

Moving on from CoDeS – The keystones for a whole systems approach to low carbon schools.

Introduction:

Moves towards reducing the carbon footprint of new buildings require a new way of thinking. Design research suggests that the development of more innovative and sustainable solutions increasingly highlight the benefits arising from the integration and participation of multiple actors with a wide range of technical and contextual knowledge and expertise. The need to address complex problems more systematically has escalated the importance of cross-disciplinary collaborations and partnerships between stakeholders (Coley and Lemon, 2009). It is also becoming more widely accepted that the inter-connected dynamics of a system's component parts is what determines its complexity suggesting that a holistic approach to problem solving cannot always rely on conventional methods. A mechanical problem is typically broken down into its parts before being able to systematically solve the problem piece by piece. Whilst this is powerful for some problems, and often requires extensive knowledge that aligns with the complicatedness of the task, complex issues, invariably involving people and their relationship with other actors (not necessarily human), do not lend themselves to such a reductionist approach. The design and subsequent operation of a school is one such complex phenomenon that requires a holistic approach which acknowledges the process of continual change that emerges from these interrelationships and patterns (Anarow, Greener et.al., 2003); it also requires collaboration, partnership and trust.

This chapter will return to the Keystones on School Community Collaboration that emerged from the ENSI-CoDeS project (Collaboration of schools and communities for Sustainable Development, 2011-2014) and are summarised and reflected upon, with examples, in Espinet and Zachariou (2014). It will focus on the continuation of city based collaborations in the UK (Leicester) that were designed to ensure that the legacy of the Building Schools for the Future (BSF) Programme was one of enhanced sustainability facilitated through collaboration and partnership. The next section will summarise the BSF programme and will introduce the projects that will be considered alongside the CoDeS Keystones. The Keystones will then be introduced alongside examples derived from the projects and a final concluding section will explore what these projects and the Keystone concepts might tell us about the generic capabilities that have been introduced above and might underpin such collaboration in very different contexts.

Building Schools for the Future and Leicester EfS projects.

Building Schools for the Future (BSF), a nationwide UK government programme, was initiated in 2006 with the aim to rebuild and or refurbish all secondary schools in England. At the heart of BSF was a requirement to engage with students in the development of a vision for their new or refurbished low carbon school. £2.2 billion was invested in the scheme in its first year generating confidence that positive changes would result in the way secondary education is delivered in the UK. Those changes aligned with a holistic approach to more sustainable education and the intention to integrate the BSF schools more closely with the communities they serve. This was consistent with the holistic National Framework for Sustainable Schools that was released by the Department for Children, Schools and Families in 2008 (DfCSF, 2008). In 2010 this alignment, and the associated integrated vision, was compromised when the BSF programme was terminated with the Education Secretary describing it as bureaucratic and wasteful (The Telegraph (05/07/10)). However, within the context of austerity, many of the construction projects that had started did continue and the activities considered below focused on the delivery of these within a sample of Leicester schools.

<i>Project and partners</i>	<i>Aim of project</i>
Knowledge Partnership – De Montfort University (DMU), Leicester City Council (LCC),	This project was intended to embed knowledge of low carbon building design into the design, construction, refurbishment and operation of schools administered under the City's Children's Capital Projects. The

17 City Schools (range of stakeholders), Politicians, design and construction teams	partnership was designed to locate Leicester as one of the first authorities to have a dedicated carbon reduction and sustainability contract for its schools' building programme and to empower those schools to manage their buildings more efficiently into the future. The project facilitated this process through the creation of tools, guidance manuals and support resources and the schools involved had a 30% reduction in energy consumption during their first full year of operation (Peterson, 2017).
Horizon 2020 funded Energy Data Innovation Network (EDI-Net) – DMU, LCC, energy managers, building users, finance managers and decision-makers	<p>Through the monitoring and evaluation of school energy and water use the ongoing project aims to help public authorities make more effective use of the information gathered from smart meter data in campaigns and awareness raising. Leicester City Council has electricity, gas, heat and water collected on a half hourly basis and this information is presented on the EDI-Net dashboard for council buildings https://dashboard.edi-net.eu/p/o/leicester-city-council/tbl/51.</p> <p>An online discussion forum enables building users to share their knowledge and experience about the performance of administrative buildings and schools. The website contains advice and guidance on how to set up and run different campaigns to encourage people to use less energy. The system is used by the Leicester eco-schools to share information and best practice using real-time data from their buildings.</p>
BSF (EPSRC) Engaging Pupils, Teachers and Governors in 'Carbon Neutral' schools; School stakeholders, University researchers	The Engaging Pupils project had three central aims: to raise awareness and understanding surrounding the design, construction and operation of low energy school buildings; to enable the school community to have informed discussions with their peers and the design team and to increase pupils' interest in science and engineering. Pupils and their teachers were introduced to issues surrounding climate change and five key principles of designing a new or refurbished school e.g. site orientation and natural day lighting. In common with OFSTED (2010) they were found to respond particularly well to ESD when given the opportunity to take part in practical activities, both within and outside the classroom, that enable them to research, plan and implement projects that make a clear difference to the school and the local community. Students presented their ideas for a low-energy school to their peers and teachers through assemblies, class presentations, securing an article on the school website or newsletter and / or having a dedicated slot on their school radio station.

Table 1: Summary of Low Carbon School projects in Leicester

Building on the Key Stones: BSF post CoDeS

The CoDeS Keystones (Espinete and Zachariou, 2014) were formulated to provide a solid conceptual framework upon which community – school collaborations could be built. As mentioned above, the BSF programme did originally align with a vision for such collaboration, and while this has been 'diluted' in the subsequent focus on the delivery of school buildings the projects summarised above have linked this delivery to more enhanced environmental (energy and water efficiency with corresponding economic implications), social (community - school networks) and human (education and social learning) capital. The following analysis will draw upon examples from case study project reports and papers and participant reflections to highlight the utility of the Keystones and to identify some over-riding and generic insights that might enhance their future adoption. Prior to this we will consider some of the potential dilemmas identified in Espinete and Zachariou (2014) that may need to be taken into account in pursuit of the keystones.

Dilemma 1 - Static versus dynamic participation: Successful participation in school community collaboration is a developmental process. Despite difficulties in times of austerity, the schools within the EPSRC¹ project that had established internal systems for collaboration were the most successful.

.....User collaboration within schools ensure needs are addressed, ownership is developed and solutions become self-sufficient with minimal external support (Paterson, .2016 p61)

Reports have suggested that the schools that are most successful in developing a commitment to sustainability throughout the school are those that have an active school council or designated 'eco-group'..... Throughout the project it has been observed that existing groups of pupils, such as the school council or even a particular science class, have been more successful in disseminating information throughout their school. (Charnley, Fleming et. al., 2010)

Dilemma 2 - Homogeneous versus heterogeneous participation: Diversity can make collaboration both more difficult and richer The high degree of diversity of the stakeholders led to enhanced learning and experiences for all concerned and continues to be considered a strength of the projects requiring *a tailored approach for engaging with each of the four user groups is required* (EDI-Net 2017 report, p19)

Dilemma 3 - Implicit versus explicit stakeholders' roles: The roles that stakeholders have in school community collaboration may change over time and or take different forms at the same time; how does the teacher engage as community member, does the community member share experience in the schools?

Usually, there is a massive disconnect between LA [local authority] staff and academics. Academics are driven by research outputs – which are often too academic for LA staff to understand or implement. The KP (knowledge partnership) has successfully bridged that divide (academic project lead, Paterson 2016, p57).

.....An expert from IESD (DMU) visited a low-energy school and took photographs of examples of sustainable design options. These were then made into a photo story to which he added commentary (indicating a change in his role and relationship with the students). As the photo story focused specifically on sustainable development, it was very effective in encouraging pupils to think about the five key sustainability principles within the context of an existing school (Charnley, Fleming et. al. 2010 p58)

Dilemma 4 - Hierarchical versus democratic participation: Participation is a structured process that is guided by values on how people can be involved in EfS; this may vary with cultural context but also with the stage of participation i.e. when formal tasks need to be allocated and performed. During the original EPSRC process it was possible to operate a more flattened democratic structure. University staff undertook training to enable them to better understand the processes involved in teaching and learning.

...Undoubtedly, more could have been achieved if the 'authorising environment' for the work of the KP had been stronger (Paterson, 2016 p5)

Often schemes for energy efficiency are top down....or bottom up.... Few schemes fully engage users from across the organisation (EDI-Net 2017 report p18)

As with any participative activity the BFS projects were more closely aligned with some of the CoDeS keystones than others and this will be reflected in the following examples.

Participation is a social process by which all the stakeholders in school and community become agents of change in their local context. During the tenure of the KTP (Knowledge Transfer Project) this wasn't possible but by this point the level of trust had deepened and successful collaboration still happened.

¹ EPSRC The UK Engineering and Physical Sciences Research Council

Each of the phases involves a number of experts from IESD who have been trained as STEM (science, technology, engineering and mathematics) ambassadors to facilitate these engagement activities with pupils and teachers (Charnley, Fleming et. al. 2010 p75).

Communication is dynamic and based on dialogue among all school and community stakeholders. It underpins the pursuit of shared meaning – vision, but as will be discussed below not necessarily consensus.

One BSF Director recognised the dangers of working within council silos and encouraged cross-team collaboration and the alignment of the BSF vision, Sustainability ARs and design briefs. The KP Company Supervisor however saw a very clear divide between staff working on capital budgets and those working on revenue strands. Disputes over output and outcome issues were more complicated because these responsibilities lay in different divisions of the local authority. ‘Tricky issues’ (epitomised by the bio-diesel systems issue) were difficult to resolve without clear ‘common purpose’ and single lines of responsibility (Paterson 2016, p52).

School and community collaboration is an emancipatory learning process whereby participants gain insight into, and about, other members of the collaborating community. This was one of the most successful aspects across the projects. In the EPSRC project there were significant findings concerning successful student learning. The approach was based on an enquiry /problem based learning approach.

As it was a co-design process the learning was also multi-directional experiences opinions and desires were shared between collaborators. It was also cross-disciplinary i.e. relating the technical and social sciences, and transdisciplinary i.e. cross cutting pedagogic and building functions and drawing upon generic, and often new, skills in order to do so e.g. seeing the school as a whole system. ... (Paterson, 2016)

Action in school and community collaboration for SD is understood as a collective process of bringing about change in the school and the community with the purpose of developing participants’ competence and awareness. The EPSRC project took place ahead of the building of the schools, action and the impact of the collaborations was very much judged on the impact of student learning.

All of the kids got a lot out of the activities and the people involved have provided a valuable basis for them to create informed decisions. (Teacher, English Martyrs School, Leicester).... (Charnley, Fleming et. al. 2010 p79)

School community collaboration for SD is always sustained by visions of how the world should be. This project grounded in a collective vision that was bought into, and subsequently interpreted, by the wide range of stakeholders involved. In the carbon neutral schools project architects found engagement with pupils useful, pupils gained confidence through working with professionals.

Additionally, providing pupils with the opportunity to engage directly with professionals who are responsible for delivering their new school is essential. Pupils have been observed to take ownership of their wish lists in the knowledge that their ideas would be heard and valued. A number of opportunities for pupils to have ‘adult’ discussions with designers, architects, local government officials, policy makers and decision makers have been organised (Charnley, Fleming et. al. 2010 p78)

Mandates are crucial instruments for the integration of school and community so that collaboration for SD is possible. This shared mandate about sustainable school design underpinned all of the projects, for example pupils were educated about design principles often only found in Higher Education there was also a shared mandate re high quality teaching and learning across stakeholders. This started before the schools were built and continued after.

Resources were developed for the pilot project in partnership with the Centre for Alternative Technology to enable pupils to fully understand the complex science and engineering issues surrounding the design of sustainable schools. A package of engagement activities was developed for the project that uses these resources but which also incorporates recent publications and reports of best practice such as those produced by the Department for Environment (Charnley, Fleming et. al. 2010 p75)

School community collaboration for SD is a *social practice which pursues negotiated aims and goals* through the use of available resources, not only funding, but also other social, material and symbolic resources.

There is a need to create strong incentives for stakeholders to engage and use research findings to substantiate claims. ... Engaging with politicians is made easier if an authority has made such a commitment to reducing energy It can support public authorities that already have energy management software and adequate human resources available (EDI-NeT report, p 18)

Collaborative research models can be introduced within school community collaboration for SD so that stakeholders have the opportunity to engage into it taking different roles. These roles might include problem setting, data collection and documentation, reflective analysis, and communication. Research can be used as a tool to support school community collaboration for SD.

The research has captured pupils' requirements for a more energy-efficient school, which they have communicated to their peers using sophisticated terminology and complex design ideas through the use of multimedia (Charnley, Fleming et. al. 2010 p73).

the Academic Supervisor has integrated a great deal of learning from the BSF programme back to academia – with four BSF schools becoming live design projects and a wide variety of KP findings being embedded back into lecture materials for the Institute of Energy and Sustainable Development (IESD) (Paterson, 2016).

Conclusions: some thoughts on partnership and trust

The previous examples linking the CoDeS keystones to ongoing projects into the design and operation of more sustainable schools have highlighted a number of considerations that underpin the collaboration and participation required for the implementation of a whole-system approach. Such an approach is based upon a common vision i.e. to design and operate a more sustainable school, which in turn highlights a number of additional attributes. While this vision is common to all stakeholders it is unlikely that they will agree on the priorities for, or route towards, it. Different views and expertise will mean that the search for a common route is problematic and that route may itself have to change according to unforeseen circumstances such as the withdrawal of BSF and the concurrent implementation of austerity measures. An ability to think systemically is key to a holistic approach and this in turn is built upon the need to accept and understand other perspectives and viewpoints in order to generate a 'rich picture' of what the route(s) to a more sustainable school might look like. Design, administrative, political, community, academic, student, teacher stakeholder perspectives may well differ but the tension between the central vision and the road map towards it is dependent upon one final feature that underpins effective collaboration – the generation and maintenance of trust.

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