

Using design-based research to improve the lesson study approach to professional development in Camden (London)

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The Haverstock Primary to Secondary Transition Project was designed to improve the experience of transition to secondary school for vulnerable pupils in Camden (London). The project used lesson study to help primary and secondary practitioners work collaboratively, to develop effective cross-phase pedagogical approaches to teaching English/literacy and science. This paper has three specific aims in relation to the project. First it reports on how a design-based research (DBR) method was used to tailor the lesson study approach to the Camden context in order to maximize its benefits and ensure its sustainability and scalability. Second it illustrates how a DBR approach to impact assessment led to a radical rethink and understanding of how impact might be measured with regard to projects that involve joint practice development. Specifically, collaborative approaches to practice development rely on more iterative, evolving approaches to understanding and collecting baseline data, developing strategies, and understanding the goals to be reached. Finally, it provides initial data on the impact of the DBR-led lesson study approach.

Keywords: design-based research (DBR); lesson study; professional development; joint practice development (JPD); impact; measuring impact; primary to secondary transition; transition

Introduction

This paper reports on Haverstock School's primary to secondary transition project. The aim of the project was to improve vulnerable pupils' transition experience from primary to secondary school, using a lesson study approach. Specifically the project involved small groups of primary and secondary teachers working collaboratively to design and test cross-phase pedagogical approaches to teaching English/literacy and science. A design-based research (DBR) methodology was adopted to tailor this approach to the context of schools situated in Camden (London) in relation to the specific needs of working in a cross-phase way, and to demonstrate how engaging in a collaborative DBR process ensured the scalability of the lesson study approach.

This paper illustrates how a DBR approach to impact assessment led to a radical rethink and understanding of how impact might be measured with regard to projects that involve joint practice development (JPD; Fielding *et al.*, 2005). Compared to the more traditional linear approaches to assessing impact that rely on ascertaining baseline, setting a vision or destination to be reached, and the corresponding development of a strategy to reach this vision (e.g. see Earley and Porritt, 2013), collaborative approaches to practice development depend on more iterative, evolving approaches to understanding and collecting baseline data, developing strategies,

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and an understanding of the goals to be reached. Results of this research provide initial data on the impact of the DBR-led lesson study approach, as well as the benefits generally of applying DBR methods when attempting to connect research to practice.

Design-based research

DBR is an approach specifically developed as a means to connect educational research to practice (Penuel *et al.*, 2011; Coburn *et al.*, 2013). For example, Vanderlinde and van Braak (2010) note that the explicit aim of DBR approaches should be to ‘close the research–practice gap’. The theory of action underpinning DBR is that better links between research and practice should result in improved teaching and learning outcomes. This is expressed, for example, by Anderson and Shattuck (2012: 16) who, in describing DBR, suggest that it is an approach ‘designed by and for educators that seeks to increase the impact, transfer, and translation of education research into improved practice’. Anderson and Shattuck go on to suggest a number of attributes specific to DBR; in particular is that it ‘stresses the need for theory building and the development of design principles that guide, inform and improve both practice and research in educational contexts’. Further important definitional attributes are (*ibid.*: 16–17):

- DBR must be situated in a real educational context
- DBR should focus on the design and testing of a significant intervention
- DBR involves iterative refinement of that intervention to improve its operation and build on/iron out past mistakes
- DBR must involve a collaborative partnership between researchers and practitioners
- the process of DBR leads to the development of design principles reflecting the conditions within which the intervention operates.

Vitaly, DBR represents a shift from the traditional perspective of research and practice being two distinct activities, with the former being able to unambiguously influence the latter (Vanderlinde and van Braak, 2010), towards the simultaneous building and study of solutions. As Coburn *et al.* (2013:8) suggest: ‘[DBR has] two goals of equal importance ... develop materials and instructional approaches that can be implemented in classrooms, schools and districts. At the same time ... to advance research and theory [in relation to how such initiatives can be implemented].’

Lesson study

Lesson study has been described as a ‘teaching improvement process’. It has its origins in Japanese elementary education, where it is a widely used professional development practice (Dudley, 2014; Cheung and Wong, 2014). As a process, lesson study involves teachers collaborating, normally in groups of three, to progress cycles of iterative practice development. Such cycles typically involve the following steps: (1) a discussion of student learning goals and the identification of a teaching strategy that might meet these; (2) planning an actual classroom lesson (called a ‘research lesson’) that employs this strategy; (3) observing how the lesson works in practice; and (4) discussing and embedding revisions to enable improvement (Lewis, 2000). In addition, three pupils, who represent wider groups of interest, are observed and their progress monitored as case studies of the impact of the approach (Dudley, 2011). In the Japanese model, teachers also report on – and often hold public demonstrations of – the lesson, so that other teachers can benefit from their learning (*ibid.*; Dudley, 2014); and it is noted by Lewis (2000) that Japanese teachers credit research lessons as the key to individual, schoolwide, and national improvements in teaching.

While in lesson study, teachers take an active role as ‘researchers’ to explore and refine lessons (Cheung and Wong, 2014). Lesson study itself can be considered a form of JPD; that is, a process that comprises practitioners developing ways of working through collaborative engagement that as a result, leads to the opening and sharing of practices with others (Fielding *et al.*, 2005). And although lesson study does have a number of distinctive characteristics, its underpinning mechanism, as with other JPD approaches, involves a process viewed as effective because it is truly mutual, rather than one-way, with the practice concerned being improved rather than simply moved from one person or place to another (*ibid.*; Dudley, 2011). This underpinning approach also serves as the main critique of lesson study, however; that is, in trying to engage in lesson study, busy and under-pressure teachers can often struggle with the demands of collaboration. Likewise, unless in trusting environments, it can be off-putting for teachers knowing that their lessons and teaching will be observed and critiqued (e.g. see Tschannen-Moran, 2004; Gero, 2015). As we note later, this critique was substantiated in this study.

Issues associated with children’s transition from primary to secondary school

The transition from primary to secondary school is an important event in the lives of pupils and their families (Evangelou *et al.*, 2008): they go from being the oldest to the youngest in their school, move around for lessons, have a myriad of teachers instead of one, and start to be given increased amounts of homework (Shepherd and Roker, 2005). Although the majority of pupils at the end of their primary schooling feel prepared for their move to secondary school, and three-quarters are happy after a term (e.g. 84 per cent of 550 pupils surveyed at the end of their first term at secondary school by Evangelou *et al.*, 2008), there is, nonetheless, a general decline in the academic achievement of pupils following this change (Galton *et al.*, 1999; McGee *et al.*, 2004; Evangelou *et al.*, 2008).

Proposed reasons for this hiatus include the argument that, for some pupils, this period can be stressful and that, in addition, more vulnerable pupils will need effective support prior to transition (McGee *et al.*, 2004). Galton *et al.* (1999: 22) suggest that vulnerable groups include ‘those on free school meals, pupils with special educational needs, pupils who were less fluent in English and pupils from some ethnic groups (which ones depended on the particular subject being assessed)’. Tree (2011) adds to this list those who display challenging behaviour. It is also argued that pupils’ academic progress falters following transition because ‘many schools are still putting their energy and money into efforts to smooth the transfer process rather than ensuring that pupils’ commitment to learning is sustained and their progress enhanced’ (Galton *et al.*, 1999: 6). As a result of these divergent arguments, an abundance of recommendations may be found in the extant literature to help smooth the process of transition. These include:

- Transitions are at their strongest when ‘the social, emotional, curricular and pedagogical aspects of learning are managed in order to enable pupils to remain engaged with, and have control of, their learning’ (DCSF, 2008: 5; also see McGee *et al.*, 2004; Evangelou *et al.*, 2008).
- There is a need to ensure curriculum and pedagogic continuity at transfer (Galton *et al.*, 1999). Such continuity serves to maintain pupils’ interest in learning, allows them to progress in their learning, and so helps them avoid the internationally observed learning hiatus that seems to accompany transition (McGee *et al.*, 2004; Evangelou *et al.*, 2008).

Setting and context

The Camden Partnership for Educational Excellence (CPEE) was set up in April 2012 with the vision to make the London Borough of Camden ‘the best borough for education’ (Camden Council, 2016). The CPEE aim has been to drive forward the recommendations of the Camden Education Commission (London Borough of Camden, 2012), which highlighted key issues and opportunities for Camden schools in the light of the changes to the English education landscape. In 2013, the CPEE board invited schools, colleges, partners, and stakeholders to bid for funds from a £2 million pot set up to support innovative projects, centred on raising achievement and attainment and, in particular, to find ways of improving outcomes for the borough’s most vulnerable groups of students. A key requirement of the CPEE’s bid call was that school improvement projects should be based on the lesson study approach. This followed the appointment to the Camden Local Authority/CPEE board of a staunch lesson study advocate who had been involved in the process for a number of years, both in the UK and abroad (see Dudley, 2014).

A key finding from the Camden Education Commission’s final report was that, particularly for vulnerable students, ‘transition arrangements [within Camden] at present are not consistently good enough’ (2011: 5); correspondingly, it argued that enhancing these should be a central focus of improvement efforts moving forward. In particular, it suggested that there should be a better understanding between year 6 and year 7 teachers (teachers of students aged 11–12) of the pedagogy and practice of teaching and learning in each other’s institutions, which would assist them both in preparing students for success and in supporting students to flourish in their new environments (2011: 36). In response to the report and the invitation by the CPEE board for organizations to bid for funding for projects, colleagues from Haverstock School (Camden) and the Institute of Education, University College London (IOE), teamed up to develop a project that might serve to address some of the commission’s concerns in relation to transition.

Our first step was to undertake a review of the international literature on the issue of primary to secondary transition. Seeking out literature, empirical studies, and meta-analyses relating to school systems broadly similar to that of England and Wales (e.g. the USA, Canada, Australia, New Zealand, etc.) involved the use of databases (JSTOR, ERIC, Web of Knowledge, British Education Index); the IOE library (including doctoral and master’s theses); and recommendations on seminal literature provided by colleagues. Overall, this resulted in a total of 21 studies being reviewed.

Following the review, we connected key themes and findings emerging from the literature to previous initiatives carried out in Camden (through consultation with CPEE staff, as well as with head teachers and teachers from schools within the borough). Correspondingly, we decided to centre our proposed bid to CPEE on the need for pedagogic continuity (Galton *et al.*, 1999; McGee *et al.*, 2004; Evangelou *et al.*, 2008). In other words, since our discussions indicated that the social and emotional aspects of transition seemed already well catered for, we decided to concentrate on an area that was recognized as important, but in terms of the Camden context, where relatively little effort had yet been placed. That is, from our discussions with stakeholders, it was suggested that the greatest impact on transition might emerge from the development of common approaches to teaching English and science (priority subject areas determined by CPEE).

As a result, the Haverstock Primary to Secondary Transition Project was conceived with the purpose of bringing together primary and secondary teachers from the London Borough of Camden in order that they might employ lesson study to develop effective cross-phase pedagogical approaches/strategies to teaching English/literacy and science, in order to support the transition of year 5 to year 8 students. In particular, the project focused on those ‘vulnerable’

students most at risk in terms of their progress post-transition. Here we consider ‘vulnerability’ as contingent on pupils’ ability to make a successful academic, social, and emotional transition from year 6 to year 7. In particular, we focus on pupils entitled to free school meals and white British students (closing the gap for white working-class students is a high priority, both within Camden Local Authority and within the English context). We also sought to include more able pupils not fulfilling their potential.

Jointly directed by colleagues from Haverstock School and the IOE, the specific aims of the project were to improve student and teacher outcomes in relation to:

- more robust, challenging, and innovative – but also consistent – pedagogic practice at national curriculum levels 1–8 in English and science (levels represent how pupils progress in relation to England’s national curriculum; Department for Education, 2011), in years 5, 6, 7, and 8 (ages 10 through to 13)
- shared teacher confidence using these practices in their subject in English and science from levels 1 to 8
- improved rates of progress and attainment for ‘vulnerable’ pupils within each of years 3–8 (ages 8 through to 13)
- a group of teachers able to use lesson study approaches to improve classroom practice and impact on standards, thus building transferable capacity.

The project comprised a pilot and main phase, with the latter involving 18 practitioners from nine schools engaged in nine lesson study sessions throughout the course of the academic year and three workshops. Further details on the participants are set out in Table 1 (and it should be noted that, individually, none of the participants had worked together before). A detailed overview of what each workshop comprised is set out in the following sections.

Table 1: Participant characteristics

	Primary teachers	Secondary teachers	Total
Focusing on English	5	4	9
Focusing on science	7	2	9
Total	12	6	18

Methods

A DBR approach to lesson study

Primary and secondary schools have their own particular ways of working and, when considering the teaching of individual subjects such as English or science, these are not necessarily well suited to fostering cross-phase collaboration. For instance, primary teachers will teach all subjects to one cohort of pupils for an entire year. In contrast, secondary school teachers will specialize by subject area, and so will teach that one subject to a number of different classes. In addition, using lesson study is a new phenomenon in English schools and using it in a cross-phase way (to tackle issues of transition) is rare to non-existent. Bearing in mind the particular ways of working of each phase – and that neither the researchers nor practitioners involved in the project had engaged in lesson study activity before – it was decided that a pilot phase of five months with a small group of schools be run to allow researchers and practitioners to collaborate in trialling

the approach and ascertaining how it might best be made fit for practice: in other words, to enable a DBR approach to the development and implementation of the lesson study model for this project. Correspondingly, in keeping with Anderson and Shattuck (2012), the project team (i.e. participating teachers from these schools, the Assistant Head project lead from Haverstock School, and researchers and facilitators from the IOE) sought, as a collaborative partnership, to design, test, and refine cross-phase lesson study in a real educational context, with a view to meeting the project's aim and establishing a basis for its future roll-out.

Developing a theory of action for lesson study

A key aspect of employing a DBR approach was the establishment of a theory of action for lesson study; that is, to determine which aspects of lesson study were an integral part of a logical chain leading to improved student outcomes, and which were more open to contextual manipulation (Argyris and Schön, 1996). A mutually developed theory of action has been shown to have significantly positive impacts on the effectiveness of interventions they relate to, and so is a vital aspect of DBR. As noted above, it is argued that, as a form of JPD, lesson study involves collaborative engagement that serves to open up and share practices (Cohen-Vogel *et al.*, 2015). As such, the development of our theory of action for lesson study centred on how adults can learn from and build upon the best practice of their peers through interaction.

In order to facilitate the type of interactive learning we envisaged, we turned to the literature on professional learning communities. In particular, we looked at the nature and structure of the 'learning conversations' that take place as part of professional learning community activity. Described as 'the way that educators make meaning together and jointly come up with new insights and knowledge that lead to intentional change to enhance their practice and student learning' (Stoll, 2012: 6), learning conversations comprise considered, thoughtful (rather than superficial) discussion and challenge, focused on matters of teaching practice, which consider evidence of actual and potential forms of practice, and which are undertaken with a view to developing both improved practice and, as a result, outcomes for students.

Moving deeper into this area, Stoll (2012: 6–11) suggests that the following features are characteristic of high-quality learning conversations between adults: (1) a focus on evidence and ideas (including both existing and effective practice within the school/network) and also potential innovations and transformations (e.g. creative ways to engage learners and extend learning); (2) experience and external knowledge/theory to stimulate reflection, challenge the status quo, and extend thinking; (3) the use of protocols and tools, to frame learning conversations more clearly, and guidelines that help participants structure their dialogue and interrogate evidence or ideas; and (4) facilitation, to elicit and support intellectual exchange, as well as maintaining open dialogue.

Operationalizing lesson study

These four elements, plus the four steps outlined earlier, thus formed the basis for how we initially sought to structure and operationalize lesson study activity. As a result, it was decided by the project team that the pilot phase should commence with a one-day facilitated workshop, in which practitioners held data-informed discussions about the key issues their vulnerable students faced in relation to English/literacy and science. Prior to the workshop, the Assistant Head project lead from Haverstock School, and researchers and facilitators from the IOE, spent a day developing protocols and tools to facilitate learning conversations and planning activity within the workshop (based on approaches used by Stoll: e.g. see Stoll and Brown, 2015). Using

these, participants worked through a series of activities designed to help them decide upon one focus area (a topic being taught that encapsulated the issue) and to also think about a common approach to teaching the topic in relation to the concept that triads could adopt, implement, and iteratively improve. Following this, participants were asked to identify three students within each school who represented the focus (vulnerable) students, and to then collaboratively plan the first research lesson that would be taught/observed.

In keeping with the notion that it is expertise with respect to a given intervention that enables practitioners to tailor interventions to their specific situation, and that the development of expertise involves both aspects of effective learning and sustained skill refinement (i.e. practice) (see Bryk *et al.*, 2011; Penuel *et al.*, 2012; Brown and Rogers, 2015), the pilot phase then involved three full lesson study days. These involved practitioners:

- (1) revisiting the purpose of the lesson and the focus area that it linked to
- (2) being talked through (by the teacher who was teaching/being observed) each phase of the lesson and what its aims and goals were
- (3) observing how the lesson worked in practice (with a focus on the case children)
- (4) interviewing the case children for their perspectives on the issues
- (5) undergoing a facilitated discussion to evaluate the lesson, based on observations and data collection
- (6) building on what had happened (i.e. collaboratively establishing 'how to') and planning for the next lesson study research class.

Again, before the first lesson study day, the project team spent a day together collaboratively developing protocols, tools, and an outline for the day to facilitate the lesson study process. The lesson study activity was also observed by the project team in order to give us an understanding of how it was being enacted.

Collaboratively reviewing and improving lesson study activity

Throughout the pilot phase, time and space were created to enable researchers and practitioners to deliberate and discuss what each had learned and their experiences in relation to lesson study. Through this dialogic process we were able to construct common understanding and meaning with regard to both aspects of the process and in terms of the use of tools and protocols to facilitate the process. As a result, we were then able to understand which aspects of the approach were successful in helping participants develop their practice and improve outcomes for the most vulnerable, and which appeared to provide limited value. In other words, as Gutierrez and Penuel (2014: 20) suggest, '[s]tudying the "social life of interventions" [helped us] move away from imagining interventions as fixed packages of strategies with readily measurable outcomes and towards more open-ended social or socially embedded experiments that involve ongoing [i.e. iterative] mutual engagement'. To ensure the learning from the pilot phase was carried over into the main project, at the end of the three lesson study days, a one-day workshop was held so that the main phase could be collaboratively developed. Aspects here included the grouping and sequencing of lesson study days throughout the year (bearing in mind the distinct ways of working that each phase of schooling has); the nature (running order) of each lesson study day; the nature of the tools and protocols to be employed as part of each main phase lesson study session; and how impact should be conceived of and measured (see below).

What was also viewed as important by both participants and the project team, however, was that, as we scaled the project up from pilot to main phase, the dialogic process that enabled us to understand and iteratively improve the operation of lesson study could continue at scale.

Perhaps one of the main issues of the DBR approach as currently conceived is that it is very researcher intensive: in other words, it requires researchers working intensively with small numbers of practitioners. We were thus concerned with finding ways of examining how the DBR approach could have impact for maximal numbers of teachers. To overcome this, practitioners and researchers jointly agreed on the need for distributed ownership: if DBR at scale is an unmanageable task for researchers alone, then researchers cannot be the only actors involved in creating meaning – practitioners experienced in the deliberative process should also be able to move beyond their traditional roles and engage in this way too (Coburn *et al.*, 2013). This agreed upon approach to capacity building therefore meant that we were able to use the original pilot group members as practitioner-researchers, who could form new triads and engage with practitioners involved in the project's main stage. This freed up time for the researchers to work with other groups of 'main stage' practitioners – and both sets of researchers could then meet periodically to consider ongoing improvements and changes that needed to be made to the lesson study methodology.

A DBR approach to measuring impact

Vital to understanding the effectiveness of our approach was a meaningful way to assess impact (Bryk *et al.*, 2011); that is, to see whether we met the aims of the project. Our initial approach to measuring impact (which was tested during the pilot project) involved practitioners establishing common understanding and, thus, a 'baseline' through the analysis of data and insight about their settings, current practices, and key issues in relation to the teaching of English/literacy and science, as well as issues of transition in relation to these subjects. They were subsequently invited to establish what they wanted to achieve by the end of the project and how they might do so – specifically following an approach set out by Earley and Porritt (2013) – and, 'starting with the end in mind' (the goal they wished to achieve), practitioners were asked how they might develop teaching strategies (based on a common focus area) that might be observed and refined via a process of lesson study to reach a desired endpoint (i.e. one that would tackle these issues).

Gutierrez and Penuel (2014) argue that partnership approaches to impact measurement are also likely to result in more robust and nuanced understandings of the differences an intervention has had. This too proved to be the case for this project. In particular, it became clear that – because practitioners were engaging in cross-phase approaches to pedagogy, and so had to develop a common issue and decide on a topic/subject matter that encapsulated the issue being taught – in essence, a 'natural' baseline data did not exist. In other words, asking teachers – who teach at different stages of the curriculum and who teach different age groups in different schools – to collaborate required them to find a level of commonality that ordinarily did not exist. This meant that baseline data could not be ascertained in advance of the lesson study, but had to be ascertained as a direct result of the lesson study process: the first lesson became the baseline for practitioner one, the second study for practitioner two, and so on. This also meant that both baseline and pedagogic approaches also necessarily developed as a result of collaborative activity; that is, practitioner two's approach to teaching the lesson study class should benefit from engaging in the lesson study related to practitioner one, and so on. Baselines and starting approaches to implementing the strategy were thus relative. Similarly, desired endpoints and improvements towards these could only be set and/or compared in absolute terms from each practitioner's starting position.

In addition, this meant that the impact process moving forward necessarily had to involve two stages: the first stage before lesson study activity involved each triad establishing an issue and deciding on a mutual topic or lesson to teach (and how it should be taught). Desired impact

(the future goal to be aimed at), however, could only be established after each baseline had been established; correspondingly, as with the pilot, a key aspect of the main stage kick-off was to ensure that the main stage participants discussed (in their lesson study triads) common difficulties and issues in relation to the teaching of English/literacy and science in the context of transition, and that they identified areas for improvement. Triads then decided upon one focus area (a topic being taught that encapsulated the issue) and to also think about a common approach to teaching the topic that might, in relation to the issue, lead to improved teaching practices and student outcomes. We also engaged participants with ways of understanding and measuring both baseline and impact; specifically, we introduced them to a myriad of hard and soft data types (from student outcomes to observations of practice), and ways of measuring baseline and impact, such as the 'Leuven' scale. Participants then each identified three case study children and collaboratively planned the first lesson study class. Following kick-off, for the first three lesson study classes, the main stage participants observed practice and student behaviours, as well as collecting/engaging with other pupil data.

A further workshop was held after the first three to enable participants to come together and establish a firm baseline for the three pupils for each of the teachers in their trio. Having established this baseline, they then determined what they would like practice to be (i.e. to establish their ideal). Participants then spent the remainder of the workshop collaborating to further refine the pedagogic approaches that might get them to this ideal. This meant that lesson study sessions four to nine were structured using the six steps as discussed above, with lesson study sessions used to ascertain whether practice and outcomes were progressing towards their ideal impact goal, in order to decide whether corrective changes in approach were required (Bryk *et al.*, 2011).

A final workshop was then held to enable trios to bring together the endline data for the project, and so establish a firm impact picture specifically in relation to the aims of the project. Here, protocols were developed by the project team to capture data that emerged from the learning conversations held within the workshops. Specifically, pro formas were created to help participants record their responses to the following questions: (1) How has your practice changed as a result of this project? and (2) What have you learned about lesson study and how to use it to develop teaching practice? We also developed a pro forma to record the perceived differences in pupil outcomes between the start and end of the project (along with evidence from the triad as to why these assessments were made).

Results

As outlined above, the aims of the project were to achieve:

- more robust, challenging, and innovative – but also consistent – pedagogic practice at national curriculum levels 1–8 in English and science
- shared teacher confidence using these practices
- improved rates of progress and attainment for 'vulnerable' pupils within each of years 3–8 (ages 8 through to 13)
- a group of teachers able to use lesson study approaches to improve classroom practice and impact on standards, thus building transferable capacity.

To understand how successful we had been in relation to each of these, in the final impact workshop we worked with participants to address the following three questions:

- How has your practice changed as a result of this project?
- What impact has this changed practice had on pupils?

- What have you learned about lesson study and how to use it to develop teaching practice?

Impact on teacher practice

We began the final workshop by first asking participants to engage in a learning conversation centred on how their practice had changed as a result of their participation in the project. All teachers participated in the exercise and used the pro forma outlined above to indicate whether there had been any change in their practice. When analysing the results, it was clear that responses divided naturally into: (1) changes in knowledge/understanding in terms of how focus pupils learn; (2) changes in practice; and (3) why changes in practice are making a difference. Examples of the verbatim responses are set out in Table 2, which encapsulates the main themes that emerged. A common focus across all groups was how they might employ ‘talk for writing’ – a process where children orally engage with the language they need for a particular topic, before reading and analysing it, then writing their own version. Potentially, the commonality of this focus derived from ‘talk for writing’ being a hot topic within Camden during the time of the project. As a result, this could be a reason why the majority of teacher participants had broadly focused on talk and the balance within their lessons between talking and writing, as well as on the use of pairing and grouping in order to facilitate this.

Table 2: Example responses to the question ‘How has your practice changed as a result of this project?’

Question	Responses
Changes in knowledge/ understanding in terms of how focus pupils learn	<ul style="list-style-type: none"> • ‘How difficult it is to understand scientific terms and concepts without context’ • ‘The benefits of using a script for peer feedback’ • ‘Pupils need structured talk with well-chosen partners’ • ‘Pupil find keywords difficult to use in a piece of writing; even if they understand the meaning of the words, it is difficult to link more scientific words together’ • ‘Grouping can make a big difference to learning’; similarly, ‘Partners really make a difference to the outcome’
Changes in practice	<ul style="list-style-type: none"> • Rehearsal of key new scientific vocabulary • Use of speaking and writing frames • Making lessons more oral and giving more oral scaffolds • ‘[Providing] more time to talk and think about what they want to write’ • ‘Mixing talk partners so children are working with different partners’
Why changes in practice are making a difference	<ul style="list-style-type: none"> • Pupils like speaking frames as ‘it gives them a starting point to structure their speech’ • ‘Making speech a high priority results in much better outcomes’ • ‘Spending more time learning new vocabulary [means that pupils are better at] unpicking meanings and processes’ • Partnering lower achieving children either with higher achieving or middle achieving pupils really makes a difference as the higher ability children challenge, push, and stretch the lower achievers

Pupil impact

We have described above that, in keeping with the DBR underpinnings of the project, participants were able to determine what changes they wanted to see in their pupils as a result of the project and how these might be measured. As such, a variety of metrics were used to ascertain impact, ranging from teacher observations and marking, to their expertise and knowledge of the child. Because participants predominantly chose not to use ‘hard’ attainment data, in order to examine impact across all participants we had to find a common way of deriving and presenting what impact, if any, resulted from the project. To do this we asked participants, working in their triads, to score each of their three focus children (in relation to the focus or aims of their triad and in relation to the data they were measuring), both in terms of their ‘performance’ at the beginning of the project and at the end. Scores, both at the beginning and end, were out of ten and participants/triads had to provide supporting evidence for selecting their scores. As a result, this provided researchers with perceptions of pupil impact and reasons for these perceptions; because all pupil impact perceptions were scored in the same way, however, we were also able to normalize these scores by looking at the percentage differences in the ‘before’ and ‘after’ scores. The scores and ranges of these differences are set out in Figure 1, whereas Table 3 provides a distribution of the percentage scores. A full table of responses showing before and after scores and reasons/evidence for these is provided in the Appendix.

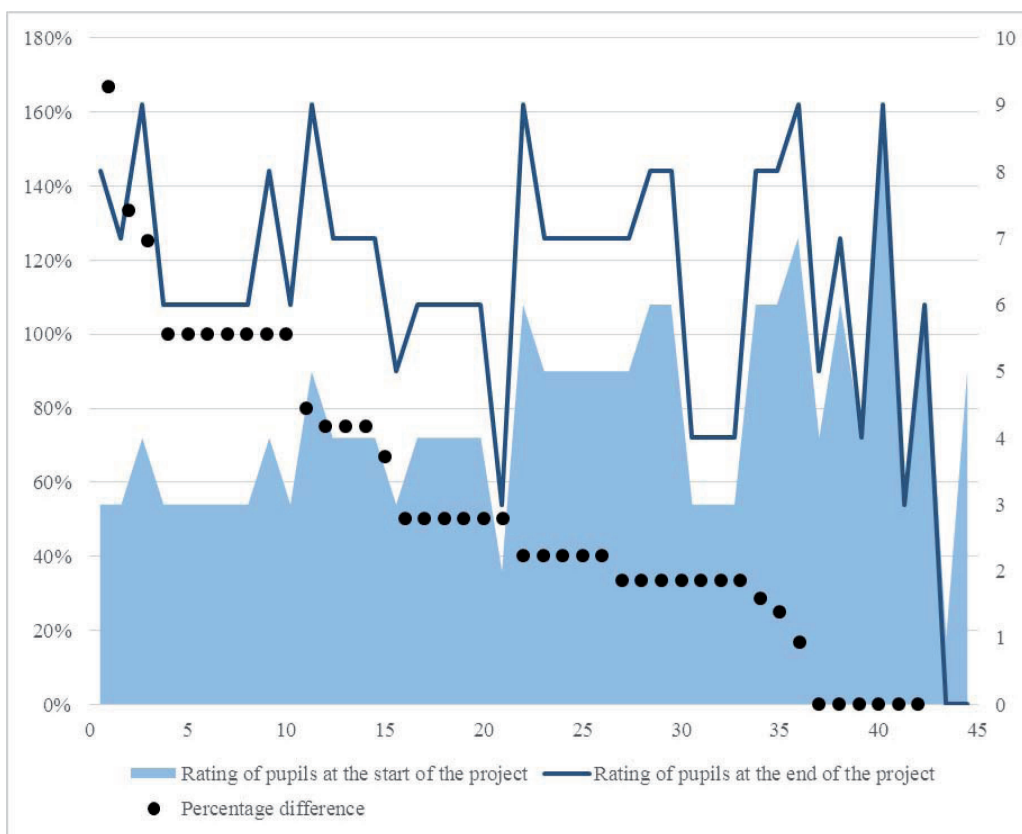


Figure 1: Pupils before and after scores and percentage change

Table 3: Distribution of percentage change in pupils before and after scores

Question	Number	Percentage
Greater than 100% change	3	7%
91–100 % change	7	17%
81–90 % change	0	0%
71–80 % change	4	10%
61–70 % change	1	2%
51–60 % change	0	0%
41–50 % change	6	14%
31–40 % change	12	29%
21–30 % change	2	5%
11–20 % change	1	2%
1–10 % change	0	0%
No change	4	10%
Pupils dropped out	2	5%
Total	42	100%

The blocked area in Figure 1 represents the student performance scores at the beginning of the project, while the continuous line represents their scores at project end. The dots meanwhile represent the percentage difference (i.e. the change in pupil performance since the start of the project). As can be seen, of the 42 focus group pupils for whom teachers provided data, teachers reported a change in the behaviours/attitudes/outcomes of all but six. For some pupils this change was substantive. As set out in Table 3, which provides the distribution of these percentage changes, teachers suggest that for ten pupils their performance had effectively doubled or more (i.e. there was a 100 per cent (or greater) change in their score). The biggest single improvement, however, tended to be between 30 and 40 per cent. In the main this was caused by ‘average’ pupils (scoring 5–6) now scoring two points higher (7–8), or by initially low performing pupils – who originally scored 3 – increasing their performance score to 4.

Naturally, in the absence of hard and objective attainment data, we need to be circumspect in the level of significance afforded to what are subjectively determined results. Nonetheless, supporting evidence was provided and the figures were triangulated with other members of the triad (who were themselves engaged in prolonged observation of these pupils). In addition, not all pupils were reported as having benefited from the project: four pupils (10 per cent) were reported as not benefiting at all, while a further two dropped out of the school they were in. Considering Lincoln and Guba’s (1985) criteria for establishing the trustworthiness of subjective data, therefore, although the exact change in pupils’ performances can be debated, the research team have confidence that some positive impact on pupils has taken place – and that this impact can be attributable to the project. It should also be noted that this data relates to the three pupils (per class) representing wider groups of interest, such as vulnerable children (Dudley, 2011). In theory, then, the impact of the project should stretch beyond the 42 children analysed here, but we do not have data to substantiate such a claim.

Learning about lesson study

Finally, we asked participants to answer the following question: ‘What have you learned about lesson study and how to use it to develop teaching practice?’ Responses here divided naturally into the benefits and challenges of using lesson study and are set out in Table 4.

Table 4: Benefits and challenges to using **lesson study**

(response to question: ‘What have you learned about **lesson study** and how to use it to develop teaching practice?’)

Question	Responses
‘What have you learned about lesson study and how to use it to develop teaching practice?’ (Benefits)	<ul style="list-style-type: none"> • ‘Observing colleagues teach and picking up ideas, strategies, sharing practice, etc. in relation to primary to secondary transitions’ • ‘Sharing good practice! [and facilitate ideas generation]’ • ‘Observing in [other] schools and seeing the difference between teaching in primary and secondary schools’ • ‘Chance to see other Camden classes of the same age’ • ‘I get a better understanding of how I might stretch more able year 7 students’ • ‘Exposure to other teachers’ styles and practices’ • ‘Supportive feedback and observations from colleagues’ • Perspectives, e.g. ‘that you would not be able to pick up about your children’s learning from the front of the class’ and ‘a focus on children who might slip under teachers’ radar’; similarly, ‘having others being able to watch the children ... [and] noticing something [you hadn’t]’ • ‘Because it’s planned collaboratively, you get to see your work in action’
‘What have you learned about lesson study and how to use it to develop teaching practice?’ (Challenges)	<ul style="list-style-type: none"> • Time, e.g. ‘Lots of time out of school’ • Timetabling: ‘Finding dates that are mutually convenient for the trio’ • ‘Increased workload in relation to planning, preparing, and hosting the session’ • ‘Immediate progress not [always] visible’ • ‘Needs buy-in from SLT to have maximum impact’; similarly, ‘Lesson study is less important in some schools’ • ‘[This type of process cannot be an add-on] if it could replace [current programme of observations] would be great’ • ‘There is already too much to try and get through in primary’

In considering the challenges, it can be seen that, in keeping with Gero (2015), for lesson study to be carried out successfully requires the buy-in and commitment of senior leaders. In particular, lesson study – as a form of school improvement – needs to be prioritized by school leaders over other school improvement initiatives, with time and space given to enable teachers to meaningfully engage in lesson study activity. As well as the comments in Table 4, this message is also reinforced by the fact that three schools (six teachers) dropped out after the first lesson study, citing competing pressures and priorities as well as involvement in too many school improvement initiatives. In part, this is because the benefits of engaging in this approach were not immediately apparent.

Significance

From analysing the results, it is clear that our approach has been effective in both changing teacher understanding and teaching practice, and building teacher capacity so that participants are able to run their own projects moving forward. Starting with the first, as can be seen in Table 2, teachers were able to articulate a logical chain – starting with what they were learning about their pupils, the changes they were making in response, and ending with arguments for making these changes. For example, one participant noted ‘how difficult it is [for pupils] to understand scientific terms and concepts without context’; as a consequence, they were now rehearsing new scientific vocabulary because ‘spending more time learning new vocabulary [means that pupils are better at] unpicking meanings and processes’. Similarly, another teacher indicated that she now knows that ‘partners really make a difference to the outcome’. This was because the lesson study process had helped her see that partnering lower achieving children with either higher achieving or middle achieving pupils can lead to the higher ability children challenging, pushing, and stretching the lower achievers. As a result, she was much more actively ‘mixing talk partners so children are working with different partners’. It seems clear, therefore, that our approach to lesson study, developed via a DBR approach – which actively promotes reflective dialogue via a process of learning conversations – has been successful in helping practitioners reflect not only on pupil learning, but also what needs to change in terms of their teaching to facilitate this learning.

In terms of capacity building, it is clear that participants saw not only the benefits of engaging in lesson study, but also the challenges that needed to be overcome in order to ensure its effective operation (Table 4). Having knowledge of the former (combined with experience of a number of cycles of lesson study) means that participants now know how best to make lesson study work for them. In other words, by building on the DBR element of the project, the teachers involved can ensure that, moving forward, they tailor how they focus lesson study to achieve maximal benefit for themselves and their pupils. Likewise, in terms of rolling out their own programme of lesson study, participants will also be aware of the challenges that need to be met if they are to get most value from the process. These include, in particular, the requirement to buy-in from senior leaders and the need for a model of leadership within their school, which promotes the vision for, and ensures, the fostering of a culture of professional development based on collaborative peer-to-peer support (including the promotion of the values required for learning communities to operate). Also key will be the need for senior leaders to provide the necessary resource and structures (e.g. time and space) for sustained and meaningful lesson study to become a reality (Stoll and Fink, 1996; Leithwood *et al.*, 2006).

Our revised approach to measuring impact too has been effective: using teacher-defined measures of impact provides a more accurate way of understanding the difference that lesson study activity has made. In other words, unlike with attainment data – where it would be hard to attribute changes in pupil outcomes specifically to lesson study activity (as opposed to other changes in context or in the teaching and learning environment) – our approach enabled teachers to focus on three pupils and how they responded to very specific changes in/approaches to pedagogic practice, based on an understanding and an assessment of these pupils’ behaviours and attitudes, both before and after the use of the practice. Importantly, this impact data is also ‘triangulated’, since the practitioner who is teaching as well as those observing must come to an agreement as to what happened and why. Likewise, then, the overall perceptions of impact scores were discussed and agreed upon in triads, giving weight to their validity. Given this, it is encouraging to note that most scores provided suggest that the lesson study approach does impact positively on pupil behaviours and attitudes to learning. As can be seen in Table 3, 85 per

cent of pupils benefited from their teachers engaging in the project, with over a third (36 per cent) benefiting by an increase in their performance score by 50 per cent or more.

Summary

For the Haverstock Primary to Secondary Transition Project, we employed a DBR approach to the development and implementation of lesson study, in order to help practitioners examine and begin to tackle some of the issues associated with primary to secondary transition. Doing so enabled the project team and participants to collaboratively develop a theory of action for the project, which enabled us to consider notions of learning and learning conversations, as well as a means of delivering lesson study in keeping with this theory of action. As well as this, we were also able to establish a way of measuring impact for situations (such as when primary and secondary teachers work on joint projects) where, because there is no day-to-day interaction and collaboration, there is no naturally occurring baseline and no common approach to pedagogy.

In light of the above, we conclude that using DBR has been vital not only to the success of the project, but also to its long-term sustainability following the project's end. However, we as researchers have also benefited from engaging in DBR; for instance, we have gained a better understanding of how to engage in lesson study in a cross-phase way. In addition, the new approach to measuring impact that emerged can now be tried and tested in other contexts, as can our revised theory of action for, and approaches to, operationalizing lesson study. That is, in keeping with Anderson and Shattuck (2012), moving forward we can take what we have learned and continue to collaboratively and iteratively refine our approach, so that it is effective in each new context we introduce it to, thus helping to serve to improve the system's overall capacity for sustained change.

Notes on the contributors

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Lorna Ponambalum is a science teacher and Assistant Headteacher at Haverstock School, Camden, London, where she is also Designated Safeguarding Officer. Lorna has been involved in a number of lesson study projects, including the project covered in this paper, which examined approaches to improve primary to secondary transition.

Appendix: Pupil outcomes at start and end of project with evidence from the triad as to why these assessments were made

Rating of pupil at start of year	Do you have evidence for making this assessment? What did you see/hear that makes you give this score?	Rating of pupil at endline of year	What are you now seeing that is different? In other words, what evidence do you have for giving this score?
4	My analysis of their workbook and my knowledge of their in-class contributions	6	Some improvements when the child is motivated
4	Under-confident. Struggles when working with a partner	7	More confidence of own ability and recognizes support from partner
4	Aloof. Issues at home	4	Still struggles to pay attention when working in pairs
5	Struggles with using some of the key words	7	Uses more key words in her written work (almost all). Expressing ideas in a better way
4	Struggles with the key words	6	Better sentence structure and better linking of ideas
3	Lacks confidence in speaking and writing	6	More confidence in verbally answering questions, puts hand up more often. Writing can still be a problem
3	Never raises hands. Refused to speak in public. No sentence structure	6	Left before end of project, but was demonstrating improved vocabulary, confidence, and written work
4	Not engaged, vocabulary and literary work poor	9	REALLY engaged and improvement in vocabulary and literary sentences improved
5	Doesn't use vocabulary accurately and not able in terms of written work	9	Vocabulary use is more accurate and is much more able in terms of written work
4	<ul style="list-style-type: none"> • Did not listen on carpet or to teacher talk • First cycle shows signs of disengagement in feedback • Writing difficult to understand 	7	<ul style="list-style-type: none"> • More focused on the task/on the carpet • Better quality of writing/better feedback as cycle progressed
6	<ul style="list-style-type: none"> • Too chatty • Distracted talk partner • Forgot to check through and punctuate • Could not peer assess well 	8	<ul style="list-style-type: none"> • Better learning behaviour • More ownership of own learning and can self and peer assess
6	<ul style="list-style-type: none"> • Prone to distraction • Unable to follow a series of instructions 	7	<ul style="list-style-type: none"> • Hand up to offer ideas more • Slowly and carefully gets on with a task • Knows how to peer assess

Rating of pupil at start of year	Do you have evidence for making this assessment? What did you see/hear that makes you give this score?	Rating of pupil at endline of year	What are you now seeing that is different? In other words, what evidence do you have for giving this score?
3	Texts not produced well; distracted and distracting others	6	Use of meta language; texts produced using appropriate grammar
4	Paucity of ideas; work not always making sense	7	Taking control of own learning; organizing ideas about grammar effectively; more confident to start writing and producing complete texts
5	General lack of confidence despite being a high achiever	7	Texts produced full of ideas; interviews with observers show confidence; more confidence in his ideas provided he is partnered with someone who he finds supportive
5	Lack of involvement in lessons. Poor writing and confused by most tasks	7	Having established that he appreciates being probed/challenged by teachers, I dedicate more time to enabling him to process information through questioning. He now often starts tasks quicker and takes more risks. He is still shy and doesn't usually volunteer
3	Withdrawn – never contributing and opting out of tasks	6	Tries tasks – not always without prompting. Beginning to take risks and occasionally volunteers ideas
7	Very low confidence. Consistently poor literacy. Reluctance to contribute. Written work was poor but reflected effort of student	9	Tries really hard to complete work to the best of her ability. Still rarely contributes her ideas
3	Completely disengaged, sees no value in school. Not answering questions and talking about anything else	8	Now focuses on the front, puts hand up, talks about the topic most of the time
6	Easily distracted, will put hand up but often doesn't have an answer when asked	8	More focused, will still often not listen on input but is able to ask someone else rather than an adult or just sitting there
1	<ul style="list-style-type: none"> • Gets out of seat • Shouts out • Disturbs others 	n/a	Pupil left school
9	Prior attainment and classroom observations	9	No difference in literacy; attainment was consistent

Rating of pupil at start of year	Do you have evidence for making this assessment? What did you see/hear that makes you give this score?	Rating of pupil at endline of year	What are you now seeing that is different? In other words, what evidence do you have for giving this score?
3	Prior attainment and classroom observations	4	Improved confidence in comprehension and writing
3	Prior attainment and classroom observations	4	No real difference, possibly slightly better at verbalizing
3	Effort score '3' in first report. Leaning back on chair, not focused, distracted	6	More focus, more likely to ask for help rather than misbehave
3	Effort score '3' in first report. Distracting others	3	Now rarely in class – exclusion/absence. On occasion shows excellent progress and can work independently
4	Disengaged on whole (although baseline observations were carried out on a 'good' day). Rudeness, not trying	8	Reading challenging texts and looking up difficult vocabulary in dictionary. Fewer days when refuses to work
3	Several learning needs and has had trouble with writing	4	Increased confidence in spelling and writing (and enthusiasm) – especially creatively. Continues to struggle with comprehension. Has made progress according to assessed work
5	As above, although a disparity between quality and quantity of spoken and written work	n/a	Has left the school
3	More willing to write than talk at length. Writing poor quality. Poor attention and behavioural issues as barriers to learning	5	Has improved appreciably in terms of spoken contributions to written work. Still presents behavioural problems as main barrier to progress. Has made two sub-levels of progress this year (based on analysis of class work)
6	Reading fiction, poor use of science vocab	6	Nothing very different
5	No attempt to use science vocab	7	Trying to use science vocab
3	Very poor engagement with larger written tasks	7	Better engagement with task and production of higher level work with better vocab
4	Unwilling to discuss with interviewee	5	Writes more, tries to write in detail, though remains unwilling to share ideas written in class – dependent on work-partner

Rating of pupil at start of year	Do you have evidence for making this assessment? What did you see/hear that makes you give this score?	Rating of pupil at endline of year	What are you now seeing that is different? In other words, what evidence do you have for giving this score?
4	Will answer questions if very sure of answer	6	Still unwilling to share ideas in class but will use connect vocabulary if it has been embedded strongly within lesson
4	Not initially willing to share knowledge, though did come to the front of class and share ideas	6	Able to discuss with interviewee in detail, information about experiment. Still somewhat unwilling to share
5	Hesitant to share ideas or answer questions unless specifically asked	7	Task dependent
6	Always willing to share ideas, although not necessarily accurate formal scientific language	8	Attempts to choose his words when answering questions, which is great effort from this student
2	Performance depending on who she partnered with	3	More effort to talk in groups; however, this is only a small step; still very hesitant and seeks reassurance from others
3	Quietly engaged – listens but rarely shares ideas	6	Making a larger effort to talk within a group. Still hesitant to share in front of class unless she knows it's right
6	Very engaged and will generally talk and share ideas, although not always using accurate language	8	Actively sharing and talking ideas – backs up her statements using reasons, can reject others' opinions and justify why
6	Appears disengaged; however, with probing does know the answers. Not always talking about the subject – depends on person who he is partnered with	9	Loves sharing ideas, constantly putting hand up! Tries to use scientific language – not as engaged in written tasks

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