillance and *panopticism* that are embodied in relations in the newly-built, more open-plan schools, they do not precisely resemble a Panopticon for three reasons:

(1) Teachers are also observed by other teachers
(2) The observed (teachers or students) can frequently see who is doing the observing in the open spaces
(3) The gaze of the observer is discontinuous

Teachers in Copenhagen expressed a much greater awareness than those in Manchester of the potential harmful effects of this type of surveillance being built into the school environment. Without prompting any Orwellian or Foucauldian analysis, a teacher at Nærum explained that *'when you do read George Orwell and his novel and when you do think of the Panopticon theory […] you can see it to a certain extent with all this openness'*. In comparison, teachers at Abraham Moss and MCA mentioned the importance of "policing" spaces, and at Middleton Tech and Loreto Chorlton concerns about the presence of CCTV were dismissed: *'there's nobody watching them...they're just a source of reference'* (teacher, Loreto Chorlton). Clearly quite different from the response of one teacher at Nærum: '*surveillance cameras, I feel threatened by them. We don't have them here'*. It is beyond the remit of this work to discuss in detail why teachers have different attitudes towards surveillance in Manchester and Copenhagen. However, it is certainly worth pointing out that aside from the UK being

the most observed nation on the planet[8], and the potential impact of neighbourhood location, the younger age of the students in Manchester schools (11-16/18) than Copenhagen (15-18) may be a factor. A teacher at Nærum explained that, at a previous school teaching younger students, using the space for surveillance was more important:

'The other school I worked at had a lot of those open spaces like we do but the students were younger so you couldn't just say you have to do that. You would have to monitor them and then of course you would have to monitor more than one place at a time'.

Section 2: Embedding 21st century ideas in space

Moving beyond didacticism in the classroom

On top of the unsuitable or insufficient numbers of large classrooms, teachers in older schools frequently faced difficulties employing desired teaching methods, such as differentiated or collaborative learning, because of a lack of perceived suitable space outside of the classroom: '*we don't really have spare rooms where we can send people [to do group work]. Okay if I want to do this, then I can go to the information room. If I want to do this I can go to the lounge area […] we don't have that. We have classrooms'* (teacher, Gammel Hellerup).

At Efterslægten, this lack of flexibility was identified by the teacher as something built in to a design that encourages more traditional learning: '*I think this school is built very much or designed very much to have classes […] We don't have a lot of rooms like this where you can actually be four or five people and do some group work'.* The old, modular environment is thus more prescriptive: *'it doesn't have any spaces where you decide the function of what you want to do. It's […] teach here, eat here, do something else here'.* Facing these restrictions of a more traditional cellular environment, some teachers unsurprisingly revert to a didactic form of teaching: '*since I started here I've been going back to traditional ways of teaching […] I just tend to go back to the old...blackboard style now'* (teacher, Gammel Hellerup). At Loreto Chorlton – a school with very few open spaces except a library – the teachers felt that their spatial freedom was largely restricted to the classroom environment. One teacher explained: *'we're kind of confined to the classroom really'*. This was followed by, '*I think at the beginning everyone thinks 'ohh we're gonna do loads of group work. We're gonna set the world on*

[8] A recent security report estimated that there is one camera for every eleven people in the UK, including 750,000 in "sensitive locations" that includes schools (See: Barrett, 2010). http://www.telegraph.co.uk/technology/10172298/One-surveillance-camera-for-every-11-people-in-Britain-says-CCTV-survey.html

fire' and now it's like, 'no, you're gonna sit in a line and be quiet'. At this school, in spite of the large classrooms, opportunities to develop collaborative learning still suffer because the environment offers little space outside of the classroom.

Left: an ill-defined group learning space at Loreto Chorlton offers little incentive to teachers. Right: the modular design of Gefion shows the limited non-classroom spaces for teaching.

Teachers in Manchester did sometimes find innovative ways to create smooth learning spaces in inhibitive classrooms. In larger classrooms, tables were moved around to accommodate group work*: I would move them [the tables] around if they're working in groups so you need to have flexible tables really'* (teacher, Middleton Technology College). Similarly, at Abraham Moss school, where almost all teaching is confined to the classroom, one student states group work is important in each lesson and *'once a week, each lesson you get to go around the class, there's post-it notes everywhere, you collect facts and there's papers, so the teachers try to make it interactive and fun'. I*n spite of the rather constrained environment teachers maintained a flexible stance towards their teaching and differentiated methods according to students' needs: *'if you feel like targeted like you're the only person who's not making progress then the teacher just helps you. They'll make a whole class activity that suits everyone that will help you the most'* (student, Abraham Moss).

In Copenhagen collaborative learning spaces were frequently created outside the classroom, often in an area not conceived for such uses. At Gefion, for example, one teacher overcomes the restrictive, cellular design by utilising the corridor: *'when we do group work here it's a bit hard to switch everybody around, so a lot of the time we go out in the hall [corridor] as well'* (student, Gefion). The teacher can create a smooth learning space where students can generate their own stance towards knowledge (Savin-Baden, 2008): *'our philosophy teacher uses the old Greek method where sometimes we pair up*

[…] and just walk around the school, maybe go outside for twenty minutes' (student, Gefion). Other teachers of traditional subjects would often activate the student to go outside running during the lesson, and at Nørre G, one teacher reported taking classes to museums to read poetry. Moving teaching beyond the classroom into often ill-defined spaces however, sometimes created distractions: *'if we go to the canteen there's a lot of your friends...you get distracted easily'* (student, Gammel Hellerup)*;* '*in principle you could sit around one of those round tables and work but you just can't if there's too much noise'* (teacher, KAG)*.* Such distraction was worse when the spaces were far away from the classroom and students were working without the observation and supervision of teachers. The relatively successful use of the open spaces adjoining the classrooms in the newly built schools of Nærum Gymnasium and Ellesmere Park will, in the following section, exemplify this point.

While it is impossible to confirm the observations of Lim at al. (2002) that didactic teaching methods are still foregrounded in older, modular environments, many teachers do clearly struggle and revert to more traditional learning particularly in smaller classrooms. However, others, mostly in Manchester, find ways to modify the larger classroom spaces, and in Copenhagen some attempt to use spaces beyond the walls of the classroom. The classroom in Copenhagen is clearly not surrounded by impermeable walls outside of which no teaching takes place. Just as with Lefebvre's (1991: 92-3) description of a house falsely imagined as 'the epitome of immobility, with its concrete and its stark, cold and rigid outlines', any critical assessment of the physically bounded classroom would find that its walls are permeable and that there is no strict boundary between *inside* and *outside* or *activity* and *non-activity*. Leander et al. (2010: 332) ask: 'if we deliberately "destroy the appearance of solidity," however, what might we observe?' Perhaps teachers need to imagine the classroom space not as a fixed container-like environment but as potential to be part of a fluid network of learning spaces that transcend its walls.

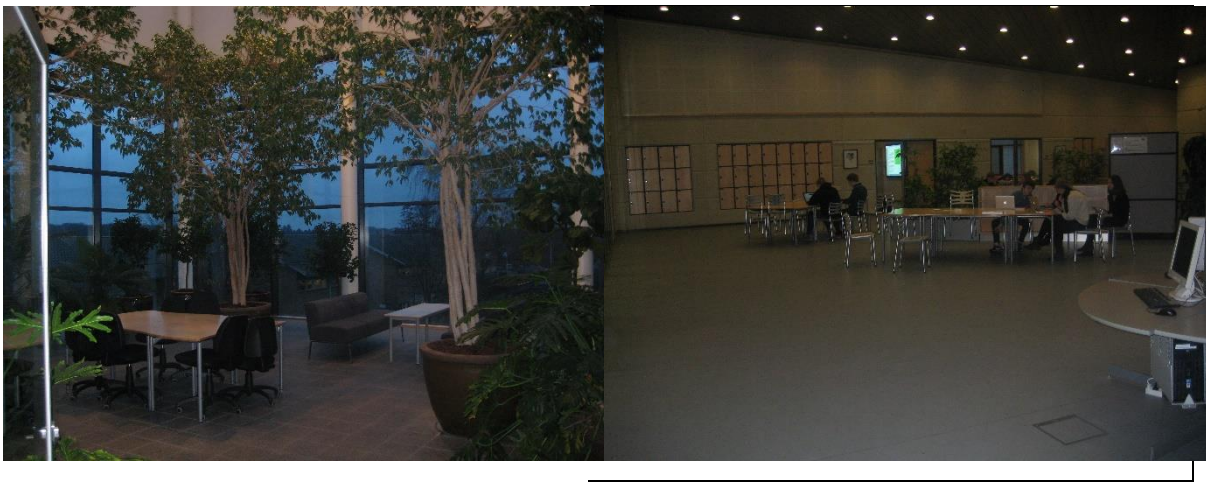
Newly built schools: Creating spaces for 21st century learning

The three newly built schools – Ellesmere Park, Nærum and MCA – are most successful in extending teaching beyond the walls of the classroom and affording a greater diversity of teaching methods. The first two are considered together and MCA separately, for it represents a unique case of a culture being built in to the architecture.

Nærum Gymnasium: A diversity of well-used spaces

Nærum gymnasium is rather luxurious in design, with huge curved glass windows opening up to a large urban-like agora and a diversity of spaces, from the large classrooms and open spaces to a glass-walled library, small group learning rooms and cosy learning spaces with beanbags and sofas. When asked the extent to which these spaces are used, a teacher replied: *'all of it. It's used every day, almost every lesson. They might start inside and then go out and work. Some of them might stay in class and they do group work out here and then can go inside and go through it with the teacher'.*

There is a clear link between open learning spaces and pedagogy: at the same time as *'maybe a third or half of all teaching'* (teacher, Nærum) taking place outside of the classroom, a student explains that, '*more often than not we're working in groups. I think it's kind of rare that we work alone'*. Teachers can vary their methods more easily and are empowered by the architecture that does not constrain them to the classroom: *'I think it's a great help that we have the small rooms and also the study centre that we don't have to be inside the room for the whole lesson'* (teacher, Nærum).



Left and Right: the varied teaching spaces at Nærum are well-used for differentiated and group learning.

Given the proximity of the open study spaces to the classroom at Nærum, unlike at older schools, teachers do not use ill-defined spaces further afield to facilitate collaborative learning: *'I usually tell my students that you cannot go to the balcony. You have to stay in this study centre or you can sit out somewhere so that I don't have to run around the whole school to find them'* (teacher, Nærum).

Ellesmere Park: A multidisciplinary, flexible environment

Before Ellesmere Park was rebuilt and renamed, *'you did kind of feel like you were confined in your classroom'* and *'nobody really left their own classrooms'* according to one teacher. That is in stark

contrast to the newly built school where one teacher told me that *'I use a combination of classrooms and open learning spaces - probably a fifty-fifty split between the two'*. Teachers clearly have more agency from the options to use the open learning environments of tables and chairs or the more typical classrooms. Before the rebuild trying to differentiate learning was a practical challenge with teachers confined to the classroom or using the playground, whereas:

'Now because we've got these open areas as well as the classrooms - and the classrooms are far bigger - you've got that flexibility where you can do those types of activities [acting, roleplaying, moving around], so I'm finding that I'm much more willing to put those in to my lessons […] So I'm being more creative in my teaching, definitely without a doubt' (teacher, Ellesmere Park).

Lessons can be changed quite spontaneously and freely and the teacher can adapt the environment and pedagogy to suit the needs of individual students: *'those youngsters sometimes find the classroom situation very difficult. However they could do that lesson in the outside learning space with a member of support staff'* (teacher, Ellesmere Park). Just as at Nærum and at MCA, the class can easily be divided by the teacher, in this case to personalise learning for students who might struggle in the bounded classroom environment. Personalised learning is also possible for individual students as a result of the way that surveillance is embedding into the open spaces and glass windows of the adjoining classrooms:

'If you look at the girl over there […] she's sitting on her own outside of the classroom doing some work. Because of the space that we've got, we can do that […] she might be catching up on a test because she's missed it, she might be having a really bad day, she might be in trouble the teacher can see the girl through the door because of the glass panel […] I'm here as well so I can supervise her' (teacher, Ellesmere Park).

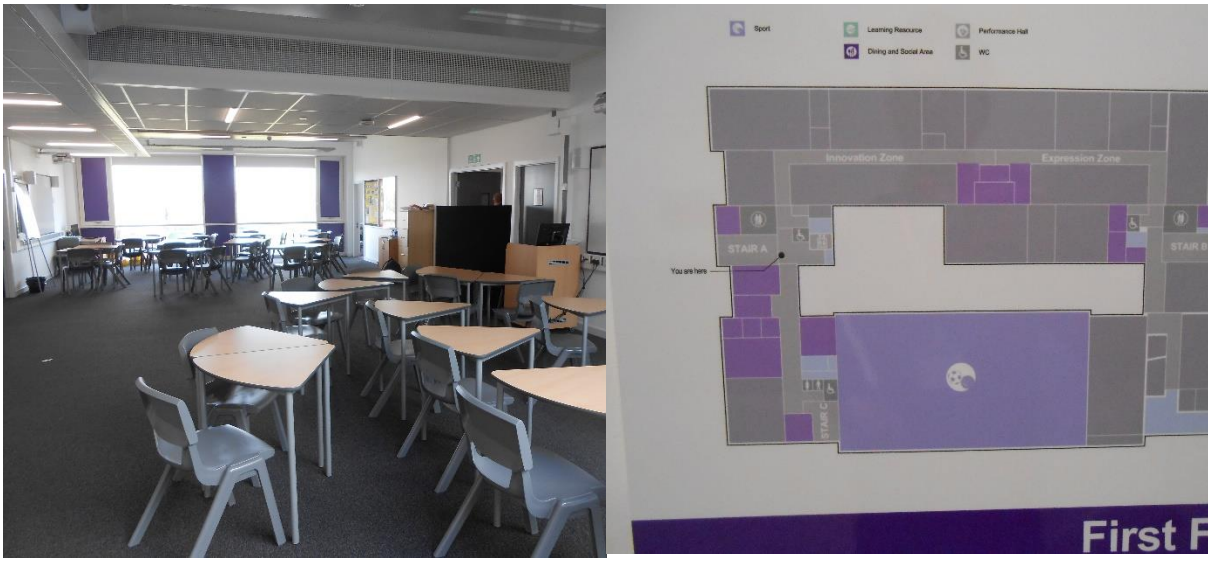
The school imbues Dewey's (1915) ideas of creating an internally fluid and cohesive environment by creating different multidisciplinary, colour-coded learning zones consisting of large classrooms, and, rather than narrow corridors, open learning spaces with tables, chairs and whiteboards. The result is clear: *'the dialogue between teachers I think and within faculties has improved tremendously'*, the reasons for which are related to spatial proximity, as an art teacher explained: '*we never really used to speak to anyone else that much really but now we're right next to science... we all kind of have the same working space really so we see each other a lot more'.* Spontaneous meetings with other teachers afford greater negotiation and therefore flexibility in the use of the diverse potential learning areas:

'There's more computer rooms, there's obviously the open spaces, the canteen, the auditorium […] you can negotiate [to use the spaces] quite quickly because of that close contact with staff members, you can just be asking them because you will see them more frequently' (teacher, Ellesmere Park).

Secondly, rather than being an unnecessary distraction, the movement of other teachers into the open space of the lesson allows for spontaneous, team teaching and a less isolated teacher:

'If any teachers are walking through the lesson, I get them involved in the lesson […] I do like that because you don't feel as isolated as a teacher. Previously teachers could quite easily close the door after registration in the morning, open it up for each lesson but then that's it, just stay inside the classroom' (teacher, Ellesmere Park).

The multidisciplinary and team teaching opportunities afforded by the increased movement of teachers supports studies (Siegel, 2002; Hansen, 2011) that have found that the greater the physical distances between departments in schools, the more isolated teachers felt in a reinforced subject subculture.



Left: multiuse, open learning spaces at Ellesmere Park. Right: a plan of the school showing the various multidisciplinary learning zones. Note the lack of corridors.

Manchester Communication Academy: Fusing an internal culture to architecture

Manchester Communication Academy (MCA) is an example of the way in which an internal culture can be embedded into the built environment to impact upon teaching. Radical pedagogical ideas are installed in daring architecture: there are very few closed classrooms, and large learning zones on each

floor offer a complete multidisciplinary environment in which teachers team teach huge classes. At this school, it is simply impossible for pedagogy to "lag" behind the school architecture: teaching didactically every day at the front of a closed classroom is impossible because neither the space nor the culture would permit it.

In the design of the school building, the aim was to ensure that a certain ethos was built into the environment and minds of teachers partly through effective onsite teacher training: *'now we've got the skip which is the initial teacher training onsite, we can train student teachers from the start in how to work in those spaces'* (teacher, MCA). This supports comments by head teacher, Lynne Heath (2015: 141-2): 'the habits of the users had to be carefully nurtured to ensure that the new staff and students arriving on a yearly basis over the next four years could be modelled, replicated and remain consistent with the habitat'. A staff recruitment process has also actively sought to employ young, newly-qualified teachers who showed commitment to the vision of MCA. For older teachers, adaptation to the environment is made easier by the "collegiate approach" at the school where "teams" of teachers share ideas and planning at specific times in spaces which connect them. The aim is to '*develop that culture so that people aren't just going off and doing their own thing. They're doing it under and understood banner of "this is how we do it here'* (teacher, MCA). Teachers are neither spatially nor culturally isolated and as such are very much included in the ethos of their multidisciplinary "school within a school" where they plan lessons together with other teachers. Similar to the "pod school" described by Lackney and Moore (1994), each area of the school has its own rationale and approach with ideas continuously shared in a way that impacts both on lessons in terms of planning and pedagogy.

A "project-based" learning approach has been adopted whereby in a year group of approximately 215 students, *'you've got small schools so groups of 55 students in each space, and in that space you've got three teachers'* (teacher, MCA). Whilst at the school, I observed team teaching, with three teachers in different spaces of a large room: one would be instructing a large group, one working with a smaller group, and one walking around intermingling with students, perhaps monitoring. According to the interviewed teacher, it is this multidisciplinary intermingling of teachers, afforded by the design of the school that shapes the culture therein:

'It's about developing a culture and if your school is modular classrooms it's hard to get teachers to work together if they're all in separate rooms. You've got a school hall where you can do certain things like but it's difficult to create that culture when people aren't working alongside one another'.

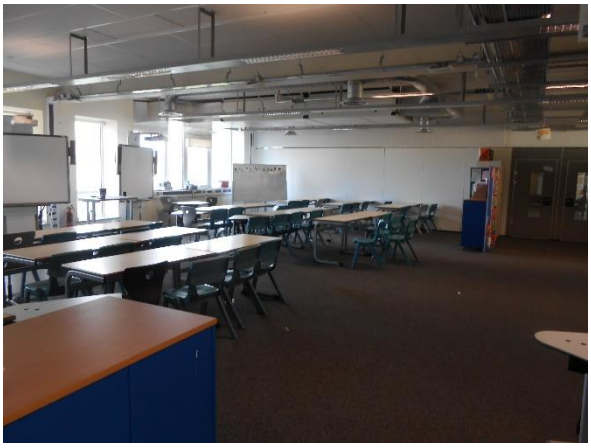
Each zone in the school has an open learning base with removable screens to block out distractions and noise, as well as access to more defined adjoining spaces: a small door-less group work room and

typically spaces for individual/computer-based activities. Teachers use these spaces innovatively: in English for example, learning groups are organised so that:

'the first lesson of the week the more able students are in the base, they use technology and podcasts through independent learning to get the students started on their learning, whereas the less able students are taught more didactically to get them going'(teacher, MCA).

Confirming Raffo's (2014: 131) findings at the school, I was able to observe a diversity of teacher methods in a range of spaces, from didactic learning, team teaching of large classes, small groups learning in isolation, power-point demonstrations and classroom teaching for specialist subjects such as food technology. Here, didactic learning forms part of a repertoire of diverse methods afforded by the range of spaces. In fact, it is used to support students with greater academic difficulties: *'If a kid isn't getting the concept or if they're falling behind...that's when you can identify a group of students and take them into that learning space and teach them more traditionally'* (teacher, MCA).

The option thus exists to create a more personalised environment adapted to individual needs: *'some students can't learn in a large learning space because they get distracted because of their learning needs so they might get taught in one of the side rooms, particularly a lower ability student'* (teacher, MCA). This also represents a 21st century manifestation of "place capturing" where students are spatially segregated based on their academic ability – not so far removed from the 19th century Bell-Lancaster method (Paechter, 2000). This matches Bertelsen's (2013) findings at Ørestad Gymnasium where she observed that more able students were granted self-determination in their work while seated separately to less able students. The two schools are somewhat paralleled in other ways: the idea of *the school for the future* is embedded into the physical and imagined existence of both, where it is seemingly unquestioned that the school building has changed a culture and shaped teachers' behaviour therein (ibid.) Only further research at MCA could disentangle how true this is, but from my observations, interview and communications at the school it is clear that there is an interconnectedness of culture, building and teachers' production of space. This is not suggesting that each school does not have its own culture, but that at MCA this is most strongly fused with the building itself, both in terms of its construction and use.




The diversity of teaching spaces at MCA: Left: a team teaching learning zone. Right: a small space used by teachers for group work.

The relative persistence of didactic methods

Whilst teaching methods are increasingly varied in the diversity of spaces offered by the newly-built schools, didactic teaching is not completely eradicated in either the classroom or open spaces: *'in biology it's kind of the teacher that's talking most of the time'* (student, Nærum); *'in science we just do like mock tests and normal lessons there that we could have just done in the classroom'* (student, Ellesmere Park). Even though it is to a lesser extent than in older schools, a reason for the relative persistence of traditional methods is the potential cause distractions:

'You can have sixty students on each floor in those open areas all quite close to each other and all competing and if some of those lessons are quite practical and they're doing group work and doing drama, it can be very, very difficult to manage your teaching style' (teacher, Ellesmere Park).

'When I have my pupils doing group work outside in the study centre like here on this balcony, I often find that certain pupils that they are easily interrupted by other pupils that are also doing group work from different classes' (teacher, Nærum).

Teachers, unable to maintain control and order, may even refrain from using the space: *'the science special we had like the whole like [named group of boys] in our GCSE doing it and they just couldn't control them in the open bit, so we haven't done that since. We did it once and it's never happened again'* (student, Ellesmere Park).

Section 3: The contextual impact in Copenhagen and Manchester

In this section, I look at the impact contextual factors have on the way teachers use and construct space in the schools, to understand: (1) the effects on teachers of a potentially incompatible architecture and wider educational, socioeconomic and urban environment; (2) the potential for architecture to compensate for and overcome such incompatibilities.

Architecture and the curriculum

Secondary schools in the UK have often been theorised as being "examination factories" where students are educated to achieve good exam results in fragmented disciplines treated separately (Boyd, 1997). The structure of GCSE and A-Level courses, as opposed to the Danish model of four interdisciplinary programmes, is to treat subject areas as naturally bounded, rather than recognising that they are actually 'territorial spaces carved out by academic scholars for their own purposes' (Beane, 1991: 9). This connection between subject-specific curriculum and school architecture is well explained by the interviewed teacher at MCA: *'the national curriculum meant that people had to be taught subjects, so walls went up. So large spaces ended up being turned into modular classrooms'*.

At Ellesmere Park and MCA, there is an incongruence between the "territorial spaces" of subjects and spaces designed to be multidisciplinary, particularly in the way in which teachers are under pressure to produce good results in "their" subject: *'you've got time pressures as a teacher that are phenomenal and the pressures of grades and of achieving certain standards for your classes. So it is a slow, subtle shift [in changing teacher methods to reflect multidisciplinary aims in the new school building]'* (teacher, Ellesmere Park). A fine balance is sought between producing an innovative space in the open environment and satisfying the need for progress: *'my students have to be making progress. If I can do that in a creative way then I will use creative [methods]… if that is not working then I have to shift my approach and do something different'* (teacher, Ellesmere Park). At schools with a more cellular physical structure, the pressure of exams only reinstates the prevalence of didactic teaching methods: *'the nearer they get to the exam deadline the less of the kind of group work and...round the room and interactive learning. It is more stress on exam strategies: "I'm going to talk and you've got to listen"'* (teacher, Loreto Chorlton).

In Copenhagen, teachers are given far more freedom in determining the content and methods of their teaching: *'the way this school and I think in Denmark the schools work is as a teacher there's great confidence that I know what I'm doing'* (teacher, KAG). Indeed, the wider respect and trust for Danish teachers seems to be internalised by all schools, irrespective of their architecture or culture, where it manifests as freedom in terms of how teachers use the available space: *'I'm very free to use any*

method I want in order to teach in my Danish class...which I do for the most part. The same goes for English I think' (teacher, Efterslægten)

Teachers in Manchester are constrained by the curriculum and its associated pressures whereas, irrespective of the architecture, those in Copenhagen have greater autonomy over their choice of methods and how they interact with space. In older schools, spatial constraints exist and are certainly only somewhat compensated for by a more relaxed educational culture; in newer schools such as Nærum there is a clear congruence between the national culture of a more open education and the more open architecture. For as long as this difference exists in national education systems, teachers in Denmark are likely to find it much more straightforward to implement their desired methods in new, flexible educational spaces.

Socioeconomic considerations

It is incredibly difficult to assess in any detail what impact the socioeconomic situation of both cities has on teachers' spatial interactions; this would be a topic for a thesis on its own. Nonetheless, it was something that teachers often reflected on when they assessed their own use of space in the school, without any clear patterns of thought. At Ellesmere Park, situated in a deprived ward in Salford, one teacher explained the importance of having flexibility in the use of space with students who may have to deal with significant problems:

'A lot of our children are from quite poor backgrounds, problematic families, all sorts going on […] so if you're trying to do some group work but you can visibly see somebody's not coping with that there might be a really valid reason […] [I'll] normally change my lesson or give them something different to do'.

On the other hand, a teacher at Efterslægten, in the more working-class north west of Copenhagen, points out the importance of having classroom space where teachers can supervise and observe the students:

'I think you need classroom teaching for the best part of your time when you teach […] if you are to teach this age group and the clients are here...the students are from this area of Copenhagen...you need to be very controlling and very supervising […] so it would be nice to try [open spaces] but you could never give up on classroom teaching'.

Section 4: Limited symbolic reflections and their relationship to the urban fabric

The way in which teachers have reflected upon the school environment, as exemplified, is most often tied to instrumentality. Symbolic reflections are limited, as, like Dewey (1915, 1966), teachers predominantly understand school spaces as intermediaries to be used efficiently. This might be the result of the case studies: many of these schools are post-war, anti-monumentalist schools in the suburbs – more functionalist than awe-inspiring. From a Heideggarian perspective, perhaps many of the schools visited impact negatively on the way in which teachers *dwell* within (Heidegger, 1971), in the sense that they are not interacting with the learning environment in a way that awakens their future aspirations or uplifts them and the educational process to a higher realm. The concept of dwelling is inherently connected to the built environment for Heidegger (2001: 157) who envisions that we can only build if we first understand how to dwell. Perhaps then if these teachers taught in "cathedrals of learning" with towers and spirals, they might feel uplifted and be able to reflect more on their symbolic interaction with the environment more easily (Ream & Ream, 2005). I can concur that it was difficult from walking around these schools – perhaps with the exception of the vast, open agora (or shopping centre, depending on your perspective) of Nærum, to feel uplifted in the same way that one might feel when walking into a religious building.

Some symbolic inspiration was however felt by teachers as a result of building renovations. At Nørre G one teacher emphasised how from the significant renovation of the building she no longer felt embarrassed of the school but now *'it makes you feel this L'oreal kind of thing...I'm worth it […] it makes me feel like someone cares about my work environment*', a feeling which may in turn raise the level of her teaching: *'this caring about us I think... you know... heightens the variable of work interest, work happiness'*. Much the same inspiration was found at Ellesmere Park, where one teacher emphasised how uplifting the new environment is: *'it's light, it's bright ,it's new, it is inspiring, it makes you feel better about yourself, it's almost like "look what we're giving you" and then you kind of rise to that level'.*

At some schools, particularly in suburban Copenhagen where schools such as Efterslægten and Gammel Hellerup sit on large plots with a lot of green, open spaces, an uplifting feeling was generated by large windows and light. Often this is combined with a serenity that comes from this peaceful location: *'It makes me positive when I get to see the sun and there's light […] it is a relaxed environment* (teacher, Gammel Hellerup). At Efterslægten, a feeling of calmness was generated, both from the large

windows with *'such a view of Northern Copenhagen'* and from the light, airy corridors with curved edges on the walls. Suggesting that this elevates both those within the space and the whole value of education might appear far-fetched but, there appears to be a clear connection to the symbolic aspects of the space. It would seem logical that an aspect of architecture that is described as uplifting, calming and inspiring by teachers and students alike can only have a positive effect on teachers' ability and motivation to innovate and become more creative in their use of space.

The contrasting urban fabrics: the boarded up pub by Middleton Tech (left) vs. the uplifting view over suburban Copenhagen at Efterslægten (right)

A Brief Summary

The influence of the school building upon teachers in this study is clear: it would be quite simply impossible for two teachers to go about their business in the same way at Middleton Tech –a mid-20th century modular school – and Nærum Gymnasium – a 21st century school of many differentiated learning spaces and open spaces. Teachers are, on the whole, more constrained in older schools with more typical cellular designs: there are fewer spaces to create collaborative learning beyond the classroom walls, and often teachers respond by employing a more traditional, didactic approach. However, to use Martin's (2002) terminology, this is not to say that they are *imprisoned* by this architecture: in older schools in Manchester, teachers find ways to modify the classroom to inject 21st century ideas into the space; in Copenhagen teachers frequently extended the learning process beyond the classroom into ill-defined open spaces such as halls and canteens. This raised inevitable

practical concerns, particularly around surveillance, as teachers were unable to use the space to supervise students effectively.

Teachers interact with all spaces across all types of school in order to supervise and observe students. In 20th-century cellular school buildings, the classroom remains a site of surveillance and disciplinary power from teachers upon students – this supporting McGregor's (2004: 18) idea: 'education in the classroom is not simply the uncomplicated transmission of knowledge, but involves a complex web of embodied relations of power which have remained remarkably stable over time and are instantiated in the space of the classroom'. In newer schools, surveillance is a fully embedded part of the socio-spatial assemblage with large open spaces, glass windows and walls and curved edges denying teachers the opportunity to escape the gaze of others without any opportunity to withdraw to the enclosure of the classroom and therefore they become subject to the same disciplinary technology.

The cellular, bounded classroom is still valued and well-used by teachers, not only in older schools where they dominate, but also in schools with a diversity of spaces. Large classrooms offer flexibility for teachers to employ a diverse range of new and old teaching methods in an area that is free from distractions found in more open spaces. To use Deleuze and Guattari's (2008) terminology, even if teachers are restricted, they still do have the possibility to produce smooth learning spaces in the striated structure of the bounded classroom and prescribed school curriculum.

However, the amount of freedom that teachers are granted to employ their chosen methods is far greater in the three newer schools, both in Copenhagen and Manchester, due to the diversity of spaces. Teaching in these environments reflect that: teachers can often team teach and create spaces for differentiated and personalised learning as well as group work. Regarding refurbished and reconstructed schools, the same applies: teachers value a range of spaces to employ a range of methods. Where architectural changes haven't afforded such diversity, such as at Middleton Tech or Abraham Moss, teachers are still largely restricted to classroom-based teaching, often didactically.

Beyond the direct influence of the architecture itself, there are several other factors that influence the way in which teachers interact with their environment at varying scales from national cultures to the location of the school within the urban environment. In Manchester, confirming Savin-Baden's (2008) ideas, a rigid and prescribed national curriculum and strong performative academic culture was incongruent with newly designed architecture, impacting negatively on teachers' abilities to produce smooth spaces where students guide their own learning and teachers are facilitators rather than experts imparting knowledge. This is often far simpler in Copenhagen, where a less prescribed curriculum and more relaxed academic culture gives teachers more freedom to use spaces in the ways

they see fit. I can thus conclude that the wider academic culture in Denmark at least at the level of gymnasia is far better suited to 21st century school architecture and pedagogies.

External factors influencing the teacher's interactions with space can also involve the school's location in the city itself. The suburban location of almost all of the schools in this study reflects the migration to the suburbs in the mid-20th century with many of the schools constructed with large windows and at close proximity to nature. In such schools, teachers interacted symbolically with an environment which uplifted them and instilled feelings of calm and peacefulness. In terms of the social and economic characteristics of the neighbourhood, the influence was unclear: while some teachers described socio-spatial processes of surveillance, others expressed the importance of self-directed learning for such students.

The case of MCA presented a very specific case study displaying the importance of fusing an internal culture with the school building in order to influence the way in which teachers interact with spaces to produce different pedagogies. At this school, there was an ethos instilled in spatiality: teachers were recruited if they fit the principles of the school and were trained in order to use the learning zones effectively. In such an environment, teachers are simultaneously emancipated and constrained: they are freed from a physical or cultural environment that might push them into teaching didactically in a classroom; yet pushed into employing 21st century methods of team teaching and differentiated teaching even if it is against their wishes. Nonetheless, embedding an internal culture is one clear way of achieving congruence between a newly-built environment and pedagogy. This confirms Heath's (2015: 137) idea that 'the success of new buildings relies heavily on its users being able to articulate a distinctive vision for their school'. Such a vision should be reflected in the organisation of the school, for it is not just the availability of spaces, but also school curricula, time availability, departmental structure and students' behaviour that often 'require teachers to establish priorities and boundaries in their classroom practices' (Aubusson, 2002; Bissell, 2004a: 1).

The implications of this research

One of the aims of this research has been to uncover any disjunction between the intended use of secondary school and gymnasium spaces, as conceived by architects and designers, and the way in which teachers actually use them. In Lefebvrian (1991) terms, there has been an examination of the reconciliation between the lived, conceived and perceived realms of secondary school and gymnasium spaces. The extent to which the three create a coherent whole is inevitably different at each school and is determined by so many aforementioned factors: the diversity of spaces offered; the size of the

classroom space; the influence of internal and external culture; and the symbolism of refurbished or light and open spaces in proximity to nature. Consistency is assured in this triad 'only in favourable circumstances, when a common language, a consensus and a code can be established' (Lefebvre, 1991: 40). Below I promote several ways in which a more joined-up approach to create greater congruence between school architecture and teachers' methods can be achieved:

1) Implications of the research for architects designing schools

Findings from interviews with teachers show that there is clearly no "one-size fits all" approach that can be taken to designing secondary schools and gymnasia: as this research shows, the design must fit to the national, local and internal culture. There are however some pragmatic and symbolic findings that transcended both locations and thus can tentatively be suggested for consideration by western European architects whether they are building or renovating/reconstructing a school:

> There is an overall need for a diversity of clustered spaces of different sizes and openness to match teachers' needs to employ a range of pedagogies. Suggestions include:

- Large, cellular classrooms with enough room to modify the seating arrangements and with plenty of light.
- Instead of corridors, adjoining open learning spaces - visible from the classroom - that can be used for lessons and collaborative/group work.
- Small, bounded rooms that can be used for one-on-one teaching and for personalised learning.
- Visibility from one space to another ensured by glass walls and curved edges could potentially reduce the need for more invasive surveillance (e.g. CCTV).
- Multidisciplinary learning zones in close proximity to each other to encourage teacher collaboration across different disciplines.
- Considering a location close to green space and designing a building with large windows and open spaces in order to create a light, airy and uplifting environment for teachers and pupils.

2) Implications of the research for schools and education authorities

In many schools in this research, teachers had rarely received adequate training to use new educational spaces or to modify older spaces to fit new ideas. Uncertainty often prevailed concerning how to interact with spaces, leaving potential for methods incongruent with the architecture. In order

to overcome this, teacher training should encourage a form of "collaborative placemaking" by promoting spatial literacy and more specifically an understanding of the way teachers are shaped by spaces and shape it (Fisher, 2004: 37): to identify 'the ways in which striated spaces and systems have moulded our assumptions, perceptions and pedagogies' (Savin-Baden, 2008: 15). Bringing spatial awareness back from the subconscious, coupled with organisational changes to the school (e.g. timetabling, team teaching, creating multidisciplinary learning zones) will help embed an ethos into the school space and encourage congruence between teachers' methods and the school architecture.

3) Wider implications upon architecture and urban design:

'If a lot of architecture's meaning is made not on the drafting board but in the complex lifeworld of how it is inhabited, consumed, used, lived or neglected, that world is at once central and peculiarly under-explored' (Cupers, 2013: 1).

Just as educational theorists have given far too little attention to the physical environment of schools, it has often been the only focus of architects who have treated the use and production of space rather blithely. Architects need to be given some knowledge of learning processes as they 'often have little conception of the complexities surrounding the role of the classroom teacher' (Clark, 2002: 21). Generally, the voice that this research has given to teachers and their interactions with space should serve to highlight more widely the importance of considering the esoteric experiences of those who interact with built environments. This could also be applied to urban planners and designers. As this research has shown the uplifting influence upon teachers of a proximity to nature, green open spaces and sunlight in suburban schools, we might consider how to situate schools in the urban fabric in the changing cities of the future in order to maintain these beneficial symbolic interactions.

4) Implications for teachers:

Although I do not anticipate this research ending up in the hands of and thereby influencing many teachers, in the process of visiting the schools and interacting with a whole host of teachers and students it can only have contributed to an increased awareness of the way in which they interact with the physical environment. It is my hope that the reflective nature of the interview process has stimulated a more engrained period of reflection from teachers upon their own practice and how they use the space around them. Ultimately, like Wright (2004: 41), I challenge 'that idea that you can build a high quality, effective school for the future from a design brief written just by planners, LEA officials or a headteacher'. The only way to empower teachers in more suitable school buildings is to involve

them in not only the design process but also academic research. This research has done so and thereby has potential to contribute to the empowerment of teachers and also adds to the knowledge of the role of teachers in changing school buildings.

Conclusion

Given more time and greater access to schools for longer periods, the ethnographic nature of this research could be enhanced by greater immersion at each school with more detailed observations and opportunities to interview. This would allow other topics that have only been briefly considered in this research to be looked at in more detail. For example, the development of online and virtual educational environments brings with it many more unanswered questions regarding how they fit into the built environment and the implications for the role of the teacher in the future (see Jamieson et al., 2000).

In spite of any limitations, this research has successfully illuminated the complex ways in which teachers' relationships with space are embedded in the school context, with close attention to patterns that have emerged in different schools according to their architectural or physical form. Teachers are generally more restricted in older, cellular buildings, and to some extent emancipated in newer buildings with diverse spaces: it is in the latter where they are able to successfully apply new pedagogical ideas of differentiated, collaborative and personalised learning and in the former where didactic, classroom-based learning remains more common. However, this is no clear binary of old/new architecture or pedagogy, for teachers are neither completely imprisoned in their ability to adapt and modify older spaces nor are they completely abandoning traditional didactic, teacher-led practices in the classrooms of newer schools with diverse spatial configurations. There are of course no clear answers for the design of schools across different cultural contexts, but the challenge for architects and designers is clear: all plans must begin from the acknowledgment that school environments are not simply physical spaces but socio-spatial assemblages (Dovey & Fisher, 2014). From the onset, teachers should be involved in design processes and architectural considerations should be guided by the following thought: "in what ways can we empower teachers and students to achieve their pedagogical goals in this environment?"

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Appendix (a) Case studies

The secondary schools and gymnasia that have been chosen have been grouped together below according to the age when they were first constructed. This does not render discussions of similarities and differences across schools in the two locations futile, but instead begins by looking at the architecture itself and not the location. It is worth noting the relatively young age of the school buildings across Manchester both in my case studies and in the city as a whole: few nineteenth or early twentieth century buildings remain and almost all of the buildings constructed in the post-war period have received significant renovation. This latter point perhaps suggested the short lifespan or poor quality of the modular constructions built during that time period.

Group 1: Schools built between 1900 and 1945

The following two schools have been grouped together because they were built between 1900 and 1945 and although both have been partly refurbished since and have some differences, architecturally they are still reminiscent of this era: long corridors and classrooms in a modular structure.

Gefion Gymnasium, Copenhagen

Gefion Gymnasium is located in the centre of Copenhagen and formed in 2010, after the merging of two schools: Østre Borgerdyd Gymnasium and the Metropolitan School. The school site was constructed, originally for the Technical University of Denmark, between 1929 and 1954, though opened in 1930 (indenforvoldene.dk, n.d.). In 2013, architects firm Rørbæk og Møller applied a less traditional approach to the building to construct the Delta wing – a new space over two floors consisting of four glass-walled classrooms adjacent to open learning spaces. The main idea about this mix of classrooms and open spaces, according to the interviewed architects (of Rørbæk og Møller), is to create flexibility where common areas can also be incorporated into teaching.

Hansen (2011) suggested that the school, because of its design, cannot invoke the same feeling of creativity as in the classroom-less Ørestad gymnasium. Instead, the long corridors, closed classrooms and bounded spaces in which teachers can work, creates a more traditional approach to education: he contrasts the 'open' and 'visible' learning/teaching in Ørestad gymnasium with the 'closed' and 'secret' learning/teaching in Gefion. Even if attempts are made to the contrary, teaching is constructed in the bounded classroom spaces as a "private matter".

Above: the main entrance at Gefion Gymnasium

HF-Centret Efterslægten, Copenhagen

Situated in the Brønshøj area of Northern Copenhagen, Efterslægten has a long history dating back to 1786. The school moved to its current site in 1940, where it has stood largely unchanged ever since. The architecture of the building is very typical of a school built anticipating suburbanisation: large windows give views over the greenery of Northern Copenhagen and there are vast outdoor spaces. The functionalist style matches those of the local area: curved internal walls, large windows and a modest structure to the building give it is a far less imposing feel than the monumentalist buildings built in the 19th century. In 2010, a new sports centre was added to the existing school buildings, but otherwise, it has so far remained free from large-scale modification.


Left: the main school building, Efterslægten. Right: the original architect's photo of the same building (1940) (source: efterslaegten.dk)

Group 2: Refurbished Schools built between 1945 and 1980

The following schools have been grouped together because they were all originally constructed between 1945 and 1980, and have since received varying degrees of refurbishment. While there are differences between them, they all embody the spirit of the time to some degree: suburban locations with low roofs and egg-crate classrooms and corridors that mostly, persist to this day.

Middleton Technology College, Middleton, Greater Manchester

Middleton Technology College (Middleton Tech), then called Moorside, was originally built in the early 1950s and was designed so that it could be used as a hospital in a nuclear emergency. Since then, the school architecture has been changed and added to many times: a humanities building was added in the 1960s, followed in the 1990s by new art rooms and a sports hall, a sixth form block (ages 16-18) in 2009 and a new multidisciplinary Science and Technology (STEM) building in 2013. This latter space, constructed as part of BSF Rochdale, aimed to create a multidisciplinary environment with 'multi-purpose learning zones' that 'support independent learning and small group work enabling an extension of the range of learning spaces and approaches available to Science and Technology to differentiate and respond to pupils' learning requirements' (inspiredspacesrochdale.co.uk, 2015). The main school building still today has a definite modular style: egg-crate style classrooms sit alongside a main corridor on each floor.


Left: the main school building, built in the 1950s and refurbished inside in 2013, Middleton Tech. Right: the new STEM block, built in 2013 as part of the BSF Rochdale programme

Nørre Gymnasium, Husum, Copenhagen, Denmark

Although Nørre Gymnasium (Nørre G) dates from 1818, it has existed at its current site in Husum since 1971, when a new school building designed to mimic Københavns Åbne Gymnasium was constructed to deal with increasing student numbers. In 2014, a major refurbishment maintained the rational corridor constructions but most of the interior has been changed, with all subjects having completely refurbished, specialist rooms and a large lounge-like lobby in the centre of the school conceived as a multifunctional space with many different zones within. According to Ifversen (2015), this redevelopment has been driven by teachers' wishes for "optimal functionality" of space.


Left: The main school building. Right: refurbishments to outdoor areas

Gammel Hellerup Gymnasium, Hellerup, Copenhagen

Originally dating from 1894, this suburban gymnasium moved to its current Hellerup location in 1956. Designed by the Danish architect Axel Maar, the main building is reminiscent of his work during the 1950s, with a strong emphasis on brick functionalism. As such, the building is almost quite basic looking: it is without doubt more "low-lying roofs" than "towering spires", and with only two floors, feels far from imposing, despite having around 1000 students. Indeed, it is well described as 'a traditional postwar low brick building in a neighbourhood scattered with seaside memorabilia and embassies' (Galilee, 2013). In 2006, a new library and study centre were added, in addition to an underground sports hall with a roof that doubles up as a rather surreal looking outdoor seating area – both conceived by the architects BIG as multifunctional focal points (ArchDaily, 2013).

Right: the original school building, largely unchanged since 1956, Gammel Hellerup. Left: the outdoor seating that sits on the roof of the underground sports hall, with the new study centre in the background.

Loreto Chorlton High School, Manchester

Loreto Chorlton School was built around Christmas 1968 and was inaugurated by a Catholic bishop in June 1969. Largely unchanged until between 2009 and 2011, the school underwent a complete refurbishment as part of the Manchester BSF programme. Although the original framework of the school remains from the 1960s, there were new windows, ceilings and walls. Classrooms were also rearranged, though remained alongside main corridors in a modular fashion, and a new library was created.

Above: main entrance showing the new façade, Loreto Chorlton

Københavns Åbne Gymnasium, Copenhagen

Københavns Åbne Gymnasium (KAG) has existed in its present location since 1970, in a very rational building, designed by Svenn Eske Kristensen, in which a central lobby connects two parallel wings consisting of traditional classrooms – a similar layout to that of the Righospitalet in Copenhagen. In 2007, a redesign by Rørbæk og Møller architects implemented more experimental ideas: three new glass-walled classrooms have been created without permanent tables, chairs or whiteboards. There are only only movable partitions and boxes, based on the premise that 'all disciplines can find alternatives to the traditional blackboard teaching' (Ifversen, 2014). The aim, according to the interviewed architect, was to 'break down the classical idea of the classroom' and afford the teacher greater flexibility in their approach, with furniture offering eight different arrangements and pedagogical possibilities.


Left: the main school building, KAG. Right: a new flexible classroom with tables and chairs

Abraham Moss Community High School, Manchester, Greater Manchester

While Abraham Moss School's original 1973 school building was implicitly connected to pedagogy in an experimental design of interdisciplinary spaces (Franklin et al., 2012: 47), it was mostly destroyed by an arson attack in 1997. After several years of temporary accommodation, the school was partly rebuilt and refurbished in 2012 as part of the BSF programme. Although one local councillor suggested that this 'will transform the way education is delivered' (Cllr Sheila Newman cited in placenorthwest.co.uk), internally the school is actually structured according to quite a typical modular design; externally it has a more unusual architectural form, shown by the photo below.

Above: the main school entrance, Abraham Moss

Group 3: Schools built in the 21st century

The following three schools have all been built since the turn of the century, and to different degrees, have attempted to shake up traditional styles of teaching with open spaces and learning zones replacing a strictly modular design.

Manchester Communication Academy, Manchester, Greater Manchester

Manchester Communication Academy (MCA) was opened in 2010, as a completely new school for students aged between 11 and 18. Its origins lie in the 'distinctive national policy context of the years from 1997 to 2010' when the Labour government became concerned that England, 'although affluent by international standards, is also beset by multiple inequalities associated with poverty and other forms of economically-related disadvantage' (Heath, 2015: 137). Constructed as part of the BSF Manchester programme, the three-year planning process was based on research, analyses of existing newly built schools, and a very clear vision that the school had an aim to marry habits and habitats by fostering a progressive culture of learning/teaching (ibid.: 141). MCA will provide a unique example in

this study; it is a school whose vision has been built into its environment in a way not really seen so clearly elsewhere.

Above: the main school building, MCA

Ellesmere Park High School, Eccles (Salford), Greater Manchester

As part of the BSF programme in Salford, Ellesmere Park High School was rebuilt and renamed (from Wentworth High School) on the same site as its original 1958 building. The aim was to shift from an environment once declared an 'educational straight jacket' with spaces that 'are not fit for purpose and which do not enable transformational learning to take place' into a 21st century learning environment to meet the needs of teachers and learners today (Salford City Council, 2007: 6). Learning suites and faculty areas aim to facilitate collaborative practice such as team teaching and joint planning: on top of more typical classrooms, the school has large open plan learning areas instead of corridors and multidisciplinary zones.

Above: the new school building constructed in 2014, Ellesmere Park

Nærum Gymnasium, Nærum

Located some 18km north of Copenhagen, Nærum Gymnasium was built in 2003 in a distinctive style based on a central philosophy of flows of 'learning and reinvention' that is 'reflected in the barrier-breaking architecture' (nagym.dk, n.d.). The school declares itself as the 'physical manifestation of a new integrated and holistic approach to space and personal and academic growth'. Indeed, like MCA and Ellesmere Park, it has been constructed with a close alignment between school architecture and pedagogy.

Below: the main entrance and building, Nærum

Learning here aims to leave behind traditional forms of instruction 'with its clear delineations of time in and out of the classroom' and instead focus more on students' learning in 'an academically, technologically, and socially relevant environment' (ibid.). Teachers should be instilled with a sense of immediacy to adapt "on the go" and flexibility 'in pursuing whatever work methods and procedures best suit the topic at hand' (ibid.). To do so, replacing the 'the inflexible framework of long hallways with classrooms in rows', there are 'sweeping glass facades' and open multiuse spaces such as the Agora (ibid.) and a library that has been considered iconic. In these open spaces, teachers and students are expected to work together to both become better learners.

Appendix (b): Information of visits, observations and interviews

Below are the interviews and observations that have taken place during visits to schools, first in Copenhagen then in Manchester. For reasons of anonymity and child protection, I have not disclosed the gender of any of the students involved in the study.

Copenhagen School	Date of Visit	Observations	Semi-structured Interviews	Focus Groups
Gefion	12th November 2014	Whole school and in two lessons	One male teacher	Three students together
Efterslægten	17th November 2014	Whole school	Two male teachers together	Three groups of three students
Nørre G	18th November 2014	Whole school	Two teachers together – one male, one female; one student; two students together	
Gammel Hellerup	2nd December 2014	Whole school and in one lesson	Two male teachers together	Three groups of four students
KAG	3rd December 2014	Whole school and in two lessons	One male teacher; two teachers together – both male	Two groups of four students
Nærum	10th December 2014	Whole school	One male teacher; two teachers together – one male and one female	Two focus groups of three students

N.B. Two interviews were also conducted with architects: one from Rørbæk og Møller architects who have been part of reconstructions at Gefion and KAG; the other from the Bjarke Ingels Group who were behind recent projects at Gammel Hellerup.

Schools	Date of Visit	Observations	Semi-structured Interviews	Focus Groups
Middleton Tech	12th March 2015	Whole school	One male teacher; two female teachers together	One group of three students
Abraham Moss	16th March 2015	Whole school		One group of three female teachers; one group of four students and a present teacher
MCA	1st April 2015	Whole school	One male teacher; plus informal chat with female head teacher and PhD student researching at the school	

Ellesmere Park High School	18th and 25th March 2015	Whole school	One female teacher; two teachers together – one male, one female	One group of four students
Loreto High School, Chorlton	27th March 2015	Whole school		One group of three female teachers; one group of three students

Appendix (c): Consent for participation in research

INFORMED CONSENT FORM

Date:

Study Title or Topic: The impact of school design upon teacher methods

Researcher: James Furlong, MA candidate, Urban Studies, Université Libre de Bruxelles

Purpose of the Research: To evaluate the influence of school design upon the pedagogical practices of teachers, with a focus upon how teachers use the space and resources available to them. The research will compare different schools across Copenhagen and Manchester with their own designs, reflecting different time periods.

What You May Be Asked to Do in the Research:

- Asked to answer various questions regarding your use of space in the school
- This will most likely be in the form of a short, semi-structured, recorded interview
- Asked to draw a mental map of the school
- Asked if a lesson can be observed from a non-distracting location

Risks and Discomforts: I do not foresee any risks or discomfort from your participation.

Benefits of the Research and Benefits to You: The research should give a more thorough understanding of how the school building influences the teacher, and therefore enlighten debates on such a topic. It should be of particular use to architects and educationalists, who together, impact upon the role of the teacher. For your own benefit, you will hopefully be able to engage in an interesting topic, and perhaps learn something new from the research.

Voluntary Participation: Your participation in the study is completely voluntary and you may refuse to answer any question or choose to stop participating at any time. Your decision not to volunteer will not influence in any way the nature of your relationship with the researcher.

Withdrawal from the Study: You can stop participating in the study at any time, for any reason, if you so decide. Your decision to stop participating, or to refuse to answer particular questions, will not affect your relationship with the researcher. Should you decide to withdraw from the study, all data generated as a consequence of your participation will be destroyed.

Confidentiality: All information you supply during the research will be held in confidence and, unless you specifically indicate your consent, your name will not appear in any report or publication of the research. The researcher may use an alias in place of your name.

Questions about the Research: If you have questions about the research or about your role in the study, please feel free to contact James Furlong, by e-mail (jamiewfurlong@gmail.com).

Legal Rights and Signatures:

I _____ consent to participate in this study conducted by _____. I have understood the nature of this project and wish to participate. My signature below indicates my consent.

Signature _____ **Date** _____

Participant

Signature _____ **Date** _____

Researcher

Appendix (d): Transcribed interview from Gefion gymnasium

Below is a transcript from a focus group with three students at Gefion. I have referred to the interviewer as I, and the three students are given initials of A, B and T.

I: What did you think of the classroom that you were just in?

A: It was terrible at the start, because it was like a shoe, so you'd be sat all the way out at the wall, and there'd be a few...sat in the middle. Afterwards the flood came and they put the tables differently, so now it's good. Before it was pretty terrible.

B: I'd say it works. It's pretty good cause there's space for activities...no....there's not really that much space, but there's enough to move about and like still not be too be too far away from the blackboard if you sit down, even if you sit at the back. So, I'd say it's rather good.

I: And you say you come in here often during lessons...

T: That's only because it's so convenient for us, but it's basically for example, if we were to do some group...we often do group work in sociology and philosophy so because when you huddle up in groups the classroom might get more squished in, and then we just pop in here cause obviously there's a lot more room and there's a lot more comfortable seats.

A: There's only enough chairs for us in there so when we do group work here it's a bit hard to switch everybody around, so a lot of the time we go out in the hall [corridor] as well

I: Yeah, you'd have a few of you in the hall, a few of you in the classroom and a few of you in here

T: Yeah, exactly

I: That's interesting

A: So it's a bit more quiet for every group too

I: And where would you pass your time in the school if you were between lessons or during lunchtime?

B: A lot of the time we go outside, yeah just down here, 'cause there's some shops over there. We go there or we go to meet some people, or we go down to have a cigarette or something. But if we're not doing that we might just, I don't know, just go about the school I suppose.

A: We've got fifteen minutes between most of the classes, so it's basically just going from class to class and waiting in front of the other class. And being in group and talking together in front of the class. And then we have lunch break and we normally go outside and sunbathe, buy something to eat.

T: We often eat kebabs!

I: Yeah, you go to the kebab shop at lunchtime?

T: We're very multicultural!

I: Up to Norrebro?

T: Yeah

I: And what about, do you have a preference, a kind of favourite space in the school?

T: It might be a sort of growing sentimental value but I think our classroom. We don't have a classroom per se like for example before we came to gymnasium you would have one classroom where you would have all of your lessons. But here, well today we have all our lessons in there. But it's not unusual if we have a class at a completely different end [of the school]. Because we have most of our classes in the room where we had our first class, I sort of prefer it because it's our class, kind of thing. You have a classroom but not in the same sense as we used to have.

A: I like it too because if you don't know where you're supposed to be, you can just go to that door and it's pretty much where you have to be.

I: Yeah, you can kind of hang around there.

A: So we don't have to bring all our stuff to the next room and wait there because we can just leave it there and come back when the next lecture starts. That's the benefits of having the same classroom. It's nice having other classes too to go to sometimes because then it's not the same old.

I: And if you had to estimate what percentage of your time is spent in the classrooms as opposed to outside of the classrooms, what would you think? Where do you do most of your learning?

A: 80% 70% maybe then about 20-30% outside doing group work. B: Yeah, but most of the time inside.

T: Our philosophy teacher uses the old Greek method where sometimes we pair up, maybe not now when it's a bit cold, but we'd pair up and just walk around the school, maybe go outside for twenty minutes...

B: Yeah, like discussing something

T: Most of the classrooms, for example, Chemistry, we're in the classroom, but I think it's really Sociology and Philosophy we sort of move outside of the classroom.

B: We also do that in English and Danish because our teachers have this thing where they want us to be activated I suppose. So they make us go outside and sometimes we'll do a little bit of running. So we sometimes do some activity in the English and Danish classes but it's not like connected to the learning - the actual thing we're learning about here.

T: 90 minutes can be a long period of time. I: Just sitting in one place.

T: Exactly

I: Do you enjoy the opportunity to kind of get out of the classroom and walk around?

T: Maybe not in Danish and English because it's a bit errr [expresses apathy] kind of thing. Because we're teenagers and we just want to sleep all day.

A: It's annoying having to get up and do something.

T: The way we do it in Philosophy, I think it's sort of the Aristotle. The Plato walk. That's very enjoyable because you're learning at the same time. That maybe is specific to Philosophy because Philosophy is where you can learn from yourself kind of thing. It starts in your head basically. Nothing is real.

I: Yeah. So you don't feel that that would be possible in other disciplines or other subjects in the school?

T: I don't think we could go around and talk about Maths problems.

I: Or talk about Chemistry

B: It might work in Danish or English, not quite as good, but if you were talking about a short story or something, you might go out and say let's discuss this and you can just walk about in like fifteen minutes. But it wouldn't work quite as good because in Philosophy you're talking about one or several questions that you have to answer and think about and take input from the one you're walking next to. So it's quite different than analysing a storry, I'd say.

T: There's not a right answer in Philosophy [unlike English or Danish where], it's sort of 'who wrote this story? Hemingway'. There is no right answer. It could maybe work if you need to take your own meaning or interpretation of it into consideration.

I: Because it is subjective and you could kind of explore the answers yourselves.

A: It's kind of the same with Chemistry and Mathematics - you can't really walk and do the Math. You have to write it down. In Danish or Philosophy you can kind of just talk about it and give a short resume of what you're talking about.

I: Yeah, of course.

A: You really need your book a lot and you probably need your computer to be able to do the Chemistry. So that's probably the main difference.

I: And do you bring computers into all of your classes?

A: Yeah, pretty much all of them we use computers.

B: Even bloody PE!

A: I bring my computer for the lectures I need to write notes for and for the other stuff I bring my iPad because it's a lot lighter.

I: That makes me feel very old! What about discipline. Do you feel in the classrooms that the teachers have good discipline over the students? Or whether they should even.

B: I'd say for the most part there is good discipline, but it could be better in several classes. I think that even though there is talking and there's discussing and something going on while we're learning, we still learn something when the teacher speaks even though we're not completely focussed on it. Because we have the ability to talk about it in between ourselves.

A: Coming from a tenth grade which was rather rowdy, I'd say it's a lot calmer here. It's not noise per se, it's sort of not following, that's sort of the lack of discipline. It's not a noise thing - there's not someone in the back yelling. They're just sort of minding their own business on Facebook, doing work. It's something that you can only control so much. And since the Philosophy classes is known for its try-hards or slackers and maybe a bit of in between, but it's like, 'alright it's philosophy I don't have to do anything'.

T: A lot of it is like, people might be talking the classes but it's only small whispering. If it comes to much, some of the teachers will tell them to shut up. If they're on Facebook, or if they don't care too much, it's a

bit like, well it's their own grades that they're deciding right there. And I think that's the philosophy of most of the teachers: 'you choose what you want to do with your grades'.

I: 'It's your education' B: Exactly, yeah.

T: And I think that is really good because it's hard to be focused for 90 minutes. We have like 6 hours of school. You can't really be, yeah, you're not focused for 6 hours.

B: Exactly, you can't give 100% all of the time.

T: It might be like, half an hour of the first lecture you're kind of asleep. The next hour focused kind of, and the last ten minutes you're not really because you're just watching the clock. The next lecture is pretty productive. Then the next one is 'ok we wanna...

B: ...'Just have food and stuff'.

A: The third lecture you've just eaten and you're kind of productive. And then in the end it's kind of like 'ok, now we just wanna be free'. And the fourth one is kind of like 'we wanna be free, we've got an hour and a half left, ok'.

T: There's a spike of productivity in the middle.

I: a five-minute period where you reach your optimum?

B: [Laughs] Exactly. Even if you try to be focused, we have 90 minutes in the lecture. You can't give 100% all the time, so sometimes you might just space out for five minutes, and recharge or something.

I: Do you think the teachers afford you that ability?

B: Yeah, I'd say so. Of course, they don't want you to like be completely unfocused for whole lecture, but they still give you the ability to just kind of step a little bit back, or just relax for a minute or so.

I: And what about if you, for example, prefer learning by yourselves or for people that prefer learning in groups. Do you think there are opportunities to kind of, learn in your own way?

T: You can always learn by yourself. I quite like it. I also accept that there is going to be group work. But I might just learn by myself at home or something. I accept that it is not the best way of learning, by yourself. Especially when you have Philosophy. If you go to Philosophy and have tunnel vision then you get such a narrow view. For example, with other people in group work you get feedback and you argue and discuss. I'd say there's a good mix of both, because we have independent essays we have to write and stuff, but there is also group work, so there is a fine balance I'd say.

B: It's normally that decides it, but you can always go up and speak to the teacher, and ask, like, I'm kind of tired of group assignments, can I just sit and read something for myself? And then we can maybe just work on some questions by ourselves for just like one assignment or something. So you can always try to talk with your teacher about it, but it's mostly just the teacher who decides. But they're pretty good at like, making a mixture.

I: So would you say that the teachers are quite flexible?

B: Yes I'd say so.

A: The problem with a lot of group assignments, not like the written assignments, but just in the class like we're doing now, it can be some people like read as homework and some people don't. So there's always

four people in a group, and two of them 100% haven't read it, or have no idea, and one person just kind of read it and kind of knows what's happening, and the last one is like, "ok, why did I end up in this group?". So that's like the downs of group work, but... [unclear talking]...mostly the teachers are quite flexible whether we should sit and do it on our own. Sometimes they just say, "talk to the person next to you about what we've been talking about".

B: It's not completely big group assignments. Normally, it's just like ok you talk to the person you sit next to, you discuss the thing and then we'll move on. Instead of like, 'ok you're going to be six in a group and you're all just going to sit and discuss this for half an hour'.

A: I think the group work way it works really well as long as it's something we've been talking about in the class. When it's something you have to read yourself or have to have read it at home, that's probably when....

I: So then people have very difficult levels and it's kind of difficult to come together?

A: Yeah, exactly.

I: What about the space in the school? Do you think that there is flexible use of space, so if you wanted to... do you feel like there is opportunity for you to use the space in your own kind of way in the school?

B: I'd say there's a lot of places you can go if you don't have a lecture or something. You can go down there and just relax. The only problem is that there's not much space for sports, which isn't really a problem for me. But that's like the only major problem that I can see. Otherwise, other than that, everything is rather good I'd say. You have the ability to go somewhere if you just want to be alone, or if you want to find someone you could.

I: What is the big circular space that is at the end of the corridor? I looked in the room very quickly

T: It's called Rotunden. I don't know what the purpose is, but basically, it's the main entrance and you come in.

B: It's pretty much just for show I think! T: I think it's just an architectural show-off really. It serves a point because we have our sort of gathering, assemblies there. I think e have a monthly assembly every third Friday of the month. We assemble like the avengers and then we sit there and listen.

I: Or attempt to listen.

B: Yeah exactly!

A: Yeah I don't think they're put in the smartest places. You either go to the meeting or you get a really early lunch break!

B: The teacher doesn't have to follow you there or anything, and it's not being taken, attendance. So you can just basically piss off if you want to. But that's basically just what we use for - those gatherings.

T: And there's a lift which I use each morning because I can't be arsed to walk up the stairs. We have almost all of our classes on this floor, and at five to eight in the morning I cannot comprehend walking up those stairs. I often also wear Doc Martin boots which aren't walking boots. They're looking good boots. Every shortcut you can take with them, you can take.

I: So, do you think that space is more symbolic or functional?

A: It is not used in any functional way at all. The only functional thing about it is that we have KU- that's Copenhagen's University, so we're not really part of it. But it kind of...

B: We share the same entrance

A: Yes, we share the same entrance and it's kind of where you're going after that [school]. That's probably the main thing and then to have like a fancy entrance to kind of show like this isn't just some old...

B: I think it's more relevant and functional to the university than it is to us because I think there's three entrances - there's two on this side and then there's one down here. And it's basically where you...obviously because when you come in from one of the entrances which isn't the one with the round, you come to in the middle of all the blocks, and you can either go left if you have the lessons in the classes 1-13 or something. And right if you have from 13 to 23 or something. So it also depends where you have a class or where you live. The round thing itself is a gathering point, because that's where we were on our first school day, which is rather practical because it was big. On the pillars there was a note with what class you had.

I: So it does occasionally serve a purpose?

B: Yes, but normally it's not that functional. But it does serve a purpose sometimes, mainly assemblies and so on. But other than that, not really.

A: I don't know if you've noticed but in the middle of it, there's this round big thing, and a metal ball going from side to side. I'm not sure what it is.

T: It's something to do with the earth, and where we are and how the earth spins around. And then it knocks all the ones down.

A: And the lamps hanging over, that's actually Gefion's logo. So it's really to kind of show off, to look nice.

B: Like, look what we have. It's stone floor so it's not very nice to sit on. It's not functional in any way.

I: So it's not somewhere you'd want to spend a lot of time?

T: No exactly.

B: [indecipherable]...When there's lots of students and you sit and you're cramped up on the stone floor, and it's horrible. It just gives me more reason to go and get a kebab! Kebabs are a big theme in our school life!

A: Our lives is basically just circling around the kebab shop.

B: We'll have these two lessons, get a kebab, have two more lessons and go home.

I: A good healthy day!

I: What about pressure in the school? To what extent are teachers and pupils under pressure to succeed in the school?

A: I think that's how much you want to put in to it. Because a lot of classes, we have them over three years. The first year doesn't count, and the next two years, they count. So you actually don't have to make anything out of the first year. But you of course still want to make a good impression on the teacher. So that's probably the biggest...how much time and effort you put into...then we have like last week, because we've got our grades yesterday, the teachers had to give us our grades. So Monday we had an assignment,

Tuesday we had an assignment, Wednesday we had an assignment, Thursday we had two tests and an assignment, and Friday was like the holiday. We still had to go to school but no pressure.

B: It's pretty much what you yourself put into it. At least in the first year the teachers are not pressuring you that much.

T: It all depends...you obviously have A, B and C. Normally you have A classes for three years, B for two and C for one. Obviously depending on...and the C classes, for example Chemistry and Physics, we get told you might come up for the exam this year and you want to do good. So it depends what classes. So I'd say generally, it's a very personal thing, because if you want to go to university, you've got to do your best, cause a lot of them have abnormally high demands and you can criticise the system they take them in. For example, if I want to do English, I need to have a good Chemistry grade. Because I need the grade average to be as high as possible.

I: And in what way do the teachers assess your work?

B: It depends because the first half year or something, our teachers have this idea that you shouldn't grade the assignments and so on because it kind of puts the students in a booth, so to say. They grade them but they just keep the grades to themselves, and they just look at it when they have to give grades to us.

A: Normally three per year...

T: It's very different for example. Paul our Philosophy teacher...he says that...cause we had our first Philosophy test when we were done with our first subject. And he didn't want to write a grade because apparently if you get a grade, maybe a C or something, you won't move as much as if you get an A. So he gave us a written comment about it. The only grades we've actually gotten are in Physics, Danish and English when we have done our tests/assignments. We didn't get grades in Maths but we got how much out of a hundred. Basically, this is roughly...

I: So you have some idea from that number what direction you're heading in.

A: We haven't gotten our first grades yet. We're getting them on Friday. We actually don't know what they're giving us. I have an idea what I'm getting some of them, and some of them I'm just like ok, I have no idea. So I think that a lot of teachers, they either give really, really tough, because if you get a high grade, then you're like, OK, I don't have to do anything because I'm naturally good at this. And if they give a really low grade, some people push themselves, like, I have to move this up, and if I get a really low grade in something I'm just like, ok, I've got no idea how to do this, I'm out, I'm not doing anything in this lecture anymore. It's different from each teacher's philosophy, and it's not necessarily what you're getting in the first grade is what they really want to give you.

T: For example, our Maths teacher told us that even though you got an A in your two Maths tests, he might still give you a B because he doesn't want to risk it because what if you just happen to be really good at the subjects we've been doing, but as soon as we go into something else, he could end up giving you completely the wrong grade.

I: So how do you feel the balance is in the school between an emphasis on marks and grades and an emphasis on constructive comments?

A: Yeah, yeah

I: And how much pressure do you think the teachers are under in the school in order to get you to succeed or something?

A: [Indecipherable] Sometimes they give pretty good written assignments so they don't have to do that much I guess. The written assignments they're good at showing you've done something wrong and this is what you should do. You can't make it all. If you make all your assignments and homework, you're going down with stress 100%. It's like some of the teachers don't think about you have other assignments and other homework too. Sometimes you get a lot of homework for the next day which is fine, you could do it if it were only that but we have other lectures to do homework for too. So you either just skip or you say ok, I'm going to do it in the other lecture. So in the Spanish lecture you're reading for the next English lecture, what you have to do. And then in the English, you're reading your Philosophy and answering questions. Sometimes it's just too much.

B: I don't think the teachers are under that much pressure from like the school and so on. But I think that most of them personally want us to succeed and do good, and they also want to be good teachers and be like 'I know something about this, I want to show people that I know something'. So I think they are under pressure, but mostly from themselves. In a way from us, because they want to show us that they know what they're talking about. Not really much from the school, I don't think so anyway.

I: Ok. The last thing, is there anything you would want to change about the school, particularly in terms of the layout, architecture or spaces in the school?

A: The hall [corridor] kind of, I would change something about it. I don't really know, because it's kind of narrow. Because it's narrow, it's easier to sit on each side of the wall and work together and people can still just get past. But there's just something about the hall - the corridors - they're a bit tiny. Open them up some weird way so they don't feel as depressing.

T: The school feels very small but it's not.

B: It's rather big actually.

T: There's 1200 pupils or something. I don't know if it's a good thing or bad thing that it feels small.

B: I'd change those lamps for sure because I hate them. They're stupid and don't serve any function. They're not even being used, they're just fluorescent light tubes. Also the colour pink. For some reason we're on pink - that's like the humanism in a humanistic - that's where all the art subjects have classes. It's an annoying colour to look at for me. There's blue, red and green and then there's pink. It's annoying, strong colour. I'd rather it just be white, or if it were black that'd be pretty cool.

A: No, that'd be a little bit depressing.

I: Very unlikely to happen in the school any time soon.

B: Pink and yellow should stay away from walls. Like orange, completely orange walls.

T: I think what I'd change is...we have this thing where if you walk into the big circle, the Rotunden, if you have to get up to the third floor, because we have two rooms up there, you have to walk from there, all the way around the school and then up. You can't just go up to the third floor, inside the Rotunden, and then just walk straight to the classroom.

I: So you have to walk all the way around it and up through the side?

T: Yeah, exactly. [Indecipherable]

B: Yeah it's not that often but I find it quite annoying that you can't just, that you have to take a D-tour.

T: You can take the lift to the third floor, go through 3-11, then go around.

B: Then you are changing the...then you still have to walk around.

T: It's not that...

B: ...I know but I find it annoying though!

A: I think there's a lot of variation in the classrooms. I really like that somehow. I think a lot of the rooms are the same but when I think about it, we have a lot of different kind of rooms like in the basement, we have a place called the study centre and there is a library too. But it's sometimes, we have tests there. We can kind of be there to get help with something I think. I'm not really sure; I haven't been to it. And then we have tests there sometimes, and Maths there, and we have Chemistry classes and we have a lot of different types of classes. It's like everything is here. If I was to change something else it would probably be the Rotunden thing. I would make something different in the design because it already doesn't serve any purpose.

I: What would you like that space to be?

B: I don't know. I quite like it actually even if it doesn't serve a purpose.

A: But it like doesn't have a roof on it on the first floor. It kind of shows how big it is. I just don't really like how it is made. The sign I would change in it, so it looks a bit more welcoming. Not just a big round structure where you don't know where you're going. The first two weeks, we're just like 'Ok we need to change classes, we're going to need about forty-five minutes because I've no idea where I'm going'.

I: So it's a bit overwhelming?

A: So just cause it's like a circle and you've no idea where you're going in that circle. Yeah I think it could be made prettier too. And a lot of the other problems that are, are just like luxury problems. When you have to walk round to go to the other side cause you have to be here and you came up here, that's two minutes, it's nothing.

T: If some of these suggestions are going to the school I'd like to say that they should put the chairs that are in the Delta, cause it's the American style with the table on it. They're not crap...

A: They are absolutely crap...

T: You have like two cup holders.

A: You're sitting and they have like rolling things on them. You put the table in front of you, and sometimes the table just falls down. Either the table can fall down or when you write, you start moving away. The computer slides to the side. They've got two cup holders and you can just sit next to who you want and they can like [imitates moving anywhere around the classroom] move around.

B: It seems like they are a lot more professional because the teacher has a sort of standing podium which they can also move around. It feels like you're at uni, and the teacher is going to say something really, really clever cause the podium sort of gives authority. If you're sat at a desk like mine, you're at the same level as me. But if I'm sitting down and you're standing up, you get this sort of [indecipherable] frog perspective where the teacher seems even more mighty. 'Let's make it more about Philosophy'.

A: The DELTA part of the building. I think it's newer I don't know. They kind of tried some new design things with that and tried making it a bit fancier, and that's kind of cool.

B: There's split opinions about it. He loves it, but he's about the only one. I don't mind the movable furniture but the table, as you said, it's very fragile. It could be fixed but it's also bloody small and you can't have your computer and book on it. Most of the time you can't even have your bloody computer there.

T: But you can drink a coffee and a cola at the same time. When I look at the future it is having two beverages