PROSIECT DYSGU CYDRADD

Facilitating Teacher Engagement in More Inclusive Practice

Designing for complex change? Critically evaluating an application of design study in relation to teachers developing more inclusive practices

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Understanding the conditions that facilitate a process of change, such as a group of teachers developing and using new skills, is difficult, not least because of the complex multi-variable environment in which the learning takes place. "Design experiments . . . attempt to carry experimentation into reallife settings in order to find out what works in practice. This means giving up the notion of controlling variables and necessitates the development of a new methodology to carry out research" (Collins, 1999 p.289). Design study has gained considerable recognition and support as a research methodology that can handle this complexity. Crucial to a design study is the iteration of the process that is being studied, and the modification of features identified as significant between iterative cycles. In modifying these features and studying the consequences, it is possible to generate and test hypotheses about the process of change. This sounds deceptively straightforward to carry out. The difficulty is in the aspects of the study competing for attention: generating valid and relevant data at the same time as modification of the intervention itself, when both of these involve the participation of teachers and others in schools, for example.

This paper begins with a review of characteristics and critiques of design study, with particular reference to contexts involving professional development and changing practice. We then consider the theoretical underpinnings of the design of the intervention which is at the heart of an ongoing TLRP project involving six schools in Wales and England. The design of the research entwined around this intervention is then discussed separately, for the sake of clarity. The implications of the design study for the development of research instruments is discussed with reference to several examples. Finally, preliminary findings are presented: we discuss some of the theoretical issues that have been identified in this first cycle of the project as being significant in the facilitation of effective teacher engagement.

The characteristics of a design study

In summary this design study tests out a theory of change, based on literature, about the context and processes which will facilitate action research by teachers, with a goal of more inclusive practice. We conceptualise such change as the result of practical and social interactions in context, and utilise activity theory in order to interpret this change

This study is similar to one of the types identified in Cobb et al (2003(Cobb, Confrey et al. 2003) p.9): 'In-service teacher development studies in which researchers collaborate with teachers to support the development of a professional community'. Intervention, theoretically-informed and responding to the emerging effects, is central, given that the overall purpose is a theoretically-informed model for action:

> 'Unlike evaluation research, design-based research views a successful innovation as a joint product of the designed intervention and the context… Models of successful innovation can be generated through such work—models, rather than particular artifacts or programs, are the goal (cf. Brown & Campione, 1996)'. (DBRC, 2003 p.7)

Cobb et al (2003) identify five cross-cutting features of design study, which we take as a starting point for framing the present study:

From Cobb et al (2003) (Cobb, Confrey et al. 2003)	**TLRP project 'Project Dysgu Cydradd', running from April 2005 to July 2007**
1. **Theoretical purpose**: to develop a theory 'about both the process of learning and the means that are designed to support that learning' (ibid, p.10).	To generate and test theory about the means of support needed to maximise teacher engagement and learning in a change process to increase inclusion
2. **Intervention**: 'Design studies are typically test-beds for innovation. The intent is to investigate the possibilities for educational improvement by bringing about new forms of learning in order to study them' (ibid, p.10).	Over the past year, a team of teachers in each participating secondary school has undertaken a micro-level collaborative action research project. Educational psychologists have played a key role in facilitating the action research process alongside departmental or other leaders. Researchers have generated a common data set involving teachers, pupils and educational psychologists through questionnaires and focus groups, in order to map the progress of the intervention and the developing contributions and perspectives of stakeholders, and to give an account of its effectiveness.
3. **Prospective and reflective**: 'Design experiments create the conditions for developing theories yet must place these theories in harm's way' (ibid,	*Testing and development over a range of contexts:* Between the six cases selected, two national contexts are represented (England and Wales); and there is also a deliberately wide range of school and departmental contexts, EP characteristics, teacher research experience and attitude

p.10).	to inclusion. The two university sites have adapted a common research framework in subtly different ways, and are constructing an account of these differences. *Limiting variability to facilitate comparison:* In terms of the topic of the intervention in each schoool, however, the focus is relatively narrow: it is pupils' attitudes to learning.
4. **Iteration**: 'As conjectures are generated and perhaps refuted, new conjectures are developed and subjected to test'. (ibid, p.10).	The overall research design deliberately involves two year-long projects in each school, with reframing of the intervention including adaptation of support materials and procedures between cycles.
5. **Working theory**: 'The critical question that must be asked is whether the theory informs prospective design and, if so, in precisely what way?' (ibid, p.11).	The aim is to produce theory which is operationalised in training packages and materials for EPs and teachers.

From our perspective, Cobb et al (2003) rather underplay several serious tensions that are evident from this list for those engaging in design study. For example, growing attachment to a developing theory can compromise efforts to test that theory, and this can become increasingly problematic as the study progresses. Diversity within a research team can be a good counter to this tendency, with regular meetings for critical discussion and reflection.

Another tension involves the compromise between contextualised theoretical understanding, implicit in points 1 and 5, and the value of the study for other settings. We would agree that

> 'The strengths of design studies lie in testing theories in the crucible of practice; in working collegially with practitioners, co-constructing knowledge; in confronting everyday classroom, school, and community problems that influence teaching and learning and adapting instruction to these conditions; in recognizing the limits of theory; and in capturing the specifics of practice and the potential advantages from iteratively adapting and sharpening theory in its context' (Shavelson, Phillips et al. 2003 p.25)

However, from our perspective, taking seriously collegiality and co-construction of knowledge makes it difficult to introduce the kind of experimental elements of design study that these authors propose (ibid. 2003 p.28) in order to deepen the warrant for the findings.

A related tension concerns case selection, and is implied in the balance suggested between variability and similarity in point 3. above. Variability in settings allows theoretical testing, but only where there is sufficient similarity between cases to be able to interpret the effect of those differences. Lloyd-Jones (2003) describes Yin's (1994) approach to multiple case study in similar terms:

> 'Yin (1994) employs similar replication logic in his description of case study method, notably in his treatment of multiple case study design. He stresses the careful selection of cases that will either replicate (literal replication) or produce contrasting findings (theoretical replication) in line with the prevailing theory' (Lloyd-Jones 2003, p.3-4).

The challenge presented by design study comes down to the management of a series of tensions which, left unmanaged, have the power to seriously compromise either the intervention or the study of that intervention, and in either case to threaten both the design process and the development of theoretical understanding.

Theoretical underpinnings of the intervention design

Overall, our research questions[1] mean that the study is focused on the learning of teachers; that their learning is viewed as taking place in a social context; that we are looking at whether and how teachers'

1. What factors relating to teachers and their learning environment facilitate or hinder schools / teachers from engaging in collaborative action research with the aim of developing inclusion? 2. What features of practice, organisation or external support can enhance these facilitating factors, or mitigate hindering ones? 3. What evidence is there of a relationship between teacher engagement in collaborative action research towards more inclusive practice and the learning and participation of pupils? 4. In respect of these questions, what are the significant differences between the Welsh and English contexts?

knowledge of inclusion[2] develops through engagement in research; and at what and how proves to be effective in supporting this learning: 'the means for supporting learning encompass the affordances and constraints of material artifacts, teaching and learning practices, and policy levers' (Cobb, Confrey et al. 2003, p.10)

We contend that there is real theoretical work to do in this area, taking the view already mentioned that useful theory in design contexts is that which guides design: ' theory must do real design work in generating, selecting and validating design alternatives at the level at which they are consequential for learning' (diSessa and Cobb, 2004 p.78). We suggest that there is a major challenge in developing theory on the way schools become more inclusive, because the changes involve so many different levels: of culture as well as in the details of day-to-day practice; in people's assumptions, as much as in organisational systems (Kugelmass, 2004).

Existing theory is helpful in relation to organisational features of inclusive schools, even if its application remains limited. For example, a recent systematic literature review attempted to delineate these 'by identifying and evaluating the empirical evidence around the question of what schools can do to become more inclusive' (Dyson, Howes et al. 2002). The features identified were: an inclusive culture, aspects of the culture that were inherently participatory, leaders committed to inclusive values and evidence of aspects of distributed forms of leadership, and good links with parents and communities. The development of an inclusive school is underpinned by a focus on the development of inclusive cultures which permeate the life of the school (Corbett 2001), and around inclusive values which inform the development of a curriculum and pedagogy which responds to the diversity of all learners (Hart, Dixon et al. 2004).

There is some literature to indicate the kinds of activities in schools which might engender the development of more inclusive practices. Studies suggest that collaborative active engagement by teachers in research-oriented activities can be productive (Ainscow, Booth et al. 2003; Howes, Frankham et al. 2004; Kugelmass 2004) in creating space for conversations about practice and perceptions of pupils. However, even taken together with the literature on organisational context, there is little theory to help in designing interventions in complex school organisations, where values are not necessarily shared throughout, and where identifiable teacher groupings are more significant for the learning and development of those teachers than the school as a whole. As a consequence, designing for these kind of changes in secondary schools with strong departmental structures remains problematic.

In this intervention, we employ the technology of action research, underpinned by a 'theory of change' approach (Connell and Kubisch, 1998). Utilising an iterative design, understandings gained from the analysis of each first school-level project are being further tested in a second project in each school, contributing further to theoretical understanding of the conditions for the development of inclusive practice. This theory aims to relate patterns in teacher engagement in reflective practice to the context and processes through which it is supported and organized in school on the one hand, and its effectiveness in promoting pupil learning and participation on the other.

Development of the research design

> 'Design experiments are messier than traditional experiments, because they monitor many dependent variables, characterize the situation ethnographically, revise the procedures at will, allow participants to interact, develop profiles rather than hypotheses, involve users and practitioners in the design, and generate copious amounts of data of various sorts' (Gorard, Roberts et al. 2004 p.580).

Although in design study research and design are interdependent and mutually constructive, we find it useful to separate out discussion of the underpinnings of the intervention from discussion of data generation and analysis. This partly responds to the criticism that design study does not take issues of warrant seriously enough:

> 'Scientists as well as policymakers now ask tough questions about the nature of inferences that derive from design studies: What is the basis of *knowing* in design studies? This question is no different from the fundamental challenge in all scientific research—to demonstrate a basis for knowledge claims, to demonstrate warrants. Should we believe the results of design experiments?' (Shavelson, Phillips et al. 2003, p.25)

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[2] In a powerful analysis of teacher learning, Cochran-Smith and Lytle (1999) provide a useful conceptualisation of knowledge along broadly Aristotelian lines, differentiating knowledge-for, knowledge-in, and knowledge-of practice. Traditional modes of professional development are seen to focus mainly on the former; teachers themselves develop mainly tacit knowedge along the lines of the second; whilst knowledge-of practice is that which is brought about through collaborative reflection and action, as teachers articulate, frame and test their tacit knowledge together.

The design study around this intervention requires a series of measures and a range of different kinds of data, systematically generated at repeated intervals. The result is a corpus of data for each project in each of the case study schools, comprising transcripts of meetings, interviews and questionnaires from pupils, teachers and EPs.

Focus of intervention: Action research and associated technologies supporting teacher change →	***Design change:*** Teacher engagement in actions for more inclusive practice →	***Consequences of design change:*** Pupil learning and participation
Data: transcripts of EP focus group discussions; repeated interviews with EPs →	***Data***: Observations in class; interviews with teachers; transcripts of action research focus group; contemporaneous reflections from educational psychologist →	***Data***: Pre and post intervention pupil questionnaires and focus groups on perceptions of participation and teachers' behaviour

Figure 1: Researchers' theory of change used in initial project design, together with summary of relevant data

We consider that the theory of change approach sits well within the overall methodology of design study. This approach is useful not only for engaging practitioners in considering carefully the rationale behind their ideas for change, but also as part of a data generation strategy, in tracing the influences on practitioners' developing practice. We invited teachers to specify the 'theory' linking the actions that they proposed to the series of expected consequential changes, and so to their anticipated outcomes. Hence in focus groups with teachers, the questions for participants were about their predicted outcomes, the intermediate changes they expect, and the reasoning behind those answers. They were first asked to 'Describe the problem…. by thinking of a pupil or group of pupils that you teach, who you consider to be relatively disengaged from learning… In what way are these pupils disengaged, or not fully participating? How do you know? How would you describe the problem? In what way does it matter to you?' (*teacher focus group protocol, June 2005*). They are then asked to identify some causes of this disengagement, and to suggest some approaches, being explicit about how and why they might work, and how they would know that. A similar set of prompts is written into draft materials for use by EP facilitators. By inviting teachers to lay out this chain of action and change in advance, we can facilitate the attribution of changes to the actions taken. This works well at the level of individual practitioners.

However, the need to deal with many practitioners' theories of change alongside our own suggests the value of an overall theoretical framework which focuses on the development of shared goals, the persistence of contradictions between competing viewpoints, and the way that these aspects of intention are mediated in practice between participants in a setting. We are finding activity theory to be a useful framework for raising questions about the interrelation between persons with intentions, the activities in which they engage, the historically and socially constructed context in which this occurs, and the tensions created in these interrelationships (Lave and Wenger 1991, p.50). From this perspective, actions are seen as mediated by the community and its division of labour, its cultural artefacts, instruments, rules and norms. Engestrom & Cole (1997) sum up the corpus of work in activity theory due to Vygotsky, Luria, Leont'ev and their followers in the notion of Cultural Historical Activity Theory, in which a principle unit of analysis is the culturally-mediated and historically-evolved Activity System, represented in the schematic diagram (see Figure 1 below). The diagram is a reminder of the complex influences on the activity of a collective, for example that of teachers working within the setting of a subject department in a school; influences which are partly culturally and historically determined.

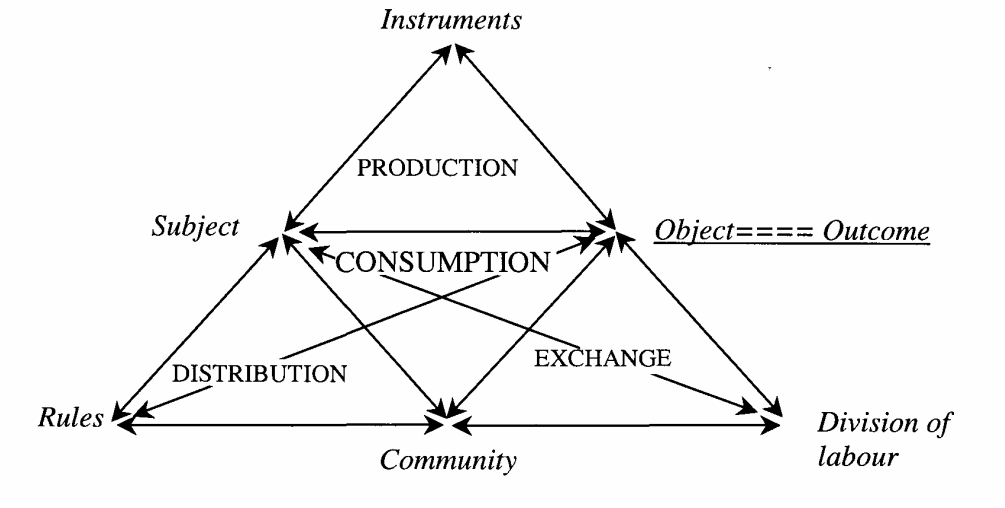

Fig. 2: Schema of activity system

We have begun to apply this perspective in interrogating the mediated interactions of teachers and educational psychologists, for example, viewing them as practitioners who whilst collaborating on the project, usually work in quite different activity systems, with rather different goals (Davies and Howes, 2006). By contrasting individuals' theories of change with the explicit or tacit goals typical of the activity systems in which they work, we can conceive of being able to identify features of improved design.

Data generation instruments and approaches

> 'Reliability of findings and measures can be promoted through triangulation from multiple data sources, repetition of analyses across cycles of enactment, and use (or creation) of standardized measures or instruments' (DBRC, 2003 p.7).

Data generation timelines follow the timescale of the interventions in schools. Below is an extract from the overall plan for one of the two university sites involved. Parallel timelines describe the expected activities involving teachers and educational psychologists.

Spr 05	Sum 05	Aut 05	Jan / Feb / Mar / Apr 06	May / June / Jul / Aug 06	Aut 06	Spr 07
Preparation of instruments	interviews with teachers / SMT / LEA officers	Instrument development, data generation and analysis EP: Interviews with each (Dec) **S** Stockport 1: teacher focus group, pupil focus group, pupil questionnaires **S and A** Attending EP / teacher meeting **S**	EP: interviews with each (March) School 1a: Pupil questionnaires (Feb) **S;** individual teacher interviews (Apr) **A**; recording EP / teacher meeting (Feb) School 2a: individual teacher interviews (Feb) **S**, rpt pupil questionnaires (April) **S**; recording EP / teacher meeting	interviews with teachers / SMT, LEA reflect, analyse School 1a: Pupil questionnaires (May) teacher interviews (June) **S, A.** School 1b: teacher questionnaires (May); pupil questionnaires (July) School 2a: individual teacher interviews (Jun) **S, A**; interview with senior leader **S** School 2b: teacher questionnaires (May) **S**; pupil questionnaires (July) **S**	EP: Interviews with each (Dec) **S** School 1b: teacher focus group **S**, pupil focus group **S**, pupil questionnaires **S, A** School 2b: teacher focus group **S**, pupil focus group **S**, pupil questionnaires **S, A** Attending EP / teacher meetings	EP: interviews with each (March) **S** Codsall 2: 2: individual teacher interviews (Feb), rpt pupil questionnaires (April); recording EP / teacher meeting Stockport 2: individual teacher interviews (Feb), rpt pupil questionnaires (April); recording EP / teacher meeting

Setting up a framework of measurements is important, but the validity of those measurements cannot of course be taken for granted: 'Measures that are feasible to administer, and that provide precise and reliable scores, may or may not adequately capture the phenomenon of interest' (Cobb, Confrey et al. 2003, p.12). One of the most problematic areas for the project concerned the evaluation of the main intended outcome of the intervention, namely changes in pupil attitudes to teaching and learning. In line with our overall purpose, we were looking for a measure with which to assess from the pupil perspective, how teachers were contributing to their engagement in learning. We opted to use both questionnaire and pupil focus group to assess this, using them as a pre- and post- intervention assessment. As we developed a clearer conceptualisation of the changes we were expecting, we realised that the two questionnaires we had thought to rely on ('Myself as a Learner' and 'Individualised Classroom Environment Questionnaire – Short Form') were not in fact addressing the question with particular precision. Consequently, we developed a new scale, which we called 'What I think about school' and which consisted of two subscales of items, one set focused on pupils' perceptions of their own participation in class (eg. 'I feel involved in classroom activities') and one on their perceptions of the behaviour of the teacher, related to inclusive practice, eg. ('The teacher cares about how I get on').

In designing this new scale and adopting it in a short timescale, we were of course unable to engage in a process of standardisation. A standardised scale offers a school the basis for longitudinal research, for comparison with other schools, and for comparison with a known and much larger population, for example. It also offers well-attested validity across a known, if limited, range of research contexts. In considering the adoption of a new scale, we were grappling with dilemmas described in the literature: 'to design iteratively demands systematic attention to evidence about learning and, as we later describe, this often involves the parallel development of measures sensitive to the changing ecology of learning' (Cobb, Confrey et al. 2003, p.10). Tests created for a purpose, like ours, have potentially greater face validity in the contexts in which they are used, and within the research projects that they are used to inform. This has the advantage that schools can more reliably evaluate their own development in that particular area. We also envisaged the possibility that other people might be interested in using or adapting the scale, if they could see that it addressed the measurement of a relevant but hitherto inaccessible construct.

In the end, our solution was pragmatic; we adopted all three scales across all of our research sites, with the additional benefit of being able to make judgements about the validity of our new scale in relation to the other two.

Emerging findings on facilitating effective teacher engagement

The following findings all have design implications for the second phase of the research:

- ***Wide range of teacher attitudes to inclusion*** Initial teacher questionnaire data shows that teachers within the project typically take quite varied positions and hold quite different beliefs with regard to the potential for more inclusive practice;

- ***Teachers' uncertainty with action research*** A methodology which values local ownership of problems appears to create uncertainty for teacher groups; the degree to which this uncertainty is seen to be acceptable, or developmental, varies from group to group, and is influenced to some extent by wider discourses of expectations on teachers; local norms and expectations for CPD play a part here. There is some evidence emerging on the range of teachers' tactics for dealing with such uncertainty, such as aiming at quick resolution by 'fast forwarding' through reflection to a decision on necessary action, or by seeking out expert direction, for example from EPs; or by seeking out confirmatory data.

  When we examined teachers' statements with regard to their historical–cultural context, areas of tension have been observed in relation to: pressure to produce good exam results for a teacher's subject specialism, which creates an imperative which leaves little space for other aspects of learning and professional development; perceptions of pupils difficulties that may be based on a within child deficit model; a difficulty prioritising time for reflection particularly when outcomes are not known in advance; and a difficulty in embracing professional collaboration, especially for teachers who often work alone within their own classrooms.

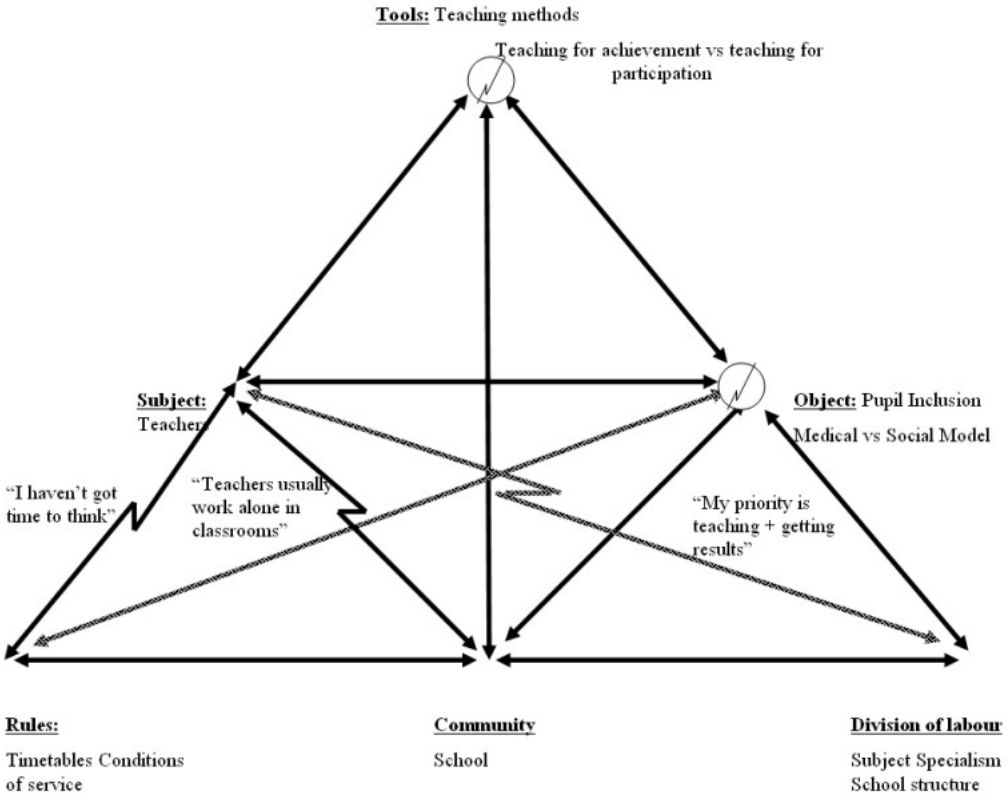

Figure 3

Although the teachers were given clear descriptions of action research before beginning their projects, many continued to find the concept hard to grasp and the lack of expert direction difficult, until the experience of how it worked was actualised by practical experience. The lack of an 'expert' was observed to create discomfort for the teachers in the early stages of their projects. This resulted in some cases in hostility towards the school psychologist, who was acting as the facilitator. We can illustrate this tension by contrasting the perceptions of the psychologist and the teacher in one school about the school psychologist's facilitation:

> "I was reluctant to be regarded as an expert and give too much guidance, preferring to encourage participants to make their own decisions about how to work differently, emphasising the process of action/evaluate /change in the light of experience". (school psychologist)
>
> "She could have suggested new ideas for us to use instead of us having to come up with the ideas" (Teacher)

- ***Cultural-historical influence on EP role and area of perceived competence*** There is evidence that the initial design of materials and introductory sessions overestimated the transparency of the technology to the key facilitators, the EPs. Where EPs had limited prior experience, the school effects were likewise limited. Analysis of the historical–cultural context of the school psychologist's role suggests that there is an ongoing difficulty in changing professional practice from individual casework to systems work, particularly relating to research, due in most cases to a system of rewards for casework both at the level of the school psychology service and at the level of school leadership.

> "I would *[welcome an increase in systemic working]* but not at the expense of the main duty…to work for the children…we have children we know who are queuing at the door and some of them with intense problems. There is a tension there. " (headteacher)

- ***Cultural-historical construction of the EP as expert*** Another culturally related area of tension for EPs is in the move away from knowledgeable expert to skilled facilitator, given the extent to which their identity within the service is dependent on specialist knowledge. Typically EPs in this study have searched for or developed a mediating technology to support them in facilitating productive reflection for the teachers without taking ownership. For some EPs, a more explicit presentation of theory of change technology is proving valuable. Others have chosen to develop their own schema for communicating and training others in the desired style of facilitation.

The role of the facilitator is a challenging one and this was sometimes exacerbated by a lack of experience and knowledge. Three of the school psychologists, all of whom lacked previous experience

of action research, agreed that they would have liked more support in order to better understand the skills needed to facilitate the teacher group:

> "We were given new snippets of theory but that's not the same as going through and understanding the process *[of action research],* the EPs *[educational psychologists]* lacked that…more discussion of ideas and support for the EP is needed" (educational psychologist).

- ***Variable wider impact within each school*** Departmental projects were more consistently successful in promoting changes in practice in the department, than they were in influencing practice within the school more widely. In some cases teachers from the department concerned were asked to disseminate their experience via staff meetings, and in one case the teacher concerned received a genuine standing ovation, but this was exceptional… The focus of the projects within a department is as expected proving to be both the strength and weakness of projects: they act as a focus for discussion among those involved, but they have little meaning for others. This not unexpected point is highly significant, given the researchers' theory of change that starting with departments is a way to effect whole school change in complex institutional contexts.

It is also appropriate to include some emerging findings on the ultimate purpose of the design study, which is to find ways to promote wider pupil engagement in secondary subjects, as their teachers make changes to their practice. Early indications from pupil questionnaires suggest that there are more positive perceptions of participation and of teacher approaches to inclusion. The following relates to one class of pupils in one school, questioned at the beginning of the intervention, and again when the changes in practice had taken place.

Differences: Dec 05 to Jun 06	**Sum of differences**
The teacher knows everyone in the class	0
The teacher cares about how I get on	1
The teacher tells me when I do well	3
The teacher helps me out when I get stuck	7
The teacher encourages us to ask questions	2
My ideas are listened to and used in discussions	-1
I feel involved in classroom activities	4
I like working in small groups in this class	4
The teacher tells me off if I don't do the work	2
I like having challenging work to do	0
I feel anxious or upset when I get stuck *(reversed)*[3]	6
We get easy work to do in these lessons	1
I enjoy answering the teacher's questions	5
I enjoy this lesson	1
The work we get given is boring *(reversed)*	-3
We can choose the work we do	3
I give my opinion during discussions	8
I learn new things in this lesson	-2
Pupils help each other on difficult problems	6
We do a lot of work from textbooks	5
The lesson is really interesting for me	4
The teacher uses words that I don't understand (reversed)	1
We do lots of different activities in the lesson	2
I understand what the teacher wants us to do	0

Pupil focus groups provide some further support for this finding, sufficient to suggest that further analysis is needed.

Conclusion

Design study as a methodology sets high expectations of researchers. In this paper we have tried to show how these expectations demand a range of approaches to theory, ranging from technologies to elucidate and help teachers to articulate their local theories of change, to a wider-ranging interpretative schema such as activity theory which can help to bring into focus the tensions between participants with their local and locally-determined perspectives. We have suggested that in considering design studies, it is helpful to unlink

[3] Note: A positive sum indicates a **more positive** response in June 2006 than in December 2005. As indicated, scores have been reversed for negatively-worded statements, so that for example, the score of 6 next to 'I feel anxious' means that the pupils have become less anxious.

the consideration of theory for the intervention from the consideration of theoretical approaches to the generation and analysis of data. The main challenge that we currently face, besides managing the dilemmas that the design study process inherently produces, is to develop an analysis that allows us effectively to interrogate our theory of change and to enrich it using the theories of participants that we are beginning to identify and understand.

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