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Learning lessons from the collaborative design of guidance for new build schools

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Abstract

This article focusses on the lessons learnt from the collaborative design of guidance for new build schools in England about the processes of school design, construction and occupation. The study involved headteachers, school building commissioners, teachers and wider school communities thinking about the pedagogic implications of the production of new school buildings. Professionals who had been involved with the development of new school buildings, and those currently involved, engaged in workshops to discuss their experiences of the process and designed guidance for those who would be involved in the future. This collaborative process pointed to possibilities but also significant potential risks involved in innovative school design. Theoretically, an activity theory framework was adopted to explore patterns of interaction and contradictions in the collaborative processes of the design, construction and occupation of new school builds and how these should be captured in a guidance document. We problematise the concept of innovation in the design of new build schools and the related risks. We suggest that collaborative school design calls for a new conception of collective action.

Keywords

Activity theory, collaborative design, design research, new build schools

Introduction

This article focuses on the lessons learnt from the collaborative design of guidance about new build schools in England. This study emerged as a follow up project to a longitudinal study of ten new

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secondary schools built between 2003 and 2012 (Daniels et al., 2017, Daniels et al., 2019a; Tse et al., 2018). The AHRC funded *Design Matters?* project involved the development of a methodology for systematically analysing the relationship of school space to the experiences of students, teachers and parents (Daniels et al., 2019a; Tse et al., 2018). The follow up ESRC funded project *Building on Design Matters* involved headteachers, school building commissioners, teachers and wider school communities thinking about the pedagogic implications of school buildings. Our team was asked by schools undergoing the design process to provide guidance on the process of a new school build. Researchers from *Design Matters?* subsequently worked collaboratively in workshops with school partners who had previously been involved in the design, construction and occupancy of new build schools. The aim of these investigations into the process and outcomes of new school design was to produce research informed school build guidance of direct benefit to schools, commissioners, policy makers and professionals who design, build and occupy primary, secondary and special schools in England (Tse et al., 2019).

In this article we discuss the contributions of professionals who had been involved with the development of new school buildings, and those were currently involved, to collaboratively design guidance for those who would be involved in the future. In so doing we expand notions of pre and post occupancy evaluation research by exploring school design as an example of multi-agency work that is driven by multiple motives for those involved (e.g. architects, engineers, school leaders). These various intentions often produce contradictions within and between phases of the overall process and are influenced by wider social and cultural histories as well as the mediating effect of the social relations in institutions. The article is based on the theoretical assumption drawn from activity theory that these intentions are influenced by wider social and cultural histories as well as the mediating effect of the social relations in institutions (Engeström, 2008). This process of learning from the lessons from previous new builds points to possibilities but also significant potential risks involved in the very notion of innovative collaborative design. We therefore problematise the concept of innovation in school design and pedagogic function and the related risks.

The school design context

School design across Europe is largely informed by national priorities and values rather than European Union guidance (Leat et al., 2012; Woolner, 2019). This is also true of England (the four jurisdictions of the UK have separate education systems). However, policy on the role of design in rebuilding schools' estate in England is currently at a crossroads as attempts are made to achieve good value and efficiency in times of austerity (Daniels et al., 2019b). At the same time in England government regulated high levels of accountability in education in England have resulted in cultures of performative professionalism that counter arguments for collaboration and participation (Ball, 2016; Connell, 2009). These pressures of austerity and performativity in part account for the Conservative-Liberal Democrat Coalition government in 2010 replacing the Building Schools for the Future (BSF) programme, set up by the previous Labour administration, with the Priority Schools Building Programme (PSBP) that aims to rebuild and refurbish school buildings in the worst condition. The government also instigated the Free School Programme (FSP) for all new builds. Free schools are state funded schools that are autonomous from local authority control. The PSBP introduced a prescribed standardised approach to school design (Livesey, 2012; Tse et al., 2015) in contrast to the ambition of the BSF programme that aimed to transform schooling in state-of-the-art buildings and technology. This major policy change with regard to the degree of central government control over school design was made amidst claims of no firm evidence of a relationship between school renovation and improved student performance (Vasagar, 2012).

There is increasing international recognition of the educational importance of the physical environment. As shown in Woolner et al. (2018), compelling research demonstrates that different physical configurations facilitate some paedagogical approaches while hindering others. Sigurðardóttir and Hjartarson (2011) in a study of new school buildings in Iceland found evidence that teachers were more likely to collaborate in open-plan classrooms and that students had more choice in the tasks they chose, while open-plan schools foster student involvement, teacher cooperation, collaboration and, often, team-teaching. However, Saltmarsh et al. (2015) argue that open-plan classrooms cause considerable pedagogic challenges for teachers. Their findings suggest that successful teaching in these spaces requires a collective commitment to discovering how to use classroom space as a learning resource. Nevertheless, Mahony and Hextall (2013: 10) point out that there is 'a growing body of research on the educational effects of newly designed schools' (e.g. Higgins et al., 2005; PricewaterhouseCoopers LLP, 2007, 2008, 2010; Woolner et al., 2007, 2012). This emerging research evidence has given recognition to the complex nature of the influences that are brought to bear on design and on the types of knowledge needed for design to 'work' (Carvalho et al., 2009).

OECD's (2013) literature review suggests that there is an overall lack of empirical evidence on outcomes from collaborative or co-design new school builds. Since then a large proportion of the post-occupancy evaluation studies has further developed this evidence base by using more rigorous research methods (Barrett et al., 2017; Imms and Byers, 2017; Lau et al., 2016), focussing on more specific types of outcomes (Brittin et al., 2017; Frerichs et al., 2016; Magzamen et al., 2016, 2017), and examining the possible mediators of the correlation between a school's physical environment and student achievement (Gilavand and Hosseinpour, 2016). Some previously overlooked aspects were also explored. For example, a research team from the University of Nebraska–Lincoln (UNL) has recently worked on establishing how the impacts of conditions in K-12 school buildings on student achievement vary with different demographic factors (Lau et al., 2016).

Reported impacts of school design on practice include, but are not limited to, teacher paedagogy, student engagement, student academic achievement, student attendance, school climate and healthy eating-related behaviours (e.g. Barrett et al., 2017; Frerichs et al., 2016; Imms and Byers, 2017). However, school design, build and occupancy are complex multi-agency processes where issues of continuity and conflict can arise (Tse et al., 2015). The process of participatory building design is complex, not straightforward and carries inherent risk (Könings et al., 2017). Research on participatory design have been conducted in different European contexts in recent years: for example, Needs centred design (De Vrieze and Moll, 2018); 'substantive design principles and procedural design principles' on the indirect effects that specific physical space qualities can have on learning (Janssen et al., 2017; Mäkelä and Helfenstein, 2016). In addition, research has looked at students as co-designers playing a central role in the design process (Can and İnalhan, 2017; Mäkelä et al., 2018; Pearson and Howe, 2017). There is also some evidence that involving teachers and students in the design process can have paedagogical benefits (Casanova et al., 2018).

However, despite this wide range of work on school design, much of which has been productive and useful, the evidence on what can be learned from the design, construction and occupancy of new school builds remains beset by somewhat uneven findings, differing objectives, and a history of changing education policy in particular contexts. This raises the questions of how the perspectives of those involved in previous collaborative design, build and occupancy can shed light on the potential patterns of interaction and contradictions involved in these collaborative processes and how these should be captured in a guidance document? The present study addresses these questions by reporting on the lessons learnt from a collaborative design of guidance for new build schools in England about the processes of school design, construction and occupation.

Activity theory as a theoretical lens

School design and construction are complex multi-agency processes that should be analysed as a social practice (Daniels et al., 2019a). These social processes involve subtle interplays between considerations of potential risk and possibilities for the various participants involved in the new school build. The object, the new school building, may be the same but the motives for those involved (e.g. architects, engineers, school leaders) can be different and, at times, contradictory.

This kind of multi- agency process has long been the focus of attention of social scientists working in other domains in which relations between the material and the interactional are being considered. Little has been done to extend this theoretical approach to practices of school design and construction.

In so doing we employ and develop the theoretical tools of cultural-historical activity theory (Cole and Engeström, 1993; Engeström, 1999). Activity theory offers a means of moving forward in terms of the different forms of collaboration, range of perspectives of the varied stakeholders involved, and constant change to which schools, and learning generally, are subject. Engeström (1999) sees joint activity or practice as the unit of analysis for activity theory, not individual activity. He is interested in the process of social transformation and includes the structure of the social world in analysis, taking into account the conflictual nature of social practice. He sees instability (internal tensions) and contradiction as the 'motive force of change and development' (Engeström, 1999: 9) and the transitions and reorganisations within and between activity systems as part of evolution; it is not only the subject, but the environment, that is modified through mediated activity. An activity theory approach views the 'reflective appropriation of advanced models and tools' as 'ways out of internal contradictions' that result in new activity systems (Cole and Engeström, 1993: 40).

Activity theoretical research explores collaborative activity systems, including all related members of the community, actors and stakeholders (Engeström, 2001). At the heart of this form of analysis is a recognition of the dialectical relationship between object (what is being worked on) and activity (the actions and motives of the actors working on the object). As Engeström et al. (2015) argue:

> The object carries in itself the purpose and motive of the activity. The object is internally contradictory and constantly shaped by the activity. Different participants of the activity take different partial perspectives on the object. It is reinstantiated and reconstructed in every specific encounter and every particular manifestation (p. 93).

Adopting a 'multi-voiced' perspective is particularly relevant to context-based and user-centred design projects. Secondly, the theory sees contradictions in a system as drivers for change and development (Engeström et al., 1999). Contradictions are difficult to perceive, but 'manifest themselves through disturbances, ruptures and small unremarkable innovations' (Engeström, 1999: 68). Finally, activity theory adopts a systemic vision that seeks to find pertinent solutions that are also adapted to neighbouring systems.

In our work we asked whether an activity theory framework offers an underlying structure that can help us to better understand interactions and contradictions between actors as well as the collaborative design and construction processes of multi-disciplinary teams. Collaborative design can be envisioned as the merging of activity systems where boundaries between activity systems of expertise weaken and new forms of practices emerge – in 'the space between'. This form of collaboration has become known as co-configuration (Engeström et al., 2015). Victor and Boynton (1998) suggest that the work of co-configuration involves building and sustaining a fully integrated

system that can sense, respond, and adapt to the individual experience of the customer. When a firm does co-configuration work, it creates a product that can learn and adapt, but it also builds an ongoing relationship between each customer-product pair and the company. Doing mass customisation requires designing a product at least once for each customer. In practices of co-configuration there is a need to go beyond conventional teamwork or networking to the practice of 'knotworking' (Engeström, 1999). Engeström argues that knotworking is a rapidly changing, distributed and partially improvised orchestration of collaborative performance which takes place between otherwise loosely connected actors and their work systems to support clients. In knotworking various forms of tying and untying of otherwise separate threads of activity takes place. Co-configuration in responsive and collaborating services requires flexible knotworking in which no single actor has the sole, fixed responsibility and control. It requires participants to have a disposition to recognise and engage with the expertise distributed across rapidly changing work places.

Kerosuo (2017), in a study of a building project in Finland, identified the process of knotworking of different professionals in flexible collaborative practices. As Engestrom and Middleton (1996) suggest, expertise in such contexts is best understood as the collaborative and discursive construction of tasks, solutions, visions, breakdowns and innovations. A precondition of successful co-configuration work is dialogue in which the parties rely on real-time feedback information on their activity. The interpretation, negotiation and synthesising of such information between the parties requires new, dialogical and reflective knowledge tools as well as new, collaboratively constructed functional rules and infrastructures (Engeström and Ahonen, 2001).

These two aspects of learning are evident in organisational, interactional and discursive practice in knotworking in inter-professional working. Learning in co-configuration settings is typically distributed over long, discontinuous periods of time. It is accomplished in and between multiple loosely-interconnected activity systems and organisations and represents different traditions, domains of expertise and social languages. In short, we see learning as being able to interpret our worlds in increasingly complex ways and being able to respond to those interpretations. How we respond as professionals very much depends on whether the workplace allows the responses that are necessary. We therefore argue that individual learning cannot be separated from organisational learning.

This form of co-configured professional action is called for in current UK policy discussions around the built environment. For example:

> We believe that, as a nation, we need to recognise the power of place and to be much more ambitious when planning, designing, constructing and maintaining our built environment. Failure to do so will result in significant long-term costs. (House of Lords Select Committee on National Policy for the Built Environment, 2016, para 64, p. 92).

The relatively limited research on the working practices of the school construction industry suggests a better understanding of current collaborative practices in relation to new school builds is required before significant innovation and improvement can take place.

Engeström et al. (2015) have discussed the possibilities for three kinds of interaction in activity systems: coordination, cooperation, and reflective communication (Engeström, 2008; Engeström et al., 1991). They suggest that:

> In coordination, the interaction is regulated by a script that determines the roles of the participants and the basic order of expected actions, whereas each participant pursues his or her own object. In cooperation, the participants focus on a temporarily unified object, namely, a shared problem or task; the script is suspended in the interest of finding a solution to the issue at hand. In reflective communication, the participants focus

> both on a shared object and on their own interaction, questioning and revising the script (Engeström et al., 2015: 100).

These three types of interaction witness differing levels of control over the possibilities for action with respect to an object of activity. However, Engeström et al. (2015) suggest a fourth form of collective action which draws on Bakhtin's (1984: 122–127) notion of 'carnivalization':

> 1. "In carnival everyone is an active participant, everyone communes in the carnival act. Carnival is not contemplated and, strictly speaking, not even performed; its participants live in it. . .. Because carnivalistic life is drawn out of its usual rut, it is to some extent 'life turned inside out', 'the reverse side of the world'" (p. 122).
>
> 2. "What is suspended first of all is hierarchical structure and all the forms of terror, reverence, piety, and etiquette connected with it—that is, everything resulting from sociohierarchical inequality or any other form of inequality among people (including age). All distance between people is suspended, and a special carnival category goes into effect: free and familiar contact among people" (p. 123).
>
> 3. "All things that were once self-enclosed, disunified, distanced from one another by a noncarnivalistic hierarchical worldview are drawn into carnivalistic contacts and combinations. Carnival brings together, unifies, weds, and combines the sacred with the profane, the lofty with the low, the great with the insignificant, the wise with the stupid" (p. 123).

Engeström et al. (2015) argue that carnivalization involves changes that go beyond existing scripts or categorisations of cooperation and communication. In the remainder of this article we draw on these theoretical accounts of interaction as coordination, cooperation, reflective communication and carnivalization in the context of the co-design of new build schools.

Methodology

This study developed from an innovative project involving researchers, practitioners, policy makers and experts in the field of design and construction that aimed to produce research informed school building guidance for end users.

The project was conducted by a multi-professional research team which included an architect (*Author*), a social scientist (*Author*), an educationalist (*Author*), and a disability specialist (*Author*) working collaboratively with the New Schools Network (NSN), school stakeholder representatives, European Schoolnet, Architects Feilden Clegg Bradley Studios and the Royal Institute of British Architects (RIBA) on the co-design of this school building guidance. The focus of this guidance was on the pedagogic implications of creating new schools.

The NSN, which was set up by the government to support new capital developments in new schools in 2010, nominated six exemplar newly built schools (including primary, secondary and special) from previous waves of the national school building programme to reflect on their experiences. A series of workshops were held collectively with all the exemplar schools to discuss the potential knowledge gained from their recent experience of school building and how best to disseminate that knowledge to future schools. An innovative iterative methodology was developed with the exemplar schools to review the feedback from each school and industry experts. Extensive consultations were undertaken: additional workshops were also held with our established external industry partners (architects, engineers, contractors) and school stakeholder representatives to design and publish summative guidance on the basis of user experience of the draft guidance. Our research team also interviewed key stakeholders in schools that were currently undergoing the

design process. The resulting guidance (Tse et al., 2019) was designed to offer lessons on: how to develop a school's paedagogical vision; how to translate these ideas into new school buildings within the funding limit; how the new school buildings in turn mediate paedagogical practices.

The research focus reported on in this article is on the lessons learnt about school design, construction and occupation from the collaborative design of guidance about new build schools in England. Theoretically, an activity theory framework was adopted to explore patterns of interaction and contradictions in the collaborative processes of the design, construction and occupation of new school builds. The research questions therefore were:

> What contradictions between the perspectives of the actors involved emerge from multi-disciplinary collaborative design, construction and occupation processes and how should these be captured in a guidance document?
>
> How do specific forms of interaction influence the processes for the design, construction and occupation of new build schools and how should these be captured in a guidance document?

In order to address these questions, the research team visited three of the NSN nominated exemplar schools. The research team were given tours of the schools and interviewed key members of staff including senior leaders. These schools are represented here as case studies of the lessons learnt from the co-design of guidance for new school builds. The research team worked collaboratively with each school to produce a presentation on their 'Lessons Learnt' from 1. Development of educational vision and the design brief; 2. Design and construction; 3. Occupation. During this iterative process of developing the presentation, school leaders were asked to reflect on the lessons learned from the design, construction and occupation of new school builds. From the perspective of activity theory, the research team drew on Vygotsky's (1987) suggestion that the bringing together of the 'everyday knowledge' and the 'scientific knowledge' can lead to new emerging forms of practice. This involved the school leaders using their 'everyday' experience of their school building process to re-contextualise the 'scientific knowledge' of government policy and technical regulatory guidance for future schools. The schools then presented their reflections in workshops involving policy makers and advisors from the Department for Education (DfE). These reflections and the ensuing discussions formed the basis for the guidance document.

Through selected descriptions of these three case studies, below, we demonstrate the challenges and contradictions involved in school design, construction and occupation. From the perspective of activity theory, contradictions in each case study are analysed as potential moments of change, innovation and learning. The research aimed to find out how school communities can learn from each other on the complex processes of multi-disciplinary collaboration to design new schools.

Findings

We first present the findings from the lessons learnt from our three case study schools.

School 1

School 1 is a designated Free School located in the East End of London, UK which opened in September 2013 with four classes of twenty-five 11–12 year old students in each. The school planned to accommodate a full complement of 700 students in 2019. Following consultation with the local community by the parents who set up the school, there was a special curriculum focus on music with resources provided to enable all students to learn to play a musical instrument.

Approximately half of the students attending the school were eligible for additional government funding intended for disadvantaged students. This was well above the national average. The proportion of students who had a statement of special educational needs or received planned additional support was also above average. The proportion of students belonging to minority ethnic groups or who speak English as an additional language was well above the national average.

Lessons learnt

Consultation is always widely promoted as the key ingredient to community engagement and effective collaborative action but the central contradictions in the design, construction and occupation of this case study school centred on who should be consulted with and at what stage in the process. The parents who originally set up the school were keen to know what the community wanted in a new school.

> *'I talked to parents and parents of every 11-year-old child that I could find. I went to community centres and playgrounds and swimming lessons and everything to talk. . ... we wanted to build a school that felt like home from home, which provides the kind of love and attention that is required to thrive and has access to the widest range of opportunities in life'* (Governor, School 1).

This community consultation led to an educational vision centred on music. In this sense, the interaction between the founders of the school and the community can be categorised in activity theory terms as cooperation. Indeed, the innovation of acting on community advice could be seen as a potential example of carnivalization beyond the standard script of school design. However, the built school had significant design and construction issues that worked directly against the pedagogic practices of the music department. The issues included the organisational layout of music rooms, design of the circulation areas and specification of building materials that jointly caused significant acoustic issues and prevented the music teachers from teaching music as envisioned. The building required significant capital funding to upgrade the acoustic specifications but the organisation layout could not be changed within the existing built envelope.

> *'My curriculum is severely impacted by the design of the building, for example I can`t integrate technology with live instruments because they are in separate rooms. We`ve got 8 practice rooms on this floor, now they can only be used for instrumental lessons and I can`t use them for curriculum lessons. . .. I would have wanted a completely different layout of rooms and the acoustic specification is not fit for purpose'* (Director of Music, School 1).

No consultation took place with music specialists at the visioning phase as specialised teachers were not hired at that stage of the school procurement process. Consultation with other music schools or music teachers would have provided valuable knowledge to the key phases of the design and construction process. This lack of focus on the object of creating school building fit for the pedagogic purposes of the community vision for a music specialism was a central contradiction. As a result, the interaction lacked even the basic level of coordination.

School 2

This primary school was opened in September 2013 as part of the government's free school programme. The first reception class children were admitted in September 2013. Year-on-year admissions increased since the opening and at the time when we were involved the school had enrolled a total of 241 students. Data from July 2017 shows that 8% of students used English as

an additional language and 34% were of Black or minority ethnic heritage (BME) and 16% had special educational needs. The proportion of students eligible for the government's pupil premium funding for disadvantaged students was broadly in line with the national average. The school is situated on the campus of a cathedral choir school. In 2017 the school was relocated to the two lower floors at the central library. The 1906 library, is a Grade I listed building which means that modifications and developments are very strictly controlled. The school has 14 classrooms and the development work was laborious and often fraught with challenges.

Lessons learnt

This case highlighted the issue of schools trying to navigate the central contradiction in the school design discourse between designing a school building that evolves out of the specialised educational vision of a specific school community and designing a generic standardised school that is not shaped by any one educational vision. New build schools need to have the possibilities to work for a changing landscape of educational polices and pedagogic practices through time. The Executive Head of School 2 pointed to the danger of the Headteacher's vision being a personal one that cannot be adapted easily when change inevitably arrives.

> *'I still see schools, where a Head has had a vision and it`s been critical to the design process. When that Head leaves nobody can make the design work. Sometimes the design is too specific to the vision of one Head. There are two parts to that. One is, listen to the educationalists, and two is base it on evidence'* (Executive Head, School 2).

Case study school 2 had the additional complexity of building the school within the lower floors of a Grade 1 listed building (historical or architectural national importance) and therefore subject to very strict building conditions. The existing built shell meant that from day 1 the school design would be very specific to the site conditions, which was contrary to the government guidance on standardised designs for schools.

Case study school 2 found the design and construction process arduous and argued that schools are often asked to signed contracts and specifications with complex expert knowledge that they are not equipped to comprehend. The interaction in this case was flawed at the basic level of coordination. The central contradiction lies in the current procurement process of school buildings in the UK where architects and contractors are contractually tied to the client, who is often the Education Funding Agency or the Department of Education and not the end users who needs to minimise risks and keep to stringent budgets and tight programmes. Schools need tools to effectively collaborate with the design and construction process to ensure that the buildings built can support the educational practices of the school as envisioned.

In practice, the current UK government's baseline guidelines, strict funding formulas and tight programmes for new schools do not allow for any real flexibility for future proofing school designs for the long term. The Education and Skills Funding Agency's (ESFA) funding for school buildings is now at £1113/m² reduced by approximately a third from those incurred during BSF (ESFA, 2014; www.gov.uk/government/publications/baseline-designs-for-schools-guidance/baseline-designs-for-schools-guidance). Project time has also been reduced from 24–36 to 12 months to drive efficiency. This involves significantly limiting consultation with school communities and multiple stakeholders. The Education Funding Agency (EFA) has produced Control Options in order to demonstrate how their standardised baseline designs should be applied in practice. There is still very limited research on the pedagogic implications of these standardised school designs and their fitness for the purposes of occupiers.

Adaptability and flexibility for different pedagogic practices within a single built envelope require additional investment in the original design with built-in design tools that allow the building to adapt to different approaches to teaching and learning e.g. additional flexible lighting and acoustic specifications, large additional doors that can allow rooms to open onto each other or additional space in classrooms to allow for different seating layouts. Current UK's Department of Education's baseline designs potentially lock school into one classroom seating layout due to its restricted size. The new schools modelled on the baseline designs will therefore be restricted to one approach to pedagogic practice. This will ultimately limit practitioners' ability to develop their pedagogic practice for the long term and further limit the useful life of the buildings.

School 3

This school is a new build co-educational all-through (4–18) school for students with special educational needs (SEN) in the English Midlands. The envisioned school roll was 175 students. This school consisted of a two level, triangular shaped building. The building provided specialist facilities including a health clinic, soft play, sensory room, physiotherapy and a hydrotherapy pool.

Lessons learnt

The main contradiction for case study school 3 involved a misplacement between the design and the anticipated particular needs of the cohort. This meant that although the interactions involved in the process went beyond coordination and involved cooperation between the various involved, the shared object of the activity, to provide a school building to cater for students with complex and multiple needs, was inherently contradictory.

> *'The main issue has been that the building was designed for a cohort of students which we haven't actually achieved. The building was designed for a complex cohort, PMLD (profound and multiple learning disabilities), SLD (specific learning disabilities), and complex physical needs. But the actual cohort currently is made up of students with high functioning ASD (autistic spectrum disorder), SEMH (social, emotional and mental health) and MLD (moderate learning difficulties). Which is absolutely at different ends of the spectrum in terms of their needs and what the building should provide to meet their needs. It's about ensuring the building has the flexibility to adapt to the needs of the young people, particularly from a special school's point of view. Your cohort can change every year depending on a range of different factors- adaptability is key!'*
>
> (Headteacher, School 3)

The design life of a school building will vary according to the type and use of the element being considered. In fact, there is no legally agreed definition of design life in the UK but on average school buildings are in use from 50 to 80 years. This calls into question the ways in which a built envelope with a long life span can be adaptable to a constantly changeable brief.

The headteacher of case study school 3 highlighted the importance of understanding the specific requirements of the cohort. However, for a SEN school the cohorts are constantly changing with diverse needs, and are therefore very difficult to predict. For this reason, it is critical to make the building appropriately flexible and adaptable to future changes in cohorts. The building was currently not fit for purpose for its current cohort. The new building constrained and worked against the pedagogic development of the practitioners to adapt to their students. Inbuilt flexibility and adaptability for a SEN school design presented significant challenges.

School priorities and needs for space change over time, often as leadership changes and/or as national priorities change. 'One-size-fits-all' formulas often preferred by policymakers and architects do not provide effective solutions to these specific problems without significant capital investment. The findings form this case suggest that it is important that matters of flexibility and adaptability are discussed with designers in order that a building can respond to such shifts or that the limitations of the design on different pedagogic approaches are understood early on. Although interactions in this case went beyond basic levels of co-ordination. This in turn calls for a new way of thinking about collaborative design as a form of carnivalization.

Discussion: Contradictions and interactions

All three case study schools had innovative design intentions but ended up with new builds with significant design flaws. Interactions between the various actors stayed at the level of coordination or cooperation. The collaborative process of designing guidance revealed not only challenges and contradictions in the development process of each case study but also in the different perspectives of policy makers and industry experts and how they perceived the role of school building guidance. Contradictions on the purpose of school building guidance between the different perspectives sharply focussed on how much policy makers allowed schools to shape the buildings away from the government's standardised designs to individualised educational visions. Discussions on the pedagogic implications of school designs were discouraged by policy makers. Furthermore, policy makers stated that the government's standardised designs were focussed on stricter space standards, stringent budgets, programmes and the standardised designs have not been assessed on its pedagogic implications by educationists. The Department of Education advisors in our study stressed the importance of building generic school designs exemplified by the government's standardised designs (see GOV.UK, 2021) produced by the Education & Skills Funding Agency, Department of Education, UK to limit risks of buildings being unworkable due to changes in leaderships and education policies. In sharp contrast, schools stressed the importance of a strong educational vision and buildings that support the pedagogic development of that educational vision. They highlighted the need to go beyond the normal practices of school design to enhance pedagogic possibilities. This suggests the potential of carnivalization for innovative co-design and thinking about pedagogic function which in turn can influence the discourses and practices of teaching and learning when the building is occupied.

However, there are both possibilities and significant potential risks involved in the conception and enactment of innovative co-design and pedagogic function. Design and construction experts in our study stated that they have witnessed both examples of highly individualised school designs and generic designs that can support and work against the pedagogic practices at different time points. These starkly different perspectives to school design require sensitive collaboration between school communities, designers and policy makers for new school buildings to continue to support the development of pedagogic practices through time.

New school builds create a unique set of challenges as headteachers and staff are required to learn and implement a new set of skills to be able to effectively participate in the design, build and occupation process. Modes of communication between educators and architects, engineers and contractors require careful thought and preparation. Each discipline has developed their own ways of thinking and talking and their priorities do not always align. Conversations between design, construction and education professionals should be thought of as the basis for establishing common knowledge about the vision and common ground for the development of the project. Every attempt should be made to provide a very clear exposition of the vision with professionals who may need to be briefed on the priorities that underpin it. This requires the level of reflective

communication between the actors, focussed on the shared object of creating a school with a shared understanding of pedagogic function and purpose. It also involves the process of knotworking (Engeström, 1999) as a means of organising previously disparate professionals around the shared object of creating a school building fit for pedagogic purpose.

Guiding the future process

In the course of the discussion of the pedagogic implications of new school builds stakeholders reflected on ways to present these findings from the lessons learnt about patterns of interaction and contradictions involved in these collaborative processes as guidance for future new school builds. They identified three key phases in the school design process which we outline below. The phases require different skills and approaches for the effective collaborative participation in the process by the school community and the various actors and stakeholders involved in the joint activity. Taken together, they provide the basis for reflective communication.

Phase 1: Development of educational vision. The process of building a new school should begin with a clear educational vision which will be the foundation of the whole process and the basis for reflective communication. At this stage the school community has a most important role in clearly identifying and articulating their requirements. The vision begins with the understanding of the local context and the wider school community in which the students live. This helps to identify the specific requirements of the students, and create the educational vision that meets those specific needs. This stage is also important for thinking ahead about how the community may change and make sure the design is flexible enough to adapt to future requirements.

> 'I'm a believer that all schools should have a focus on something, a speciality, which is their real strength and then think about how the new building should accommodate that'. (Executive Head, case study school 2)

The development of the educational vision for specialisms should fully engage relevant school staff or consult specialist staff in exemplar schools with similar specialisms from the very beginning. Schools who have been through the process emphasised the importance of learning from the experience of educationalists as well as from past projects.

Ensuring that education is the primary focus of the design process and that the outcome will support the teaching and learning as envisioned for the life of the building may sound like an obvious imperative. However, a lack of this focus has resulted in the creation of dysfunctional schools. It is important that the educational vision should not be based on the views of one commissioner, or indeed one headteacher. Key stakeholders should be consulted to ensure that the school design will serve the community for the life of the building and be sufficiently flexible and adaptable to allow for changes in priorities.

A clear educational vision that is defined by the school community; that reflects the needs of the students, the teachers and key stakeholders; and one that is based on evidence and lessons learnt from the experiences of others will support the effective development of the design and construction stages.

Phase 2: Design and construction. The design and construction stage is where the educational vision of the school is translated into the reality of school buildings. During this stage it is important to refer to the clearly stated, educational vision from stage one in order to ensure that the building will be fit for the purposes of the occupiers.

Our case studies have demonstrated how school buildings function after occupation depends on the effectiveness of communication and cooperation among multiple agencies during the design

and construction stage, including but not limited to the school community, architects, engineers, project managers and contractors. Clear, transparent communication between the school community and the design and construction team is crucial to the effectiveness of this phase.

Timely inputs from key staff members with different expertise will be crucial throughout the design process. Consultation with professionals and careful reference to existing school building guidance has also been identified as helpful by our sample schools. Students can be involved and this can help to promote students' sense of belonging after occupation.

It is also advisable to maintain a client role and keep appropriate scrutiny of the design. This can be achieved by working closely with different agencies, paying close attention to detail when signing a contract and keeping a robust record of all the change decisions made. Every detail should be carefully considered at the early design phase (e.g. lighting, fire doors, plug sockets, timetable, logistics etc.). Any design or specification changes will have a significant impact on the budget or the delivery date once the project has reached financial close and signed off. Identifying key educational priorities will also help the school with decision making during any value engineering process in which costs must be cut.

Phase 3: Occupation. The handover and occupation of the building requires careful preparation on the part of the school. It is a key stage for the school community to adapt to its new environment and maximise the potential of the new school buildings to deliver the school's educational vision. It is important for the wide range of different user groups in schools to learn how to use the building for their purposes. It takes time for users of a new school to settle in and understand how the school buildings and services should operate. Our sample schools all referred to the strong positive impact school design has had on their educational practice, school culture and student behaviour, and this impact has some support in the literature.

Our sample schools also identified 'teething' issues with their new buildings and the processes required to rectify, modify and adapt during the post occupation phase. The occupation stage can be frustrating when issues from previous stages are unresolved and when changes need to be made retrospectively. For example, poor specification and build quality, ventilation and acoustic problems may all result. To some extent, many of issues identified by our sample schools can be addressed by a rigorous commissioning process, deeper engagement and collaboration between the designers, the facilities team and sufficient training and review of the occupation process.

The development of an effective vision depends on a series of learning conversations throughout these phases. These conversations between design, construction and education professionals should be thought of as the basis for establishing common knowledge about the vision and common ground for the development of the project. This involves: a focus both on the shared object and on their own interaction; questioning and revising the initial script of the educational vision; learning to attend to the details of the design that have pedagogic implications, both inside and outside of the building; and being proactive in accessing information and support during the design and construction stage. Designing and constructing a new school is a complex and demanding task. It is vital that 'an eye for detail' is retained on areas that will have implications on pedagogic practice. This may involve educationalists asking for more detail about particular aspects of the design from their colleagues in other professions.

Conclusion

This article aimed to contribute to the literature on school design by sharing the perspectives of some professionals involved in previous collaborative new school design, build and occupancy and showing how this might be captured in a guidance document. Although the research is limited in

size, and restricted to the context of England, data from our research has suggested that school design involves a variety of actors with potentially different object motives. Defining and working on a shared object, involves reflective communication on the pedagogic possibilities of design. This is a complex outcome of consultation, architectural design, construction and adaptation which involves ongoing negotiation of design and social practice through time. The discourses and practices of collaborative design can produce educational spaces which in turn can influence the discourses and practices of teaching and learning when the building is occupied. However, this form of collaboration needs to move beyond levels of coordination or cooperation between professionals from different disciplinary perspectives to involve a new form of 'knotworking' (Engeström, 2008). This points to possibilities but also significant potential risks involved in the very notion of innovative collaborative design and pedagogic function.

We argue that learning from the lessons of co-design with teaching practitioners and other professionals who have experienced the process can offer new lessons from 'the everyday context' to support new practitioners to the challenging process of how one designs, build and occupy new schools. Government school building policy documents are often written in professional jargon and only offer broad, abstract, generalised guidance. The 'scientific knowledge' of how to design, build and occupy new school buildings in isolation can be difficult to understand and apply to a specific local context without expert training. Furthermore, the paedagogical and theoretical aims of stakeholders can complicate the implementation of Government guidance on school design (Tse et al., 2019). Moreover, scientific concepts/professional knowledge may be re-contextualised in different ways in different projects. That is, what counts as professional knowledge may vary from one project context to another. Practitioners are asked to effectively contribute to the design process at key points—but without the everyday context of how one can enact the theory into practice, practitioners often find they lack the scientific knowledge to effectively contribute to the process. This fault line in the collaborative process can lead to a breakdown in communication and a built design that hinders everyday pedagogic practice.

We do not want to finish this article without issuing a word of caution about the collaborative design of school buildings. Consultation and joint activity are forms of collaboration but collaboration in itself does not necessarily lead to effective innovation. Engeström et al.'s (2015) discussion of coordination, cooperation and reflective communication suggests that these three types of interaction witness differing levels of control over the possibilities for action with respect to an object of activity. In our work we became very aware that power was also a dominant feature of the interactions in which we were involved. Different 'players' or stakeholders in the practices of design and build are positioned differentially with respect to the power that they have to influence both process and outcomes.

Complex forms of social practice do not take place on a 'level playing field' with respect to the power that different parties can exert. In our work we came across examples of constructors mediating the communication between clients and architects after the construction contract had been signed off. At times this 'mediation' looked more like censorship as the vested interests of one party subverted attempts at co-design on the part of two other parties. In the production of the guidance itself we were also made aware of the judicious editing of the comments of junior members of staff by members of a senior management team.

Working together on a new school design is not some kind of panacea for egalitarian collaboration. We suggest that it calls for a new conception of collective action in face to face encounters in line with Engeström et al.'s (2015) suggestion of 'carnivalization'. Carnival as event and social phenomenon is usually what lies outside the norm – the occasional Mardi Gras that allows the existing social structure to continue relatively unchanged for the rest of the year. We argue that the spirit of carnival, of pressure against the structure, can offer a more sustained inversion of established practice in schools. Perhaps, in this sense, the spirit of carnival can be used to recalibrate systems and lead to new forms of practice in education.

It would seem that the true essence of collaboration lies in this breaking down and abandoning of scripts to play with the possibilities for collective action. Indeed, carnivalization may be an essential approach to the design of new schools in times of austerity and New Public Management. It is perhaps in this creative, radical interruption of the usual relations of power and control that the path leads towards new possibilities in the development of complex systems of human action.

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