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Developing Great Subject Teaching

Rapid Evidence Review of Subject-
Specific Continuing Professional
Development in the UK



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Foreword

Teachers say that they find subject-specific continuing professional development (CPD) more beneficial to their teaching than generic pedagogic CPD - and the evidence suggests that they are right in this judgement. It seems strange then, that teachers in the UK generally do less subject-specific CPD than generic CPD and less, also, than their colleagues in high performing countries.

This important review builds on key findings from Developing Great Teaching <http://tdtrust.org/about/dgt>, which highlighted the effectiveness of subject-specific CPD. It examines the evidence about the extent, nature and impact of subject-specific CPD in the UK, and also explores why take-up is so much lower than it should be.

The review describes how some schools have thrived through prioritising subject-specific CPD, and highlights the enabling role senior leaders play in this. But it also describes the challenge that many school leaders and teachers face in identifying and embedding high quality CPD. Financial constraints, teacher workload, the need to prioritise external accountability requirements and the move to school-led improvement all contribute to a culture in which subject-specific CPD is rarely prioritised despite widespread recognition of its value. Addressing these issues may change the culture of low expectations surrounding CPD that the review has identified, leading us towards more skilled and valued teachers, and ultimately, better outcomes for students.

Wellcome has been investing in subject-specific CPD for science teachers and technicians for over 15 years as part of our commitment to improving science education. We believe that every teacher, STEM or otherwise, should regularly engage in high quality, impactful subject-specific CPD.



Dr Hilary Leever

Head of Education and Learning

Wellcome Trust

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Executive Summary

Background to review and definition of subject-specific CPD

The Wellcome Trust commissioned this rapid review to explore the evidence about the extent, nature and impact of subject-specific continuing professional development (CPD) for school teachers in primary and secondary schools in the UK. Wellcome asked the research team to draw together evidence from a range of sources to provide an overview of the current picture across the four UK nations. These findings have then been compared with practices in high performing countries and with evidence from research reviews about the effectiveness of CPD. This includes the umbrella review undertaken by the same research team for the Teacher Development Trust (Cordingley et al, *Developing Great Teachers*, 2015).

One key finding from the *Developing Great Teachers* review was that subject-specific CPD is more effective, in terms of its impact on pupil outcomes, than generic pedagogic CPD. Subject-specific CPD is defined here in terms of programmes and activities which focus on enhancing teachers' understanding of the subjects they teach (i.e. subject knowledge); how pupils learn in those subjects and how to teach them (sometimes called pedagogic content knowledge); and/or helping teachers to understand how generic CPD might apply to specific learning issues in the subjects they teach, in explicit and structured ways. The full report defines a number of other key terms and includes a glossary.

Headline Findings

Factors that influence the need for subject-specific CPD

- **Teacher recruitment and skill levels influence the extent to which subject-specific CPD is required.** A significant number of teachers do not have a relevant post A-Level qualification in the subject they are teaching. For example, national statistics of the school workforce in England in 2016, published by the Department for Education (DfE) in June 2017, showed that of teachers in state-funded secondary schools, 49.6% of ICT teachers, 37.3% of physics teachers, 25.1% of chemistry teachers, 24.9% of history teachers and 18.6% of English teachers did not have a relevant post A-Level qualification (DfE, 2017). Furthermore, many schools face challenges relating to the recruitment and retention of teachers, with some subjects (for example, physics) and schools (the most disadvantaged) facing particular difficulties.
- **The need for subject-specific CPD differs between phases.** For example, the requirement for primary teachers to teach all subjects influences their needs, although the focus on English and maths in the assessment and accountability frameworks means that primary teachers are most likely to access subject-specific CPD in these areas. The exception to this is Wales, where there is also a recognition of the need for subject-specific CPD in Welsh, the arts and science.
- **Needs differ between schools, with school size and stage on the improvement journey appearing particularly influential.** Schools that are seen to be struggling in terms of pupil outcomes and/or inspection results appear less likely to prioritise subject-specific CPD over more generic school improvement approaches, for example in relation to classroom management or whole school assessment and marking policies. **Developing the curriculum - and the subject-specific CPD that can support this** - can be seen as something of a luxury in these schools. The size of a school - particularly in the primary phase - may also influence the extent to which CPD is supported and available to staff.
- **School cultures and existing levels of expertise influence the extent to which needs are identified and addressed.** As we explore below, existing levels of subject-specific expertise

within a school (or within a particular department) and the extent to which school leaders prioritise and support professional development, including from external sources, will influence how far a school or department recognises and actively seeks to address its needs.

- **Performance review is widely used to identify and balance CPD needs** for the school as a whole and for individuals. Primary and secondary schools with a strong CPD offer put a lot of effort into doing this systematically, using different evidence sources and aligning analysis of individual needs with school self-evaluation, improvement and CPD activities. Teacher choice and ensuring a range in the CPD offer are also common mechanisms for achieving a balance. More individualised CPD processes such as enquiry, coaching and lesson study also help some schools to achieve this balance.
- According to the most robust study (TALIS, 2013), **teachers in England engage in less CPD overall and are less likely to engage in subject-specific CPD than in most other high performing countries**. For example, while just under 50% of teachers in England had participated in curriculum-related CPD in the 12 months before TALIS, almost 90% of teachers in Shanghai and 80% of teachers in Singapore had done so. Perhaps as a result of this limited historic exposure to subject-specific CPD, teachers in England are around three times less likely than their international peers to say they need more subject-specific CPD. A more recent survey (2017) indicated that classroom teachers identify a greater interest in and need for subject-specific CPD than school leaders, particularly in secondary schools.

What influences the demand for subject-specific CPD and what are the barriers to uptake?

- **Changes in curriculum and assessment policies are key drivers of demand** for subject-specific CPD. However, the kinds of subject-specific CPD that schools engage in as a result of such policy driven changes can often be limited to – for example - exam board briefings attended by one or two members of staff rather than extended professional development programmes for all staff.
- **School leaders play a significant role** in setting expectations for CPD and in influencing the extent to which it is prioritised, supported and integrated with other internal initiatives. Leaders - including middle leaders, heads of departments and senior leaders - play a key role in enabling staff to participate in CPD and to implement what they learn from it, creating the necessary conditions for effective subject-specific CPD to flourish. The level of control that individual staff have over their own CPD varied across the school case studies examined as part of this review, and across phases, but a general pattern was that teachers had less control in lower performing schools.
- This review identified a number of **barriers to the development of high quality subject specific CPD** in schools. Some of these, such as school size, have been referenced already, so we focus here on additional issues identified:
 - **Budgets and resources** were consistently raised as the most significant challenge by teachers and leaders. Backfill costs for staff are an important consideration alongside the actual cost of an external conference, an invited speaker or consultant, or a professional development programme.
 - **Perceptions of CPD quality** - the TALIS 2013 study indicated that teachers in England rate the impact of subject-specific CPD more highly than generic pedagogic CPD. However, this review revealed a perception among some schools and teachers that externally-run CPD can be poor quality with little impact on practice. There was also a view that the loss of local authority (LA) support in England and, to a lesser extent, Wales, has created a market-place

for CPD provision, but that schools lack the knowledge or ability to quality assure such provision, and so rely more heavily on internal expertise and on learning from close partner schools.

- **Teacher workloads** - there is strong evidence that teachers across the UK face high workloads and so struggle to find time for CPD.
- **Competing improvement priorities and the need for quick fixes** - subject-specific CPD for staff is one among many competing priorities for schools and teachers. The over-riding need is to address external accountability requirements, in particular national tests and exams and school inspections. New policy initiatives and demands, such as Prevent, can require staff development time. Even where subject-specific CPD is prioritised, the pressure on time and resources can mean that schools adopt sub-optimal approaches, such as a single member of staff attending an external event and then cascading the learning to colleagues in a single twilight (i.e. after school) session.
- **A culture of low expectations** - for schools where there is no established culture of high-quality subject-specific CPD, and where external challenge and support for subject development is fragmented, there can be limited awareness of the potential for subject-specific CPD or of what “good” looks like. Such schools might have limited internal subject expertise to draw on (for example, where staff retention is an issue) and, perhaps as a result of this, can appear less confident in seeking out external expertise and challenge.
- Despite these challenges, **some schools do appear able to overcome the barriers** and to create coherent and high quality subject-specialist CPD for all their staff. We draw on the learning from these schools in the following section.

Provision

- It is difficult to quantify **the scale of subject-specific provision available to schools** and how this has changed over time, not least because the landscape differs significantly across the four UK nations.
 - On the one hand, publicly funded provision has reduced significantly since 2010, particularly in England (although recent initiatives such as Maths Hubs; the Strategic School Improvement Fund and Teaching and Learning Innovation Fund; and the consultation on strengthening Qualified Teacher Status should reverse this trend to some extent).
 - At the same time, the subject advisers that were a feature of LAs in England and Wales have largely disappeared, leading to a loss of dedicated expertise across the systems.
 - Meanwhile there has been an increase in provision from private providers, from school-based providers – particularly Teaching School Alliances in England - and through initiatives such as the Education Endowment Foundation (EEF), some of which has a subject-specific focus.
 - By contrast, in Scotland, the role of LAs in supporting schools has been sustained, while the role of universities in supporting professional and leadership development has been strengthened in recent years.
- **Cascading learning from external CPD** is widespread in both primary and secondary schools, including for subject-specific CPD. This is seen as key to securing value for money, consistency, and building capacity. However, the CPD activities designed to cascade professional learning vary significantly in the quality of delivery and design.

- In general, but particularly in England and Wales, the **tradition of separation between external and internal support is becoming blurred**. Learning from more experienced colleagues is seen as the main source of specialist expertise in both primary and secondary case study schools. In Scotland, external specialists do still work closely with schools, whether from the LA or other subject-specific CPD providers. The form of external expertise that appears to be most valued by schools is **bespoke “critical friendships”** from, for example, Higher Education Institutes (HEIs), individual consultants or LAs.
- As resources and LA support have reduced, there has been a parallel **growth in the extent to which schools provide CPD internally and through school to school partnership arrangements**, especially in England and Wales. Many of these network-based approaches include subject networks which bring together individual teachers from different schools to share practice. These networks are most common in the core subject areas that dominate the accountability metrics but do sometimes span other areas. The mechanisms through which networks and partnerships support subject-specific CPD include: visits to observe and share good practice; sharing resources; discussing changes to curriculum or examination reforms; sharing specialist leaders in education (SLEs) to provide school improvement support; and (in the words of one school leader from the self-improving systems research) less need to “reinvent the wheel”.
- However, school-to-school networks also serve other functions, such as providing peer review or leadership development programmes, which will not necessarily focus on subject-specific CPD. Indeed, **overall, the move towards more school-led improvement models appears to have increased the prevalence of whole school improvement and generic pedagogic CPD, and reduced the likelihood of subject-specific CPD for most teachers**.
- **Whether and how schools access this more diverse provision has become more variable**, with some schools and regions notably less engaged. However, secondary schools with a strong CPD offer do still seek out external subject-specific CPD support. Many primary schools seek out subject-specific CPD for English, maths, and to a lesser extent, science. Some of the Multi Academy Trusts (MATs) in England have invested heavily in subject-specific expertise in their core teams and so can provide significant CPD and support to teachers in subject areas.
- **Subject-specific CPD and specialist CPD are often seen as closely linked**, even interchangeable. In primary schools, the younger the pupils being taught, the more subject knowledge shades into specialist knowledge, and subject-specific CPD into specialist CPD (for example, in child development or oracy). Access to subject-specific teaching resources and support in using them is a common feature of subject-specific CPD in many secondary schools, but much less so in primary schools. Secondary teachers see the supply of CPD using such materials as exceeding its usefulness, but primary teachers value the small amount they access and would like more.

Quality content and impact

- An important feature of **effective CPD is that it is either focussed directly on developing knowledge or practice in a subject area**, or focussed on developing an aspect of teaching and learning in ways which are contextualised for specific subjects.
- The evidence indicates some **important differences between different subjects** (maths, science and English) in terms of how the effective CPD in these areas is designed for impact. In highlighting these differences it is important to note that **the CPD in all three subjects had more similarities than differences** – meaning that it largely adhered to the kinds of extended, cyclical

and structured development processes that are described in detail in *Developing Great Teaching*.

- However, differences between these three subjects relate to: how the subject content connects with the curriculum and pre-existing teacher knowledge; how new approaches and new subject/pedagogic content knowledge are supported through classroom materials for different subjects; and how CPD content reflects the values and nature of the subject discipline in question. For example, while the need to align instruction and follow-up support was key in all three subjects, there were nuanced distinctions in how this was done.
 - In maths, principles and theory were taught explicitly at the start to support depth of thinking and learning.
 - In science, teachers learned through experimenting with new materials followed by activities to transfer those materials into classroom practice.
 - In English, new approaches were introduced in principle and followed by learning through the juxtaposition of a range of readings about reading and comprehension, direct comprehension of challenging texts and challenges to assumptions about learners.

Implications

- There is a **need for an increase in effective CPD in the UK**, and for building awareness of effective practices. It is particularly important to build awareness of the importance of subject specific CPD and/or the contextualisation of pedagogic CPD. There is a **need to strengthen CPD** especially with regard to how far it involves sustained exploration of new approaches; the involvement of external subject specialists; the time allocated to CPD; and the use of *structured* peer-to-peer support to embed approaches. There is an urgent need for primary schools in England, Scotland and Northern Ireland to expand access to subject-specific CPD in subjects other than English and maths; in Wales, this also incorporates science and Welsh, but there remains a need to expand beyond this. There is a **need for more professional development for school and CPD leaders** to help them understand:
 - the evidence about the nature of effective CPD, especially the evidence about the nature and impact of subject-specific CPD; and
 - **how to judge the quality of CPD provision suggested to them** by heads of departments/phase and/or external providers including other schools.

This is particularly important for leaders in schools that have lower OfSTED or other external inspection ratings.

- Frameworks such as the **English Standards for Teachers' Professional Development**, the new **Welsh Professional Standards for Teaching and Leadership**, the **Scottish Standard for Career-Long Professional Learning**, and the **values for specialist learning and teaching in the professional standards in Northern Ireland** all **provide a helpful structure for development**. There is a need to build more awareness amongst teachers about the CPD evidence and, in England, the linked CPD Standards. The move towards inter-disciplinary learning in Scotland may, however, emphasise cross-curricular rather than subject-specific CPD.
- There is a need for developing mechanisms for and skills in **assuring the quality of CPD and evaluating the value for money** that school CPD policies and activities represent, in relation to pupil, teacher and subject development.
- In order to improve the way the needs of schools and individuals are balanced, **further links need to be developed between performance review, school improvement and CPD** through

the use of a broader range of evidence about professional learning needs, and through enhancing choice and the use of CPD activities where individual strengths and needs are surfaced and explored.

- There is a need for schools to recognise that **contextualising generic CPD for subject-specific contexts represents an important early step** in increasing their colleagues' access to subject-specific CPD, and that school subject leaders can do this effectively for and with their subject leaders and/or subject teams. This has been identified as a particular need in Northern Ireland.
- As networks become a more important source for CPD and school improvement support, there is a need to **review and enhance the nature and quality of subject-specific work across networks** to ensure that such provision remains inclusive, particularly in meeting the needs of schools in disadvantaged areas.
- The recent focus on evidence-informed teaching – for example, through the EEF's Teaching & Learning Toolkit, has highlighted the importance of evidence relating to generic aspects of pedagogy, such as metacognition and feedback. In this context, there is a need to **ensure schools contextualise work to respond to this evidence**. There is also a need to ensure that **research- and evidence-informed practice does not become distorted, and distract from a focus on subject-specific approaches and implications**.

Introduction and background

The purpose of this rapid review

The Wellcome Trust commissioned this Rapid Evidence Review to explore the evidence about the extent, nature and impact of subject-specific continuing professional development (CPD) for school teachers in primary and secondary schools in the UK. Wellcome asked the research team to draw together evidence from a range of sources to provide an overview of the current picture in each of the four UK nations. These findings have then been compared with practices in high performing countries and with evidence from research reviews about the effectiveness of CPD. This includes the umbrella review undertaken by the same research team for the Teacher Development Trust (Cordingley et al, *Developing Great Teaching*, 2015).

Key concepts and building blocks

A glossary of frequently used terms and acronyms, with their definitions, can be found in Appendices A and B. Here we define the concepts that form the building blocks of this report.

It is important for this review to distinguish between subject-specific and generic CPD. **Subject-specific CPD** refers to programmes and activities which focus on:

- enhancing teachers' understanding of the subjects they teach, how pupils learn in those subjects and how to teach them – encompassing both subject and pedagogic content knowledge; or
- helping teachers to understand how pedagogic issues and approaches might apply to specific learning issues in the subjects they teach, in explicit and structured ways. This may incorporate developing teachers' abilities in a subject in which they are less confident, but may be expected to teach.

Generic pedagogic CPD, on the other hand, relates to activities and programmes which seek to develop teaching and learning approaches which can be applied across any subject area.

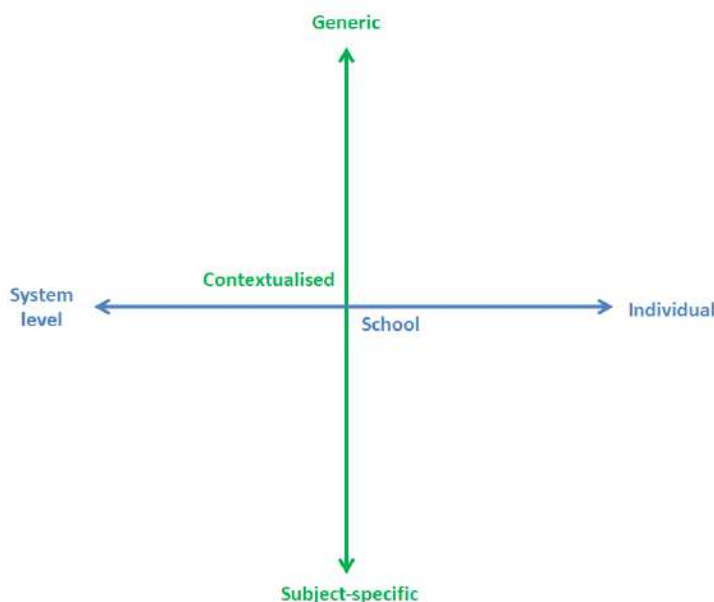
We consider CPD to be **effective** where it makes an impact on outcomes for pupils, teachers and school leaders. In the *Developing Great Teaching* report (Cordingley et al, 2015) we identified the features of effective CPD as follows: a process involving support for professional learning that

includes sustained, iterative, aligned combinations of activities focussed around evidence about how pupils respond to the changes teachers are making. These activities should then be focussed on or contextualised for subjects, and help teachers to review and refine their beliefs, knowledge and skills in ways which address their aspirations for their pupils' learning. The *Developing Great Teaching* report indicates that subject-specific CPD is more effective than generic pedagogic CPD.

Highly successful schools are increasingly integrating CPD and school development, and describe the choices they make about subject-specific CPD as a continuum. It is useful to note that this spans, for example, specific workshops and programmes provided by external CPD providers and/or internal specialists and ongoing, embedded but also structured continuing professional development and learning (CPDL) activities integrated into, for example, departmental meetings and/or professional learning communities. As these schools approach decisions about subject-specific CPD in the context of both the support given to teachers and the ongoing application and testing of new information and ideas in classrooms, we both connect and distinguish between them, in this report. We use the term CPD to describe the support offered, and we use CPDL to refer to the steps schools and CPD providers take to enable teachers to apply and test these ideas in the classroom. The distinction also reflects the subject-specific support offered in high performing countries, where subject specific CPD approaches such as lesson study attend specifically to both.

Finally, it is important to identify the key elements underpinning the extent, nature and impact of subject-specific CPD. These include factors such as provision, demand and uptake, and their determinants. The graphic in Figure 1 maps the range of factors influencing the provision and take-up of subject-specific CPD. The horizontal axis moves from system-level factors through to school and then individual staff factors. The vertical axis moves from generic to subject-specific CPD themes. Further evidence about how these axes interact and influence each other can be found in the relevant sections of the report.

Figure 1



Methods

The detailed methods for the review are described at the end of the report. In short, we carried out a rapid review focused on:

- understanding the nature and impact of effective CPD and the differences between subject-specific and generic CPD, essentially by revisiting and updating the *Developing Great Teaching* review;
- understanding the current CPD landscape in each of the four UK nations - this involved secondary analysis of existing published and unpublished data sets (including surveys, substantial evaluations, and policy reports and documents) and collecting primary evidence from interviews and a focus group with school leaders and CPD providers; and
- understanding CPD policy and practice in a sample of high performing countries.

The key data sources underpinning our analysis, including existing datasets, were sourced from:

- The *Developing Great Teaching* (Cordingley et al, 2015) review of systematic reviews
- Three new reviews:
 - Basma & Savage, 'Teacher Professional Development and Student Literacy Growth: a Systematic Review and Meta-analysis' (2017)
 - Goldsmith, Doerr, Lewis, 'Mathematics teachers' learning: A conceptual framework and synthesis of research' (2014)
 - Kennedy, 'How Does Professional Development Improve Teaching?' (2016)
- Evidence submitted to the UK Government CPD Expert Group in 2015-2016
- CUREE's current international comparative research with Educational International into teacher professionalism and development in seven nations, including Scotland (forthcoming)
- National Foundation for Education Research (NFER) Teacher Omnibus Survey Data, completed by at least 1,000 primary and secondary school teachers from publicly-funded schools in England
- Evidence from studies commissioned by Wellcome:
 - Allen & Sims, 'Improving Science Teacher Retention: Do National STEM Learning Network professional development courses keep science teachers in the classroom?' (2017)
 - Leonardi, Lamb, Howe & Choudhoury, 'State of the nation' report of UK primary science education. Baseline research for the Wellcome Trust Primary Science Campaign (2017).
- National and international reviews and analyses of provision for the four UK home nations
- CUREE research into the effectiveness of school professional learning environments and approaches to school improvement and the resulting case studies (Cordingley & Bell, 2014)
- STEM Enthuse Partnerships Programme Evaluation conducted by CUREE in 2017
- Evidence from the evaluation of 75 CPD providers for the Teacher Development Agency
- Interview findings from teaching practitioners and CPD providers across the UK
- Secondary analysis of data from the Teaching and Learning International Survey (TALIS), carried out by the Organisation for Economic and Cultural Development (OECD) in 2013. We also reviewed wider evidence from the 2015 Programme for International Study Assessment (PISA) 2015, the Trends in International Mathematics and Science Study (TIMSS) 2015¹, and a sample of international research reports and reviews

In order to illustrate what CPD practices look like on the ground, we analysed in-depth qualitative and quantitative evidence from schools in the UK. This included:

¹ It is important to note that the teacher sample in TIMSS is not representative. The OECD's TALIS survey provides the most comprehensive and robust evidence of CPD participation. England participated in TALIS 2013, but Northern Ireland, Wales and Scotland did not. England, Scotland, Wales and Northern Ireland all participated in PISA 2015, while Northern Ireland and England also participated in TIMSS 2015. However, the focus of PISA and TIMSS is on pupil outcomes, so the teacher samples are not drawn to be representative and are therefore not as strong as TALIS for an analysis of CPD.

- CUREE case study reports of the nature and structure of the professional learning environment of four primary and five secondary schools with a particular interest in improving CPD (either because they had an existing commitment to CPD or because they were facing challenges and had been advised, as part of school improvement to review their approach to CPD) in England, as well as teacher surveys from these schools and 12 others²; and
- 47 detailed school case studies developed as part of the Institute of Education (IOE)'s wider self-improving school system research project (Greany and Higham, forthcoming).

These case studies illustrate the range in practice across primary and secondary schools, schools in rural and urban locations, of different sizes, and with higher and lower OfSTED ratings and stronger and weaker CPD offers³. Examples and quotes from the case studies are included throughout the report. In Appendix C, we have provided our full analysis of how these case studies can represent the differences in CPD provision, demand, uptake and quality between primary and secondary schools. Appendix D provides example, anonymised vignettes drawn directly from the case studies.

This report synthesises evidence from across the UK to provide an overall assessment of subject-specific CPD. Where we have evidence that relates to specific nations or parts of the UK, we state this.

Provision/uptake of subject-specific CPD

Provision/uptake across the four home nations

The following section provides a brief assessment of the issues relating to subject-specific CPD for each UK nation, as this provides important context for the findings related to provision and uptake of CPD.

Across **England**, the CPD uptake is lower than the average of other, similar education systems; according to TALIS 2013, on average, teachers in England spent half as much time participating in CPD activities as other teachers in the survey (Micklewright et al, 2014). The provision and uptake of subject-specific CPD varies considerably across schools and localities. The changes to the National Curriculum in recent years have increased the focus on subject-specific CPD across the board. However, in a poll carried out by the Institute for Teaching (IFT) at the Ambition School Leadership Conference in 2017, 193 secondary middle leaders were asked how subject- or phase-specific their CPD programme was. The leaders were asked to rate this from 0 – entirely generic – to 10 – fully subject- or phase-specific. The average rating across the board was 2.8, with leaders themselves identifying the CPD programmes in their schools as broadly generic⁴.

As in the other three nations, there are key distinctions between primary and secondary schools, owing to differences between primary and secondary curricula, school size and the nature of the teacher workforce (i.e. at primary level, a teacher will be responsible for teaching most subjects, whilst at secondary level, a teacher will generally be a specialist in one or two). At primary school

² These schools represent a sub-group of a larger set of 50 schools, who had elected to participate in this research into CPD provision. The sub-group was chosen to illustrate the range of practice across rural and urban settings, in a mix of sizes, and includes schools with both stronger and weaker CPD offers.

³ Where a school is referred to as 'strong' or 'weak' in this report, this refers specifically to its CPD offer as assessed by CUREE evaluators during their reporting.

⁴ When the same poll was carried out with 33 teachers in a session at the 2017 ResearchED conference, the average rating was 6.5, with responses mostly ranging from 4-8⁴. We have taken the former as more representative, however, as the ResearchED conference attracts a group of teachers and leaders with a particular interest in research and CPD.

level in England, CPD for teachers is available for English, maths and, to some extent, science, but rarely for other subjects. At secondary level, subject-specific CPD is available across a wider range of subjects, but with a core focus on the areas prioritised by the different accountability framework, including the English Baccalaureate – EBacc – subjects (especially English, maths and science). In terms of uptake, key differences relate to:

- leadership – in most primary schools, CPD activities are directed by the senior leadership team (SLT) as an integrated part of school improvement, whilst in secondary there is usually a named CPD leader. Whether or not senior leaders participate in CPD and model professional learning varies according to the local understanding of the evidence about effective CPD;
- school size - in very big primary schools there may be a specific CPD leader. In very big secondary schools this is sometimes a significant role for senior leadership, in which SLT members identify needs, oversee the CPD programme and facilitate significant elements within it;
- the CPD and subject policies of the governing organisations;
- the school's performance level e.g. their OfSTED rating (where higher ratings seem to be linked with significant systematic support for high quality CPD which gives priority to the depth of development of content knowledge); and
- where the school is located e.g. accessing CPD in general, and subject-specific CPD in particular, in rural areas can be more challenging.

In **Northern Ireland**, the evidence from TIMSS 2015 indicates that teacher participation in CPD is in line with the international average. However, participation in CPD which is focused on science is lower than the international average and shows little sign of increasing over time. Furthermore, CPDL for heads of department in post-primary maths and English has been recognised by the Northern Irish school inspectorate as an area of weakness. Department meetings often focus on administration issues instead of CPDL, and there is limited sharing of good practice or discussion of teaching and learning.

In **Wales**, there have been lots of changes in CPD provision recently, and the system is continuing to evolve. Until recently, the CPD which was available to teachers was largely generic and not given policy priority or emphasised in national professional standards, and organised intermittently or at irregular intervals, with the offer often varying by location. Recently, there has been a positive shift to providing structured CPD, to giving it priority in national initiatives and standards, and there are plans to increase subject-specific support, especially for maths and science. Currently, however, the amount of subject-specific CPD experienced by Welsh teachers is below the international average. Most schools state that there is almost no support for non-core subjects from regional clusters although lead schools have been identified to build capacity for subject-specific CPD in the arts.

In **Scotland**, the new national curriculum emphasises inter-disciplinary learning and is less focused on individual subjects than it has been in the past. This has an impact on the degree of subject-specific CPD which Scottish teachers receive. It also makes it challenging to identify the exact amount of subject-specific CPD available. The evidence there is, however, suggests that the CPD Scottish teachers receive tends towards generic CPD. This would tally with the shift in emphasis towards inter-disciplinary learning (OECD, 2015c). Unlike the rest of the UK, where CPD is largely optional, teachers in Scotland are required to take part in 35 hours of professional development activity each year.

Below, we have included four graphics which illustrate the broad pattern in interactions between key CPD organisations and decision makers for each of the four home nations. The vertical axis marks where the CPD interactions this relates to are subject-specific or generic. The horizontal axis shows whether this CPD is primarily driven by or takes place at a system level (for example, government) or at a local level (e.g. at the level of individual schools).

Figure 2

Patterns in Interaction Between Key Stakeholders - **England**

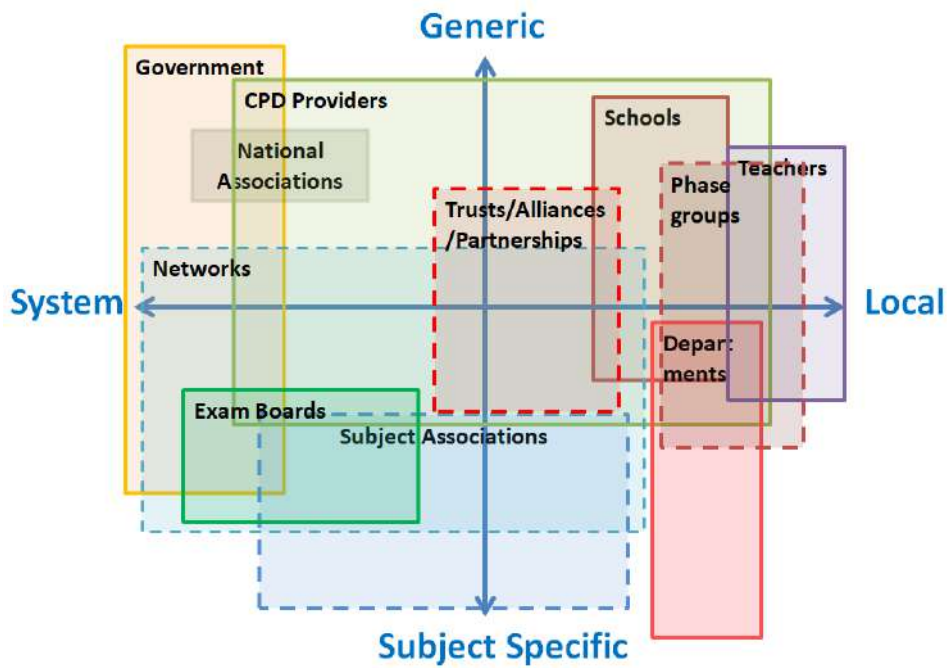


Figure 3

Patterns in Interaction Between Key Stakeholders – **Northern Ireland**

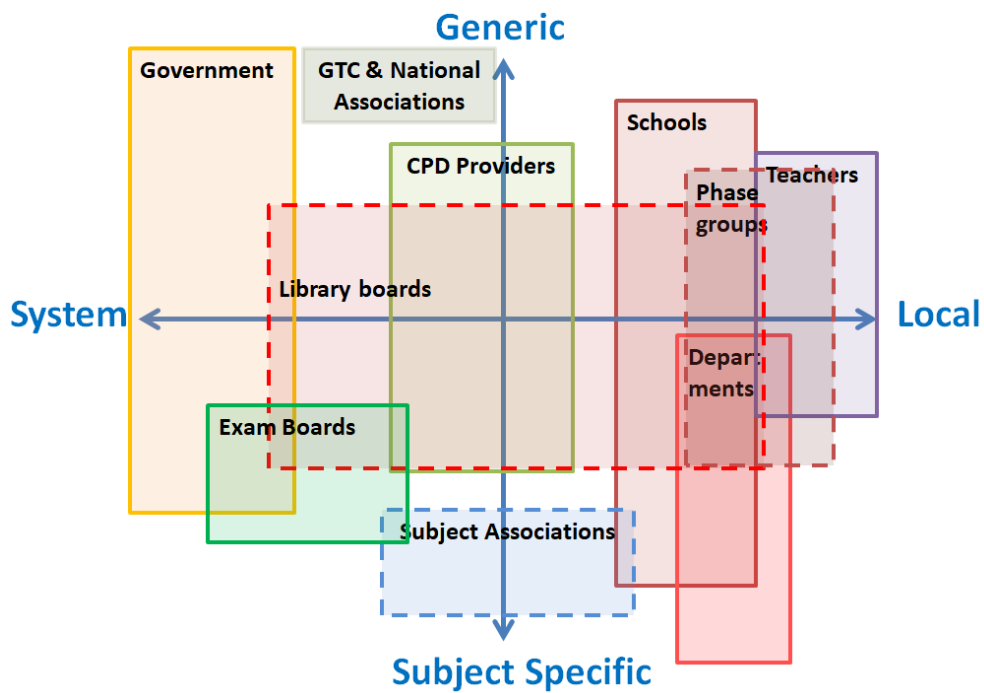


Figure 4

Patterns in Interaction Between Key Stakeholders - **Wales**

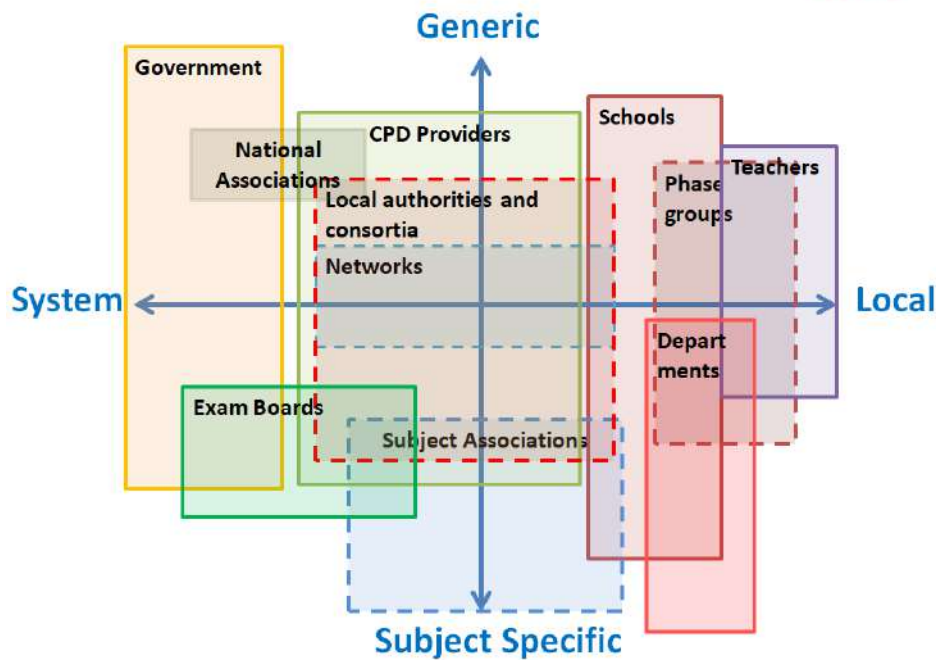
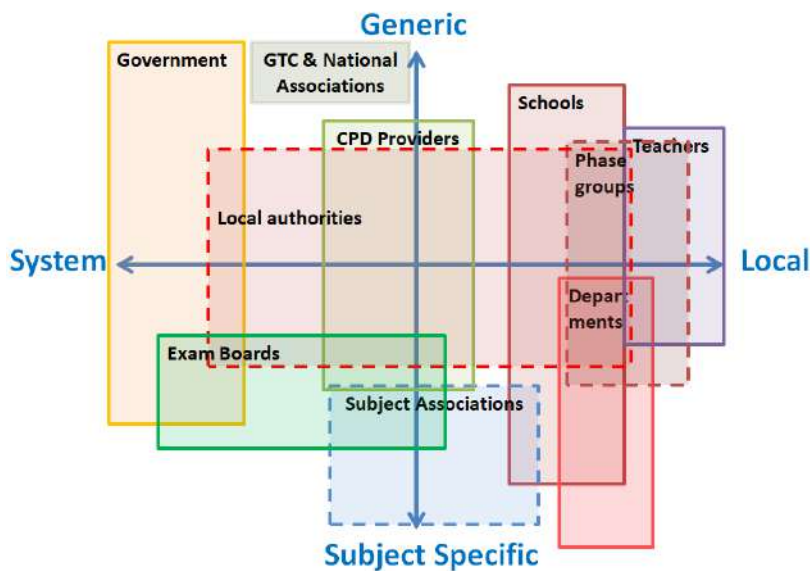


Figure 5

Patterns in Interaction Between Key Stakeholders - **Scotland**



These graphics aim to provide an overview of a very complex picture. It is possible to identify a group of school-based actors (centre right, colour-coded in red) whose operations span phase and department groups, tending to act more locally, to trusts, alliances and partnerships who tend to have wider, sometimes regional or multi-regional reach. Of these, our evidence indicates that it is secondary school subject departments that are most focused on subject-specific development activities. There were numerous instances of primary phase groups targeting subject-specific aims, particularly in relation to core subjects. However, there was a greater tendency than with secondary

subject departments to pursue more generic foci, a tendency that was even more pronounced for whole school CPD.

The picture for CPD providers is diverse, and varied greatly in scale from local consultancy to national providers, which tended to operate from generic to moderately subject-specific. For other organisations (including networks, subject & national associations and government), subject associations were understandably the most subject-focussed, with government having the most systemic reach.

External factors affecting provision and uptake

We explored the factors which affect the relationship between schools and providers, and the impact this has on the provision and uptake of subject-specific CPD.

The leadership of CPD

The evidence is clear that the extent to which school leaders promote and model CPD in their schools is a significant factor in pupils' success (Robinson et al, 2008). Leaders - including middle leaders, heads of departments and senior leaders - play a key role in helping their colleagues to participate in CPD and to put new knowledge, understanding and approaches to work on a day-to-day basis, creating the necessary conditions for effective subject-specific CPD to flourish.

In general, the individuals who have the biggest role in shaping how and whether schools access subject-specific CPD are those with an explicit role as CPD lead. These individuals have to balance the identified needs and priorities of their schools against the needs of individual colleagues. This must also all be done in the context of the school's strengths and limitations in terms of existing subject-specific expertise, and when planning for the future. Put another way, a school in which the staff have a strong existing level of subject expertise can support new staff members more effectively than a school where existing expertise is weak and which is therefore reliant on external support. Paradoxically, we found that schools where existing expertise is strong are also more likely to draw on external expertise as well. In having set about developing internal specialist expertise, these schools have come to recognise its value and to see where additional, external specialist expertise might be necessary; they are also more confident about how and where to access such support. Furthermore, the weaker schools frequently don't appreciate the importance of subject-specific CPD or what it looks like. They tend to gravitate towards what they have done historically.

To illustrate practice on the ground, the research team analysed existing qualitative and quantitative evidence from CUREE research reports. These reports explored the nature and structure of the professional learning environment in four primary and five secondary schools in England. In secondary schools, there were identified CPD leads, while in primary schools CPD was mainly led by the SLT. In one, very large primary school, rated good by OfSTED, CPD leadership resembled the pattern in secondary schools. There was a wide range of sophisticated CPD structures, opportunities and roles to enable rigorous analysis of whole school needs, alongside careful consideration of individual teachers' requests for CPD. This included a financial commitment to subsidising teachers studying for a Masters degree (of whom there were nine at the time of the report). By contrast, in a smaller but still strong (in its CPD offer) primary school, the link between needs and the CPD offer was less structured and depended on the energy and contribution of individuals.

“The SLT as a whole and the CPD group have an in-depth knowledge of the research about effective CPD and have translated this into a series of coherent systems for providing and sustaining professional development and articulating it effectively with monitoring systems” – vignette from CUREE case study

While the role that leadership plays in CPD is becoming more widely-understood, there is still more to do. Evidence suggests that this needs to be developed still further in relation to subject-specific CPD. For example, evidence from the Year 1 evaluation of the Paul Hamlyn Foundation Teacher Development Fund programme (TDF) found that arts-based subject specialists with varying previous CPD experience, whilst very comfortable working with teachers, lacked knowledge of how school leadership works and how the curriculum was organised, and so, unsurprisingly, found it hard to work with school leaders to embed and the benefits of CPD and explore how learning from subject-specific CPD could be embedded (Cordingley, Bell, Crisp and Bradbury, forthcoming). This was influenced by a number of factors. There was a lack of shared understanding between school leaders and external specialists about how the primary school curriculum is developed and implemented. This, combined with an historical emphasis on developing one-off projects with individual teachers and their class, often obscured the potential to build strategic internal specialist subject capacity. Leaders with a more strategic view of CPD and subject specialism, in this case, were able to overcome these challenges to embed more in-depth subject-specific teaching within the curriculum.

In CUREE's nine case study schools, the source of specialist expertise for CPD at both primary and secondary level in England was seen as being increasingly internal. Schools identified as good or outstanding by OfSTED exemplified systematic structures for identifying, deploying and making use of internal, specialist subject expertise. For example, in one school, the role of Advanced Skills Teacher (which the school maintained long after government support was removed) was considered to be of central importance. This school also used other subject specialists as the key contributors to in-school CPD. There were other examples of these outstanding and good secondary schools contextualising the expertise from external (pedagogic or subject-specific) facilitators by, for example, asking participants to think about the implications of approaches highlighted within CPD for particular aspects of a subject, or for lesson planning.

Wider factors influencing provision and uptake

Other factors that affect the uptake and provision of subject-specific CPD include changes to the national curriculum or national assessments. This is especially the case where these changes are accompanied by government funding to provide CPD in priority subjects.

A key issue is how schools identify and source subject-specific expertise, and how they balance internal and external support. For example:

- Despite a growing enthusiasm for internal support for CPD, many schools are **still engaging with externally supported CPD** when, for example, implementing major new initiatives and addressing new curricula or external examination requirements. Of the teachers who participated in the case study surveys (n=154 primary, 667 secondary), approximately one third had attended external, subject-specific conferences, either termly or annually. This was broadly similar in secondary and primary schools.
- The need for external expertise and subject-specific challenge is recognised most often in **highly successful schools that prioritise subject-specific CPD** based on understanding of individual teachers' needs.
- External subject-specific expertise often takes the (usually more economical) form of **individual experts brought in to school**, rather than teachers attending external programmes. From the primary school case studies, there were a number of examples of bespoke use of literacy and maths consultants to support CPD. Schools also often tap into external expertise through the use of pre-made classroom resources that are associated with significant CPD, like those provided as part of the Numicon Mathematics CPD or the "Mystery" evidence sets used to support critical thinking in history. This was more commonly illustrated in the secondary schools.
- The form of external expertise that seemed to be most valued is **bespoke "critical friendships"** from, for example, higher education institutes (HEIs) or local authorities (LAs). In general, the

critical friendship model is unusual in relation to arts-based subject-specific CPD. **Shared interest partnerships** such as nationally funded Science, Technology, Engineering & Mathematics (STEM) partnerships and local partnerships offer possibilities for planning shared CPD activities and sharing of good practice.

- A popular approach thought to maximize the value of external experts is to ask teachers with access to such expertise to **cascade their learning** to the whole staff, key stage, department, partnerships, or networks.

In general, but particularly in England and Wales, the **traditional separation between external and internal support is becoming blurred**. Learning from more experienced colleagues was seen as the main source of specialist expertise in both primary and secondary case study schools. In Scotland, where there is still an active LA support role, and schools expect to work with external subject-specific CPD providers, the TDF programme revealed the importance of external specialists working with teachers as partners to plan and run specialist activities for pupils (Cordingley et al, 2017).

We also found evidence about the need to create a sustainable infrastructure for **inter-school networks**, to support sharing of specialist expertise. This was important in Northern Ireland and Scotland, and thought to be a key role for newly emerging structures to support subject-specific CPD in the arts in Wales. Evidence from the Self-Improving System Research (Greany & Higham, forthcoming) illustrates how the reduction in LA capacity since 2010 and the growth of school networks and partnerships has inhibited access to subject-specific expertise in England. In most instances, the case studies reveal only limited LA support for subject networks in England; where such support exists it is typically limited to short information briefing sessions. This has increased the need for schools to be more outward-looking in their approach to CPD.

There is evidence that some, but not all, teaching school alliances (TSAs) and bigger multi-academy trusts (MATs) in England are finding ways to address the emerging gaps in subject-specific CPD. Some of the highest performing MATs have invested heavily in subject-specific expertise in their core teams and provide significant CPD and support to teachers in subject areas. Furthermore, the use of subject leader networks was prevalent in the self-improving system case studies across phases and LA areas. However, there were wide variations in the strength and inclusiveness of these networks. Such networks were most common among English, maths and science leaders, and there were examples of individual subject leaders who had a degree of ownership over, and in some cases instigated the creation of, subject networks. In Wales, regional clusters are, to some extent replacing LA support especially with regard to maths, science and increasingly, the arts. In Scotland the prioritisation of inter-disciplinary capabilities is thought to have slowed the uptake of subject-specific CPD.

There is also evidence about the importance of managing the workload of CPD participants in relation to provision and demand. For example, secondary analysis of TALIS 2013 data by the Education Policy Institute indicates that teachers in England face higher workload demands than their peers in many other countries, making time to access CPD more difficult (Foster, 2017). School leaders can play a further role in helping to manage teacher workloads, which can be a significant barrier to participation in all forms of CPD.

Comparison with high performing countries

The research team has drawn on the evidence about how provision and uptake of subject-specific CPD has been structured in high performing systems elsewhere in the world. The systems explored in greatest depth in this element of the work were Singapore, Ontario, British Columbia, Japan and China at both national and regional levels (specifically Hong Kong and Shanghai).

With the growth of subject leads and specialist leaders of education (SLEs) in the UK, we can see emerging structures to support subject-specific CPD. However, these fall a long way short of the approaches of high performing systems in:

- establishing clear career pathways for subject experts;
- promoting collaborative enquiry which focuses on developing subject expertise; and
- centralising CPD with a significant volume of subject-specific content.

Comparison with wider research evidence

Research has identified areas where current CPD activities are moving towards but not yet attaining the potential identified in *Developing Great Teaching*. In particular there is a need to increase:

- the extent to which CPD involves sustained exploration of new approaches in subject contexts;
- the extent to which CPD involves external subject specialists, and clarity about the role of subject leads;
- the amount of time allocated to CPD and how it is structured; and
- structured peer-to-peer support to embed new approaches in specific schemes of learning and lesson planning (and therefore subjects).

Need

The major issues which define the perceived needs for subject-specific CPD in the UK include:

- the existing levels of subject expertise in the workforce, which result from historic and ongoing patterns of teacher supply, retention and development (DfE, 2016a);
- changes in national curricula and assessment, as well as wider understanding of how subject disciplines are changing and developing; and
- at school level, differences between perceptions of needs by school leaders and teachers, between primary and secondary schools, and between schools in different contexts.

CPD needs in primary and secondary contexts

There are clear differences in need between primary and secondary schools, driven by the nature of the generic primary teacher workforce and the specialist secondary one. This is reinforced by the emphasis in the primary curriculum on a narrower focus on literacy and numeracy, even in comparison to science. The Wellcome-commissioned 'State of the Nation' report on UK primary science education revealed that whilst 80% of teachers surveyed rated English and maths as "very important", only 30% rated science as "very important" (Leonardi et al, 2017). Equally, whilst 91% of UK schools had a science lead and 60% had science-specific areas in their school development plan, only 37% of schools had an allocated budget for CPD in science and 30% of teachers reported that they "had not received any support for science teaching in the last year" from their school. This figure was lower for Scotland (19%) than for the other UK countries.

Secondary teachers are also more likely than their primary peers to say they would like more subject-specific CPD. The NFER Annual Teacher Omnibus Survey conducted in 2017 identified that primary school teachers in

"In all nine case study schools, there were extensive examples of school leaders using performance review to identify CPD needs, at both primary and secondary level. Good and outstanding secondary schools and the larger, good and outstanding primary schools offered more systematic examples of linking review targets with ongoing monitoring and CPD through activities such as coaching. For example, in one school, the review element comprised formal observations, followed by an interim review carried out by SLT, sub-groups of teachers with shared CPD goals and heads of department" – vignette from

England were most likely to participate in mathematics and literacy-focused CPDL, with very low rates reporting participation in subject-specific CPDL for non-core subjects such as modern foreign languages, art or design & technology. This contrasts with a much broader spread of subject foci in CPDL at secondary level.

Identifying need

A number of schools, especially those struggling in terms of pupil outcomes and inspection results, are directed to see developing the quality of teaching and learning as a top priority. In these schools, the focus is largely on addressing under-performance or developing missing pedagogic skills, for example in relation to classroom management, as well as wider strategies such as those relating to assessment and marking. In our case study schools (where we were able to explore this issue in depth), the development of the curriculum with its consequences for subject-specific CPD is often seen as something of a luxury, in the face of a need to respond to core examination and assessment requirements (Cordingley et al, 2016).

The CUREE case studies illustrate that some proactive schools work hard to assess needs and to balance whole school, departmental and individual needs. Enabling teacher choice and providing a range of activities/foci for CPD are two linked strategies for balancing individual and whole school CPD needs.

- The level of control that teachers had over their individual CPD activities varied across the case study schools and across phases, but a general pattern was that teachers had less control in lower performing schools. Most participating teachers (60% of 154 teachers at primary level and 70% of 667 teachers at secondary level) indicated having some level of choice over their CPD activities. Approximately one quarter reported having a larger amount of choice, having chosen three or more of their five most recent CPD activities.
- The case study schools achieving good or better in OfSTED assessments used multiple sources of evidence and clear processes to identify individual needs. For example, one school employed a strategic combination of structured cross-school experience teams, departmental development groups and research and development groups to involve colleagues in identifying and taking forward their own learning. Staff were able to choose the focus of the cross-school experience teams they chose, and opt into research and development groups. The departmental groups then tested and applied the learning from these cross-school groups for their own subjects, differentiating for sub-groups of teachers.
- Whilst the case study secondary schools which were weaker in their CPD offer did use mechanisms for identifying individual and whole school needs, these were not always well-aligned with each other. In the weaker primary schools, we found fewer illustrations of systems for identifying individual or school needs and, as a result, fewer ways of aligning the two.

“In one case study school CPD activities included the use of tools, such as Coaching & Learning Threes. These enabled colleagues to explore problems and solutions for improving practice and enhance student learning within a subject-specific environment” – vignette from CUREE case study

The need for subject-specific CPD and the related expectations of teachers and school leaders are inevitably conditioned by their experiences. The level of subject-specific CPD provision in the UK is low relative to high performing countries, which may mean that expectations in the UK are relatively low by international standards. Where subject-specific CPD is provided externally, school-based and provider interviewees frequently remarked that it is often

dislocated from other, more embedded CPD in school, and that expectations of its ability to align with school development plans, or result in significant academic progress for pupils, are low. Where

such low expectations prevail, teachers and leaders often fail to make a strong connection between externally provided, subject-specific CPD and school improvement. In the TDF programme, expectations about what subject-specific CPD in the arts could achieve for pupil engagement and wellbeing were often high; it was in the area of accelerating academic progress that expectations were less clear (Cordingley et al, 2017).

The evidence from interviews for this study suggests that there is also pressure in some schools for quick fix solutions; this was spoken about extensively and in considerable depth by two secondary school CPD leads, one of whom had a county wide development role for maths. They reported their brief as being to “fix the teacher’s problem”. This desire could also be observed among some schools in the TDF programme, sometimes resulting in teachers wanting the arts specialists to work directly with pupils or to work towards performances of self-contained projects. Where arts-based classroom techniques could be modelled and supported by in-depth skills development (e.g. in singing or rehearsal techniques, which lie beyond teachers’ usual repertoire) the projects found it easier to overcome the desire for a quick fix.

Policy

Schools and teachers interviewed for this study felt that their subject-specific CPD needs were high at the time of interview, due to recent changes to the National Curriculum and to GCSEs and A-levels in England. This fits with wider evidence that an increased need for CPD can be driven by such changes. Among the TDF projects, there was a widespread perception that the narrowing of the curriculum as a result of increasingly high stakes accountability structures in England, Wales and Scotland were making it harder for primary head teachers to give priority to subject-specific CPD in the arts – but also that many heads had a passion for this and many teachers can see the benefits for pupil engagement (Cordingley et al, 2017).

Whole school priorities driven by accountability systems inevitably influence CPD decisions. New challenges in society and new policy priorities, such as the ‘Prevent’ agenda, bring with them new CPD content to cover too. Schools, heads of department and phase and subject leaders do notionally have a role in defining priorities. However, we have not found evidence that this has led to a significantly increased focus on CPD in particular areas, where these are prioritised by a school. Nor have we found evidence of extensive personalisation to meet individual teachers’ CPD needs, except in the most successful primary or secondary schools. So, it seems these priorities are often superseded by priorities driven by accountability or government policy.

Recruitment and retention

Evidence indicates that significant number of teachers do not have a relevant post A-Level qualification in the subject they are teaching. For example, national statistics of the school workforce in England in 2016, published by the Department for Education in June 2017, showed that of teachers in state-funded secondary schools, 49.6% of ICT teachers, 37.3% of physics teachers, 25.1% of chemistry teachers, 24.9% of history teachers and 18.6% of English teachers did not have a relevant post A-Level qualification (DfE, 2017). Furthermore, many schools face challenges relating to the recruitment and retention of teachers, with some subjects (for example, physics) and schools (the most disadvantaged) facing particular difficulties.

Effective CPD environments have the potential to reduce staff turnover, which seems critical in the context of shortages in specialist teachers. Allen & Sims (2017) found that the odds of a science teacher who participated in the National Science Learning Network (NSLN) remaining in the profession was 29, meaning that for every one teacher who left, 29 did not. By comparison, for science teachers who did *not* participate in the NSLN, the odds of remaining in the profession was

around 11, meaning that for every one teacher who left, 11 did not⁵. In addition, there was a 4% reduction in the proportion of teachers from science departments leaving the profession where at least one of the department’s teachers had participated in NSLN. However, some caution is needed with these findings. As Allen & Sims note, the overall comparisons between NSLN participants and non-participants could be influenced by unobserved differences between teachers which make them more likely to stay in the profession, as well as to participate in the NSLN. The research did run further analyses comparing different departments within schools and the same departments over time following NSLN participation. By correcting for whole school differences such as resources or senior leadership effectiveness, these further analyses lend additional support for casual interpretation of the findings. The evidence stops short, however, of allowing firm conclusions about whether better retention was caused by CPD participation, or is merely related to it, and caused by another factor.

Demand and barriers

The review revealed high levels of demand for subject-specific CPD among teachers. The NFER Survey in 2017 found that 75% of surveyed staff in England wanted more opportunities to participate in subject-specific CPD. Class teachers are notably more likely to say they want more subject specific CPD than senior leaders. Teachers consistently rate the impact of subject-specific CPD higher than generic CPD. The responses are detailed in the table below:

Given the opportunity would you like more externally provided CPD that is subject-specific?									
	All			Primary			Secondary		
	All	Senior leaders	Class teachers	All	Senior leaders	Class teachers	All	Senior leaders	Class teachers
Yes	75%	61%	81%	69%	62%	73%	80%	57%	87%
No	14%	24%	9%	15%	22%	11%	12%	30%	7%
Not sure	12%	15%	10%	16%	16%	15%	7%	13%	6%

There is a range of barriers which can influence demand:

- Resourcing – school CPD budgets are widely felt to be insufficient to purchase subject-specific CPD, and/or cover staff release to attend it. Therefore, externally funded provision helps promote demand, although it does not resolve the challenges, owing to the financial and opportunity cost of teacher release, which is frequently thought to be greater than the fees for external provision.
- Provision – the availability of subject-specific CPD and expertise to lead it are both finite resources with limits on their capacity, so unsurprisingly, approaches that help to build subject expertise at the same time as supporting generic teacher development are particularly valued but even scarcer.
- Time – teachers often feel CPD is a luxury in which they don’t have the time to indulge, in the context of other demands they have to contend with, such as marking. In schools that have

⁵ Expressed as a percentage, this means that the odds of a science teacher who participated in the NSLN leaving the profession was 3.3%, compared to 8.3% for science teachers who did *not* participate.

managed to integrate high quality CPD which is specifically contextualised for subjects and where subject expertise is highly prized, curriculum development and CPD are aligned in ways that overcome these challenges.

- Distractions – the drive to ever-greater high stakes accountability, and/or other statutory organisational requirements (e.g. with regards to safeguarding) can take the focus away from the development of content knowledge.
- Depth – the evidence of a need for in-depth, extended engagement over time with subject-specific CPD content can be off-putting for teachers who desire a quick fix solution to a problem, so they can move on to deal with the next one.
- Focus on pedagogy – there is a considerable sub-group of leaders and teachers, usually those working in challenging environments and vulnerable schools, who see developing the quality of teaching and learning as separate from, and more urgent than, developing subject-specific CPD.

Of these areas, resourcing emerged consistently as the single largest issue restricting demand for subject-specific CPD. There was also evidence that many schools in the UK lack a clear concept of how subject knowledge can be developed further. Further evidence showed that the lack of high expectations, quality assurance and provision of subject-specific CPD (and especially quality assurance thereof) contribute to an environment in which schools do not see subject-specific CPD as providing a good return on investment.

Comparison with high performing countries

Comparing the UK with international evidence, teachers in the 34 nations who participated in TALIS 2013 were around three times more likely to say they needed subject-related CPD than teachers in England⁶. By contrast, teachers in the other TALIS countries, and those in high performing countries, are just under twice as likely to say they needed generic CPD as teachers in England. While just under 50% of teachers in England had participated in curriculum-related CPD in the 12 months before TALIS, almost 90% of teachers in Shanghai and 80% of teachers in Singapore had done so.

“Each member of staff identifies up to three areas of training they are particularly interested in, as well as outlining the areas of expertise where they could support others” – vignette from CUREE case report

Comparison with the wider evidence

The wider evidence about effective CPD (Cordingley et al, 2015) demonstrates that it is important to recognise that CPD ‘wants’ are not necessarily the same as CPD ‘needs’. For example, there is evidence that high quality CPD can have the same impact on conscripts (teachers who are obliged to participate in CPD, by their heads of department or school leaders, or, at a higher level, by national requirements) as on volunteers (teachers

participating in CPD of their own volition). Therefore, where teachers say they do not ‘want’ CPD, in general or in a particular (subject-specific) area, it does not necessarily follow that that they cannot benefit from it even where they do not recognise a need. Subject-specific CPD can (and arguably should) address these unrecognised needs by, for example, raising teachers’ expectations of pupils’ potential in a subject.

⁶ The participating nations were as follows: Abu-Dhabi, Alberta (Canada), Australia, Brazil, Bulgaria, Chile, Croatia, Czech Republic, Denmark, England, Estonia, Finland, Flanders (Belgium), France, Iceland, Israel, Italy, Japan, Korea, Latvia, Malaysia, Mexico, Netherlands, Norway, Poland, Portugal, Romania, Shanghai (China), Singapore, Slovak-Republic, Spain, Sweden, United States.

Provision

External provision is shaped most of all by the providers responsible for it. However, these individuals/organisations also have to take into account demand and expectations, and the resources that schools can bring.

One example of a major supplier of subject-specific CPD in the UK is STEM Learning, which offers a range of support to enhance the teaching and learning of STEM subjects. This includes the STEM ENTHUSE Partnership Programme (EPP), which develops school links with businesses, providers and other schools to build subject knowledge and awareness of possible careers. Another example of a supplier is the National Centre for Excellence in the Teaching of Mathematics (NCETM), which manage the Maths Hub programme. This is a collaborative national network of 35 hubs led by OfSTED-graded outstanding schools to support career-long professional development, including 'Teaching for mastery' and 'Leadership development'.

Interestingly the research team found evidence that school-based providers are increasingly linked with larger networks, associations or other organisations in a way which affects the content and quality of CPD which they supply. The case studies reveal growing engagement between many schools and external organisations such as Read Write Inc., Big Maths, and the Centre for Literacy in Primary Education's 'The Power of Reading' programme. In some instances these shared projects also sparked broader partnerships. This is often but not always by expanding the range of subject-specific CPD offered.

There are clearly definitional issues about what does and does not count as subject-specific CPD in the minds of practitioners. The most commonly cited examples of subject-specific CPD tended to be linked to changes in national examinations, and whilst some see this as subject-specific CPD, other interviewees distinguished this activity by describing it as "subject-specific briefing" i.e. the imparting of information about changes without support for understanding their consequences for teaching in any depth. Findings from the STEM EPP evaluation indicated that secondary teachers tended to highlight the value of getting new ideas for activities and resources, and the improvements this had made to their teaching. Meanwhile at primary level, core subject knowledge, observing partnership colleagues and practical teaching ideas were more commonly emphasised.

It is important to take into account the internalisation of CPD within schools and the growing realisation amongst school leaders of the importance of CPD leadership. When coupled with increasing pressures to promote teaching as a research-informed profession, this generates some nuanced tensions around providing subject-specific CPD which is both current for practitioners' and schools' interests, and based on robust evidence. The evidence for the review reveals a number of ways in which these tensions can and quite often are being mitigated by:

- The widespread favouring of "**cascade**" models, through which schools can access external specialist expertise through a single participant bringing their learning to school, and sharing what they have learned with colleagues (through a range of less and more effective mechanisms). In doing so, they are hopefully building internal capacity, coherence and cost effectiveness. 64% of primary teachers and 75% of secondary teachers participating in the case study school surveys (n=154 primary, 667 secondary) reported having attended a session run by a colleague who had attended an external course. Teachers in both phases were more likely to have attended a cascaded session from a colleague who had attended an external course, than to have attended one themselves.
- Some providers anticipate the increasing push to adopt "cascade" models of CPD by supporting action planning, enquiry and follow-up collaboration during CPD and providing tools and resources the scaffold this. Others do not.

- **School networks** (both formal and informal) can bolster access to and support for specialist expertise as they expand by increasing networking between specialist teachers. However, possibilities do not always translate into realities, and some networks continue to focus purely on generic pedagogic CPD. In addition, there is a risk that the diversification of networks, and the voluntary nature of participation, can leave some schools isolated and introspective.
- The ways in which schools can and increasingly do take more ownership of the quality of the CPD which they both commission and supply. This is achieved by taking steps such as **combining internal and external expertise** to address school and practitioner needs. However, this too depends on schools understanding the value of external specialist expertise and what makes CPD effective.

Specialist arts expertise

The provision of specialist CPD, and specialist arts CPD in particular, varies significantly across the four home nations, as exemplified by the TDF pilot projects. In Scotland, there seemed to be more subject-specific specialists in the arts, especially compared with England and Wales. Where arts specialists did exist in all four countries, many did not have any recent experience of supporting in-depth subject-specific CPD. Enabling art, dance or music specialists to work effectively on a sustained basis with schools often depended on CPD for the specialists on how to support teacher learning and embed new knowledge from CPD in the curriculum. Arts specialists also did not necessarily have the skills in reflective practice to support teacher CPD effectively. The most powerful examples of embedding subject-specific CPD involved subject specialists working in partnership with colleagues who were expert in evidence-rich reflective CPD/teacher enquiry (Cordingley et al, 2017).

“Colleagues’ experiences of engaging with expertise via external courses were less rich, the bulk of them being limited to listening to a PowerPoint presentation and accessing their materials and resources. Yet it was external facilitators (alongside ‘more experienced colleagues’) that were identified as the group of specialists who helped practitioners understand why things did or did not work” – vignette from CUREE case study report

Comparison with high-performing countries

Many high-performing systems encourage teachers to follow career pathways that use subject expertise and enable access to external subject experts. Examples of this type of policy approach include:

- Singapore, and the existence of career progression tracks for teachers which are divorced from administrative leadership, such as Specialist and Master Teachers (Gopinathan et al, 2016);
- Ontario, with elementary specialist teachers, as well as Literacy and Numeracy Strategy specialist coaches (Campbell, 2014);
- Japan, and the lesson study programme offering a *koshi* (‘knowledgeable other’) role for subject experts (Fujii, 2016); and
- Shanghai, with subject expertise progression pathways (Jensen et al, 2016).

High-performing jurisdictions also frequently promote collaborative enquiry amongst teachers that is focused on developing subject expertise.

Opportunities for development in the UK

The research team have identified current policy initiatives from across the UK which have the potential to raise interest in and the provision of high-quality subject-specific CPD. These initiatives include:

- the development of new or revised national curricula and strategies to implement them in Wales and Scotland;
- the strengthening of focus on the curriculum by OfSTED in England; and
- increasing interest in research and evidence-informed practices and a growing awareness of the need for CPD to support and embed them, and a growing focus on quality CPD across the UK.

In addition, there are national initiatives including, in England:

- The DfE is currently making a £140m investment in CPD to support practice in disadvantaged communities through, for example, the Strategic School Improvement Fund (SSIF). This fund requires TSAs and MATs to develop sustainable approaches to CPD that meet the English Standards for CPD. The guidance for the Standards requires that school leaders “ensure teachers can adapt generic pedagogic practices for different subjects and contexts”. It also states that teachers should “expect to improve pedagogical knowledge *and* subject knowledge, or specialist knowledge (e.g. for special educational needs)”. This fund is likely to increase interest in subject specific CPD.
- The Education Endowment Foundation (EEF) is an independent charitable trust, endowed by the English government, whose purpose is to select, fund and evaluate high quality evaluations of interventions for which there is promising evidence, in order to enhance education for vulnerable pupils. The majority of the evaluations funded and evaluated involve significant elements of CPD and many have a strong subject focus. The EEF is supporting the development of the SSIF in order to encourage those applying to select interventions where there is promising evidence of likely success, and to ensure that evaluation is effectively designed into the implementation process.

Quality, content and impact: the evidence base

There is very little evidence of the impact of specific CPD programmes or whole school CPD approaches across the UK system. This partly reflects the challenges inherent in evaluating such a disparate landscape in which most CPD is bespoke and in-house. This also reflects the limited capacity in schools to undertake rigorous evaluations, and the difficulties faced by external providers in reaching into schools and classrooms.

The STEM EPP evaluation does illustrate differing identified impacts from primary and secondary teachers. For example, the most commonly raised area of improvement at primary level was a shift towards fostering rich scientific enquiry and a more practical approach to science. There was evidence about more fundamental changes in the culture in some schools, particularly in primary science. However, fundamental changes in teaching were less apparent for secondary teachers. In addition, links with industry were more commonly reported at secondary level, where both teachers and pupils had had industry placements.

Comparison with the wider evidence

The evidence from the review of systematic reviews shows that, in order to be effective, CPD *of any kind* needs to include:

- a focus on teachers’ aspirations for learners;
- access to specialist (usually external) content expertise;
- peer supported dialogue about how participants might apply new approaches in practice;
- exploration of assumptions and beliefs about the area of CPD focus;
- support for developing practice and theory side-by-side;
- modelling of professional learning by leaders;
- the development and use of tools to contextualise new approaches and ideas for subjects; and

- formative assessment to evaluate pupil progress and impact as a result of the new practices participants have introduced, linked to feedback and collective discussion.

Subject-specific CPD

The evidence from systematic reviews enabled the research team to make comparisons between subjects about the quality and impact of subject-specific CPD. Overall the reviews conclude that the quality of effective, subject-specific CPD across the core subjects of maths, science and English (there is insufficient evidence to draw conclusions about non-core subjects) was more similar than different. However, some specific, important but nuanced differences between effective CPD in different subjects do emerge relating to:

- how the subject content of CPD connects with the curriculum and pre-existing teacher knowledge;
- how new approaches and new subject/pedagogic content knowledge are supported through classroom materials for different subjects; and
- how CPD content reflects the values and nature of the subject discipline in question.

For example, the need to align instruction and follow-up support in CPD emerged as being key in all three subjects. However, there were nuanced distinctions in the order in which this took place.

- In effective **maths** CPDL, principles and theory were **taught explicitly** at the start to support **depth of thinking and learning**;
- in effective **science** CPDL, teachers **learned through experimenting with new materials** followed by activities to **transfer those materials into classroom practice**; and
- in effective **English** CPDL, new approaches were **introduced in principle** and followed by learning through the juxtaposition of a range of **readings about reading and comprehension**, direct **comprehension of challenging texts** and **challenges to assumptions about learners**.

In addition to the evidence summarised at the start of this section, one new review, ‘How Does Professional Development Improve Teaching?’ (Kennedy, 2016) examines experimental studies of CPD in core academic subjects carried out in K-12 general education in the United States. The review compares CPD programmes in relation to their focus on each of four core aspects of teaching practice (one of which is ‘portraying curricula content’, which most clearly correlates with subject-specific CPD) and by their approach to how the CPD is designed and facilitated. Overall, programmes that used prescription as a means of enforcing changes in teacher practices and those that introduced a new body of knowledge with little attention to how that knowledge could be applied in practice were less effective than those that supported teachers with strategies for application, or that enabled teachers to apply the learning through their own insights through, for example, research study groups. When programmes where the researchers controlled for the effectiveness of delivery, which focussed on content knowledge, were successful, the content was often subsumed under a broader goal, such as helping teachers learn how to expose student thinking.

Exploring the impact of CPD on a broader scale, the evidence indicates a range of positive outcomes from subject-specific CPD. Higher quality evidence, however, is restricted to nationally-funded evaluations or evaluations of large-scale programmes, including the very rigorous evaluations from EEF and more qualitative ones from, for example, STEM Learning and the TDF programme. The absence of good, fine-grained impact evidence for CPD programmes is not a UK-specific phenomenon.

There are a number of ways in which the quality and quantity of impact data can be improved, all of which provide opportunities for making the quality of CPD more visible as an issue to both schools and providers, and provide standards against which quality can be measured. They include:

- national CPD standards in all four UK nations, such as the Department for Education Standards for Teachers' Professional Development in England;
- the Welsh government's publication of a research-based National Framework for Mentoring and Coaching and associated professional standards; and
- the Scottish General Teaching Council's "Standard for Career-Long Professional Learning".

Case studies

The case studies analysed as part of this research provide detail about practice across phase, location, size and external inspection results – and about how these factors intersect with the CPD offer. This includes similarities and distinctions between primary and secondary schools. Most significantly, however, they provide an insight into a range of ways of tackling the day-to-day challenges of incorporating effective and subject-specific CPD in different contexts.

Key findings from the case studies are woven in throughout the report. However, examples of additional texture which the case studies provide include:

- details of the processes and mechanisms employed by schools to link and balance whole school and the staff needs and the ways in which these can be woven into day to day practice;
- examples of the kinds of specialist expertise accessed by schools, and the processes that schools find effective for doing so;
- examples of how learning is cascaded across schools; and
- examples of how schools are using networks and partnerships to fill the space left by the reduction of LA-provided CPD, including the use of self-directed subject leader networks.

Methodology

This study started with 10 questions relating to: a) effective subject-specific CPDL; b) the current state of subject-specific CPDL in the UK; and c) how the UK picture compares to the international context. This required sourcing and analysis of a range of data sources, spanning from rich interviews with practitioners to high-level systematic reviews of international evidence of effective CPDL.

Data sources

Targeted search of academic literature – During the initial stages of the study, we reused the search strings and inclusion criteria used during the DGT review to highlight more recent reviews that could supplement or challenge key DGT findings. This identified two reviews which were relevant to the present study. Whilst neither of these reviews met the DGT inclusion criteria, they both add interesting texture to the DGT findings and are discussed further below.

Interviews with school-based CPD Leaders (n=11) and CPD providers (n=6) – These were a key source of evidence for understanding the current UK CPDL landscape and provided detailed information about how CPDL is operationalised. Tailored semi-structured interview schedules for CPD leaders and CPD providers addressed relevant research questions. The list of potential interviewees was sourced through social media and organisational communication channels across the UK regions, and the professional networks established by the research team.

Datasets from research, government consultation and school improvement work - A large range of data sources were sourced and curated by the research team. The key data sources underpinning our analysis were sourced from:

- The *Developing Great Teaching* (Cordingley et al, 2015) review of systematic reviews
- Three new reviews:

- Basma & Savage, 'Teacher Professional Development and Student Literacy Growth: a Systematic Review and Meta-analysis' (2017)
- Goldsmith, Doerr, Lewis, 'Mathematics teachers' learning: A conceptual framework and synthesis of research' (2014)
- Kennedy, 'How Does Professional Development Improve Teaching?' (2016)
- Evidence submitted to the UK Government CPD Expert Group in 2015-2016
- The 'Self-improving School System' research project conducted by the Institute of Education (IOE) (Greany and Higham, in press)
- CUREE's current international comparative research with Educational International (EI) into teacher professionalism and development in seven nations, including Scotland (forthcoming)
- National Foundation for Education Research (NFER) Teacher Omnibus Survey Data, completed by at least 1000 primary and secondary school teachers from publicly-funded schools in England in 2017
- Evidence from studies commissioned by Wellcome
 - Allen & Sims, 'Improving Science Teacher Retention: Do National STEM Learning Network professional development courses keep science teachers in the classroom?' (2017)
 - Leonardi, Lamb, Howe & Choudhury, 'State of the nation' report of UK primary science education. Baseline research for the Wellcome Trust Primary Science Campaign (2017).
- National and international reviews and analyses of provision for the four UK home nations
- CUREE research into the effectiveness of school professional learning environments and approaches to school improvement and the resulting case studies (Cordingley & Bell, 2014)
- STEM Enthuse Partnerships Programme Evaluation conducted by CUREE in 2017⁷
- Evidence from the evaluation of 75 CPD providers for the Teacher Development Agency⁸
- Interview findings from teaching practitioners and CPD providers across the UK
- Evidence from PISA, TALIS, and TIMMS, as well as OECD reviews

Primary analysis

The analysis matched the data sources listed above to 10 research questions. These were allocated to research team members within CUREE and UCL IOE. Relevant evidence was identified and extracted against each of the research questions, maintaining references to the source and identifying the robustness and pertinence of the evidence concerned. Following analysis by data source, the research team brought together data from all applicable sources against each of the research questions. The evidence was then analysed to identify emergent themes which appear persistently across multiple data sets (contextualised by weight of evidence). All the available evidence was then organised by four overarching questions concerning effective subject-specific CPDL, how this is operationalised in the UK, how this compares to international evidence and the implications of the findings for the results.

Refinement of analysis

Following the identification of initial findings from the primary analysis, the research team conducted a **focus group** with representatives from educational practice, CPDL providers and policy experts (n=16). The focus group was drawn from the research team's professional networks, with the aim being to produce a group representing interests and knowledge of teachers' needs and design and provision of CPD. The group was exposed to preliminary conclusions and the team explored their reactions, with particular focus on a) plausibility and b) implications for practitioners and providers. From this point, the research team were in a position to refine the conclusions and conduct a small amount of targeted further analysis to identify illustrations for key study findings.

⁷ Available at: <https://www.stem.org.uk/resources/elibrary/resource/417168/enthuse-partnership-impact-report-2017>.

⁸ Available at: <http://www.curee.co.uk/publication/tda-evaluation-cpd-providers-national-cpd-database-reports>.

Background methodological material - Additional evidence from new reviews

The review by Goldsmith, Doerr and Lewis was considered too weak on impact to be included in an update of *Developing Great Teaching's* conclusions. The research review by Basma and Savage et al was considered sufficiently strong on impact, and was deemed to be a good review with a potentially valuable contribution to make to the evidence base. However, its conclusions were found to be problematic in this context. For example, a limitation of Basma and Savage is that it uses an average which is based on a small number of studies, and attempts to draw conclusions based on the between study variation. In addition they challenged Timperley et al. on the basis of what seems to be a misunderstanding about the Timperley's use of effect sizes. Finally they concluded that shorter CPD is more effective than longer CPD for reading but draw no conclusions about quality, even though the shorter courses were also the best quality programmes.

There is no rigorous international evidence about the effectiveness of virtual versus face-to-face CPDL. However, the emphasis on sensitive relationships and peer support suggest that virtual CPDL alone is unlikely to be effective. We did find one review with findings that highlighted the effectiveness of what the authors described as online CPD. However the review did not meet our inclusion criteria. In addition, the online CPD was in fact a process of supported engagement with videos of the participating teachers' developing practice. The broader evidence about key components of effective CPD suggest that it was the iterative engagement with videos of emerging practice rather than the online nesting that was the key variable. Our conclusion is that the reviews synthesised in *Developing Great Teaching* remain a good guide to the evidence about effective CPDL. However, Basma and Savage, and Goldsmith, Doerr and Lewis, provide helpful additional context.

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Appendix A: Glossary of key terms

Core conceptual terms for this report

Continuing Professional Development (CPD): The sustained support offered to teachers to develop their skills, knowledge and experience, beyond their initial teacher training.

Continuing Professional Development and Learning (CPDL): The processes and activities teachers undertake as they participate in and respond to CPD.

Effective CPD: A process involving support for professional learning that includes sustained, iterative, aligned combinations of evidence-rich activities focussed around evidence about how pupils respond to the changes teachers are making. These activities should then be focussed on or contextualised for subjects, and help teachers to review and refine their beliefs, knowledge and skills in ways which address their aspirations for their pupils' learning.

Evidence-rich: In relation to CPD, activities focussed around evidence about how pupils respond to the changes teachers are making.

Subject-specific CPD: Programmes and activities focused on updating and enhancing teachers' understanding of their own subject areas and how to teach them or on developing a teacher's ability in a subject in which they are less confident but may be expected to teach. This includes CPD with an exclusive focus on specific areas of subject content and associated pedagogic content knowledge, as well as the development of teaching and learning in ways that are contextualised for specific subjects.

Generic pedagogic CPD: Activities and programmes designed to enhance teachers' knowledge and skills in relation to aspects of pedagogy that are not specific to a curriculum subject area.

Pedagogy: The discipline that deals with the theory and practice of teaching. Pedagogy informs teaching strategies, teacher actions, and teacher judgments and decisions by taking into consideration theories of learning, understandings of students and their needs, and the backgrounds and interests of individual students.

CPD Uptake: The action of making use of support for professional learning that is available and/or the pattern of use made of CPD that is offered.

CPD Provision: The range of support for professional learning made available.

CPD Demand: The quantity of CPD supply that people are willing or able to buy and/or participate in given the costs and resource requirements involved.

CPD Landscape: The observable features of CPD demand, provision and uptake in a given area.

Drivers: The incentives which encourage action or change in relation to CPD, which might be direct (for example, legislation, resource allocation) or indirect (for example, accountability measures).

Barriers: The obstacles that suppress take up and/or demand for subject specific CPD and CPDL.

Broader glossary

Core subjects: The subjects identified by governments and accountability and assessment regimes as being central to the curriculum. There are differences in what this refers to across the four home nations.

Inter-disciplinary learning: Learning that relates to more than one branch of knowledge or subject.

Teaching School Alliance (TSA): A group of schools led by a designated Teaching School with recognition and modest funds for providing CPD to educators within and also beyond the Alliance.

Multi Academy Trust: A group of academy schools that sits under a single governing board, which operates as a single charity and company.

School leader: This term incorporates any member who holds a leadership position within a school.

Specialist Leader in Education (SLE): A designation made by individual TSAs to individual school-based leaders based on nationally-developed criteria as well as perceptions of local needs and strengths.

Senior [school] leader: A senior leader or member of the senior leadership team (SLT) in a school refers to members of staff with key operational responsibilities for whole school development. This includes the head teacher, deputy head teacher, and any assistant head teachers.

Middle [school] leader: This term refers to a member of staff who holds a leadership position within a school, but does not hold leadership responsibilities at a whole school level. This includes (but is not exclusive to) heads of department or phase, CPD leaders or leaders for specific areas such as special educational needs.

Specialist CPD: This refers to programmes and activities that seek to develop specialist approaches to teaching on learning by drawing on a particular body of expertise. This may be linked to, but is not the same as, subject expertise. For example, specialist CPD in oracy would be linked to, but is not the same as, subject expertise in literacy or English.

Specialist expertise: This term is often understood differently at primary and secondary level.

- In secondary schools, specialist expertise is often, but not always, subject-specific; it might also, for example, focus on special needs or meta-cognition.
- In primary schools, specialist expertise often includes maths and English for older pupils, but frequently relates to threshold numeracy or literacy skills, including phonics for teachers of younger pupils. For teachers of very young pupils, subject related CPD in, for example, reading readiness frequently also relates to child development.

Cascade model: This refers to a method where schools access external specialist expertise through an individual from the school participating in CPD, and sharing what they have learned with colleagues.

Action planning: Action planning means creating a document which lists the steps to be taken in order to achieve a specific goal. The purpose of this is to clarify what resources are needed and formulate a timeline.

Enquiry: Enquiry-based learning is a form of active learning which focuses on posing questions, problems or scenarios – rather than simply presenting facts or working your way through pre-defined steps to complete a task.

Appendix B: Glossary of acronyms

CPD: Continuing Professional Development

CPDL: Continuing Professional Development and Learning

DfE: Department for Education (England)

EBacc: English Baccalaureate, a school performance measure introduced by the English government in 2010

EEF: Education Endowment Foundation

HEI: Higher Education Institute

IFT: Institute for Teaching

LA: Local Authority

MAT: Multi-Academy Trust

NCETM: National Centre for Excellence in the Teaching of Mathematics

NFER: National Foundation for Educational Research

NSLN: National Science Learning Network

OECD: The Organisation for Economic Co-operation and Development

OfSTED: The Office for Standards in Education, Children's Services and Skills

PISA: Programme for International Student Assessment

SLE: Specialist leader in education

SSIF: Strategic School Improvement Fund

STEM: Science, technology, engineering and mathematics

N.B. Instances of STEM Learning refer to the name of the organisation, which is drawn from the acronym

TALIS: Teaching and Learning International Survey

TDF [programme/project]: Paul Hamlyn Foundation Teacher Development Fund

TIMSS: Trends in International Mathematics and Science Study

TSA: Teaching School Alliance

CUREE: Centre for the Use of Research of Evidence in Education

[UCL] IOE: University College London, Institute of Education

Appendix C: Illustrating practice on the ground

Overview

Schools are the most significant mechanism for determining the provision and uptake of subject-specific CPD, but there are clear differences between primary and secondary schools which affect what is possible and what happens in practice. In England and Wales, schools themselves are also increasingly working in partnership with other schools – for example in regional clusters in Wales, and in TSAs in England. Where there is an overarching single governing body, as in MATs, this partnership can be very close, although the extent to which MATs adopt a standardised approach to CPD across all member schools varies. The quality of the school and the CPD offer are additional factors that significantly shape what happens on the ground.

In this section, we consider:

- school-level decision making about access to subject-specific and generic CPD in primary and secondary schools;
- how individual and whole school CPD needs are identified and balanced in primary and secondary schools;
- the relative emphasis given to pedagogy, subject knowledge and specialist expertise in CPD in primary and secondary schools;
- how knowledge from external CPD and subject specialists is cascaded in primary and secondary schools;
- in-school mechanisms and processes which shape the take up of CPD in primary and secondary schools; and
- the ways in which shared governance and wider partnerships between schools can affect access to subject-specific CPD.

To illustrate the above, we have analysed readily available, in-depth qualitative and quantitative evidence from CUREE case study reports of research into the nature and structure of the professional learning environment of nine primary and secondary schools in England. These schools were a self-electing sub group of the larger set of 50 schools which have participated in this research. The sub group was chosen to illustrate the range of practice across rural and urban settings, in a mix of sizes, and includes schools with both stronger and weaker CPD offers. Alongside this qualitative evidence we have also summarised evidence from surveys of teachers in these schools and 12 others, to help us explore teachers' perceptions of the effects of these mechanisms on their CPD. In addition, for the final section, the data are drawn from 47 detailed school case studies developed as part of the wider self-improving school system research project. The 47 cases were drawn from four localities and represent a broad range of primary and secondary schools.

A selection of illustrations from the case studies can be found in Appendix D.

How do schools make decisions about teachers' participation in generic and subject-specific CPD?

The wider evidence shows school leaders' contributions to CPD to be a significant factor in its success (Robinson et al, 2008). Leaders - including middle leaders, heads of departments and senior leaders - play a key role in enabling staff to participate in CPD and to implement what they learn from it, creating the necessary conditions for effective subject-specific CPD to flourish.

In all the nine case study schools, there were extensive examples of the use of performance review as a key mechanism for identifying CPD needs at both primary and secondary level. Good and outstanding secondary schools and the larger, good and outstanding primary schools offered more systematic examples of linking review targets with ongoing monitoring and CPD through activities

such as coaching. For example, the report for one school described the strong links between performance review, the school improvement plan and a subtle and differentiated CPD offer which helped colleagues tease out similarities and differences between different subjects. The review element comprised formal observations, followed by an interim review carried out by SLT, sub groups of teachers with shared CPD goals and heads of department. The school CPD activities included the use of tools, such as Coaching & Learning Threes, to enable colleagues to explore problems and solutions for improving practice and enhance student learning within a subject-specific environment. In the secondary schools either graded as Requiring Improvement by OFSTED or in special measures, the structures for linking CPD with performance reviews and school improvement priorities, whilst also enabling subject-specific depth, were fewer and less systematic.

In primary schools, CPD was mainly led by SLT rather than a specific CPD lead. But in one primary school with a strong CPD offer, CPD decisions involved subject leaders as well as senior leaders. In another, very large, good primary school CPD leadership resembled the pattern in secondary schools, described above. There was a wide range of sophisticated CPD structures, opportunities and roles to enable rigorous analysis of whole school needs and priorities arising from performance review, alongside careful consideration of individual teachers' requests for CPD. This included a financial commitment to subsidising teachers studying for a Masters degree (of whom there were nine at the time of the report). By contrast, in a smaller primary school but one still strong in its CPD offer, the diagnostic systems for identifying CPD needs employed a wide range of evidence such as pupil assessment, pupil work and observations via video. In some ways this approach resembled those used in secondary schools but the link between this and the CPD offer was less structured and depended on the energy and contribution of individuals rather than established and sustainable systems approaches.

How are individual and whole school needs identified and balanced?

The level of control that teachers had over their individual CPD activities varied across the CUREE case study schools and across phases, but a general pattern is that teachers had less control in lower performing schools. The survey data collected as part of the case studies provide illustrations of this. Most participating teachers (60% at primary level and 70% at secondary) indicated having some level of choice over their CPD activities. Approximately one quarter reported having a larger amount of choice, having chosen three or more of their five most recent CPD activities at the time of the survey. Equally, between two thirds and three quarters of teachers had had at least one CPD activity identified for them by a member of SLT or a line manager, with primary schools more likely to limit individual choice. Teachers in higher performing schools (in OfSTED terms) reported higher levels of control over their CPD choices. For example, in the "Requires Improvement" and "Inadequate" schools, 49% of teachers had chosen none of their last five CPD activities (compared to 27% for "Good" or "Outstanding" schools), and only 16% had chosen the majority.

There was no single model for balancing individual and whole school needs, although considerable effort was put into trying to achieve such a balance. For example, the case study survey data indicated that in schools participating in this research, one third of secondary respondents, and three fifths of primary respondents, reported that the majority of their CPD activities targeted whole school priorities. However, a quarter of teachers had had all, or the vast majority, of their CPD specifically tailored to their individual needs

Enabling teacher choice and providing a range of activities/foci for CPD were two linked strategies for balancing individual and whole school CPD needs. The case study reports illustrate a number of different ways of accomplishing this. For example, some schools enabled choice through careful (sometimes very elaborate) matching of individual targets to the CPD offer. Others used personalised CPD approaches such as coaching and mentoring to ensure individual as well as school needs are met. A third sub-group used departmental or phase meetings to balance whole school

needs with the needs of sub-groups of teachers and, sometimes, for teachers individually. These schools also illustrated, in a minority of cases, attempts to balance individual and whole school needs by creating close links between CPD processes and teachers' aspirations for identified sub-groups of pupils. The more that schools embedded the focus of their CPD activities on sub-groups of pupils who were of concern to teachers, the easier it became for staff to see school and individual needs as complementing or balancing one another. In the schools that relied heavily on whole school INSET sessions, it was harder for staff to believe that their individual needs were being balanced with those of the school as a whole.

The case study schools which were strong in their CPD offer used multiple sources of evidence and clear processes to identify individual needs and to put them in the context of whole school priorities. For example, one school employed a strategic combination of structured cross-school experience teams, departmental development groups and research & development groups to involve colleagues in identifying and taking forward their own learning and connecting it with the development of colleagues in their department, in other subjects and for the school as a whole. Staff were able to choose the focus of the cross-school experience teams they chose, and opt into research & development groups: the departmental groups then tested and applied the learning from these cross-school groups for their own subjects, differentiating for sub-groups of teachers.

In the case study schools with weaker CPD offers there are fewer illustrations of mechanisms for balancing individual and whole school needs. There was also more distinction between primary and secondary schools. Whilst the weaker secondary schools used mechanisms for identifying individual and whole school needs, these were not always well-aligned with each other. In the weaker primary schools, we found fewer illustrations of systems for identifying individual or school needs and, as a result, fewer ways of aligning the two.

How does subject knowledge and specialist expertise intersect with CPD at whole school level?

The NFER survey conducted in 2017 identified that primary school teachers in England were most likely to participate in mathematics and literacy-focused CPDL, with very low rates reporting participation in subject-specific CPDL for non-core subjects such as Modern Foreign Languages, Art or Design & Technology. This contrasts with a much broader spread of subject foci in CPDL at secondary level.

In our nine case study schools, the source of specialist expertise for CPD at both primary and secondary level in England was seen as being increasingly internal. The schools which were strong in their CPD offer exemplified systematic structures for identifying, deploying and making use of internal specialist expertise. For example, in one school, the role of Advanced Skills Teacher (which the school maintained long after government support was removed) was considered to be of central importance. This school also used subject specialists as the key contributors to in-school CPD. There were other examples of secondary schools which were strong in their CPD offer contextualising the expertise from external (pedagogic or subject-specific) facilitators by, for example, asking participants to think about the implications of approaches highlighted within CPD for particular aspects of a subject, or for lesson planning.

For all the primary schools, there were a number of examples of bespoke use of literacy and maths consultants to support CPD, and of school networks being used to expand the pool of school-based subject specialist expertise. However, beyond literacy and numeracy, the illustrations were focused on pedagogy, or using the links with other schools to access direct, specialist teaching support. Another common way of accessing and using subject specific support exemplified in these schools

(primary and secondary) as a component of CPD was tapping into subject expertise through the use of pre-made resources, like those provided as part of the Numicon Mathematic CPD or the “Mystery” evidence sets used to support critical thinking in history. This was more commonly illustrated in the secondary schools (over 70% of teachers cite this as a frequent component of CPD) whilst only 30% of primary teachers identified this as a frequent aspect of CPD, although the primary teachers did say they would like more.

How is knowledge from external CPD brought into school from external specialists diffused/cascaded?

The findings from the *Developing Great Teaching* review suggest that external expertise is crucial in challenging orthodoxies, illustrating best practice from elsewhere and facilitating effective evaluation of the impact of CPD. Prioritising access to specialist and external expertise emerged as a key characteristic of schools that are exceptional in meeting the needs of vulnerable communities

“The school is unusual in the extent to which it engages with research so that senior leaders model an interest in evidence-informed expertise systemically [...]The extended senior leadership team also models the school’s commitment to ensuring that outstanding teachers with deep knowledge of curriculum areas sit at the heart of development” – vignette from CUREE case study report

(Cordingley and Bell 2014). Despite the increasing trend towards internal support for CPD, many schools are still engaging with external support. Of the teachers who participated in the case study surveys, approximately one third had attended external, subject-specific conferences either termly or annually. This was broadly similar in secondary schools and primary schools.

Our interview evidence and this illustrative data set suggest that schools are attempting to maximise the value of external expertise by asking those involved to “cascade” what they have learned to other colleagues. For example 64% of primary teachers and 75% of secondary teachers

participating in the case study school surveys reported having attended a session run by a colleague who had attended an external course. Teachers in both phases were more likely to have attended a cascaded session from a colleague who had attended an external course, than to have attended one.

How are these school processes and structures experienced by the teachers in them?

In many case study schools, specialist expertise and subject specific CPD were thought of as closely related. In comparing survey responses about the decision-making processes and structures for CPD in our case study schools, we can exemplify how the teachers experienced the way CPD was being operationalised in schools. Learning from more experienced colleagues was seen as the main source of specialist expertise in both primary and secondary case study schools. At primary level, this was closely followed by learning from SLT. Learning from SLT was also a very strong feature of the illustrations from “Requires Improvement” and “Inadequate” schools; this accounted in part for the prevalence of generic, rather than subject-specific, CPD, in these schools.

“Competing provision in some instances meant that judgments had to be made on which network(s) should be attended based on perceptions of relative quality” – SISS vignette

In two thirds of case study schools, working with colleagues from their department or phase featured as a core context for CPD. Working with colleagues from other departments or phases featured less frequently, but was still a common and valued example of how teachers saw

themselves learning. There were no distinct differences in the illustrations between how teachers at primary and secondary level were learning from colleagues' expertise.

How do networks and partnerships affect access to subject-specific CPD?

The evidence from the self-improving system research (Greany and Higham, in press) illustrates the ways in which changes across the wider school landscape in England – most significantly the reduction in local authority capacity and the growth of school to school networks and partnerships - affects access to subject-specific CPD. This landscape is varied, with different models and examples developing across different contexts; formal networks, informal collaboration, close links between two schools, external organisations, LAs and SLEs all play a role in one or more of the case studies.

The use of subject leader networks was prevalent in the illustrations across phases and local authority areas, but with wide variations in the strength and inclusiveness of these networks. These differences reflected the context of the school: for example, whether or not it was working within a TSA, a federation, a local school cluster and/or some other form of collaboration. Such networks were most common among English, maths and science leaders, and typically met on a termly basis. In these networks, there were examples of schools and individual subject leaders who had a degree of ownership over, and in some cases instigated the creation of, subject networks. For example, a secondary religious studies leader developed a network of ten subject leaders from schools across two LAs. This network was “intentionally informal” and focused on the sharing of experiences and best practice. Across these schools, there was an emphasis on sharing best practice as a driver for informal collaboration. This involved, for example, visits to other schools to observe practice and sharing resources. The benefits of seeing effective practice in action and being able to discuss this with those implementing it were viewed as influential considerations in building networks in general. In addition, a key contributor to this collaboration was seen by one principal as “not forced or defined by a system that demands collaboration, but a freer approach defined by interest and need”.

*“The benefits of seeing effective practice in action and being able to discuss this with those implementing it were influential considerations in building networks. In addition, a key contributor to this collaboration is seen by the principal to be that it is not forced or defined by a system that demands collaboration, but a freer approach defined by interest and need: It's not like 'you will work this way. You will support each other this way.' It's literally a case by case basis” –
SISS vignette*

In most instances, the self-improving system case studies reveal only limited LA support for subject networks in England and where such support exists it is typically limited to half-day information dissemination sessions. There were, though, illustrations of schools supporting LA-provided CPD as part of a wider strategic approach. For example, a maths SLE in one primary teaching school met regularly with the LA's maths leader, and the pattern of LA-wide maths CPD training was agreed between them.

The reduction in LA provision since 2010 seems to have increased the need for schools to become more outward looking in their approach to CPD and school improvement more generally. The case studies reveal growing engagement between many schools coupled with the use of external organisations such as Read Write Inc.; Big Maths; and the Centre for Literacy in Primary Education's 'The Power of Reading' programme. In some instances these shared “projects” also sparked broader partnerships. However, the research also highlights that some school leaders identified challenges as

a result of the proliferation of external providers and curriculum packages in the CPD marketplace. Without any means of quality assuring this external provision, and in the context of reducing school budgets, some schools appear to be focussing internally rather than risk an external provider that might not offer value for money.

Appendix D: Case Study Illustrations

Illustrative case studies from CUREE SKEIN reports

School 1

Needs Analysis

The school has a tightly defined, well-structured and closely linked performance management and development process which reflects the school's ethos and aims; lesson observations and feedback sits at the heart of this.

The performance reviews explore a range of evidence from learning walks, mentor meeting notes, review meetings and lesson observations. Every year the conversations following lesson observations are based on 'What Works Well' (WWW) and 'Even Better If' (EBI) which enable staff to review their practice and discuss their individual development and training needs in the light of strengths and weaknesses. These formal observations and conversations followed by an interim review are carried out by members of the Senior Management Team (SMT) and the CPD group and Heads of Department and provide the basis for determining the whole CPD programme for the school. There is also a rhythm to monitoring, organised around 6 cycles a year, which enables more intense support for new colleagues and those needing extra support.

The staff's individual needs are constructed in detail and gradually through informal conversations and coaching and mentoring based on (inevitably subject specific) classroom practice as well as through reference to formal review conversations. Staff have ownership of the decisions they make about professional development and enjoy the freedom to choose, for example, the most appropriate twilight sessions to meet their needs. There is a professional progression ladder which facilitates a focus on career pathways as well as professional learning for classroom practice. Student voice exercises, for example through surveys, also contribute to evidence to identify further teaching development needs. In addition, a recent, greatly appreciated, formal CPD session focused in depth on a specific group of students at risk and pooled experiences and evidence about those students and their progress within and across subjects from across different departments and roles to build a collective picture of CPD priorities in meeting colleagues' aspirations for the group in focus.

The dynamic and mutually supportive culture that exists amongst colleagues and specific protocols and tools, such as Coaching and Learning threes, enable colleagues to explore problems and solutions for improving practice and enhancing students' learning within a subject specific, safe and non-judgmental environment

The school's strong performance management and review framework, which embraces all teaching and support staff, requires the staff to set targets and objectives against the five aims of the school and to identify the necessary professional development. The objectives are collated centrally to inform the school aims for improvement and the professional development programme which also includes nationally identified themes.

Use of specialist expertise

A key feature of the school's extensive commitment to professional learning is its investment in the identification, development and accreditation of specialist expertise. One colleague's comment sums up a view expressed by many: "When I want to know or do something better my first thought is 'Who can I learn from?'" The role of Advanced Skills Teacher, which the school has retained long after central funding and support was removed, is considered to be of central importance to the school, and is demonstrated in its commitment to continue the programme despite the national trend of decline.

Teachers at all levels are empowered through the school performance management structures to identify their own development needs and also seek the support they need both within and beyond the school. Moreover, there is no perceived hierarchy of expertise with staff feeling equally comfortable in approaching senior leaders or less experienced, but knowledgeable, colleagues.

Significantly the school does not see its status as a Leading Edge and Teaching School as a one-way relationship with the schools it supports; it recognises the expertise that exists in its partner schools. It is also open to learning from other schools, for example, SLEs in their outreach work will access new ideas and colleagues will look to see what they can learn from Challenge Partner schools.

Leadership

The CPD group plays a major role in planning and managing CPD. Membership of the group is sought after.

Staff believe, again correctly, that their commitment to modelling excellence in their teaching practice is noticed and their whole-hearted entry into the observation and feedback cycle is understood to attest to this. But, in general, staff see SLT leading CPD sessions and hunting for best practice as operating in an expert mode.

The SLT as a whole and the CPD group have an in depth knowledge of the research about effective CPD and have translated this into a series of coherent systems for providing and sustaining professional development and articulating it effectively with monitoring systems. The school has invested heavily in mentoring and coaching and Learning Threes so that CPD can be personalised. The set piece CPD twilight and whole day sessions are also carefully focused by SLT and the CPD group on issues emerging from the schools extensive and fine grained approach to monitoring quality and spotting and nurturing talent.

School 2

Needs analysis

The school undertakes in-depth diagnostic assessment of staff development needs and priorities through a number of mechanisms including performance management, staff voice meetings and observations of teaching and learning across the school.

Staff-voice meetings are held annually. During these meetings colleagues are encouraged to think about their practice and career development and specify their preferences, professional interests and priorities for the coming year. Each member of staff identifies up to three areas of training they are particularly interested in, as well as outlining the areas of expertise where they could support others. Colleagues are encouraged to be specific, to which many of them respond by indicating the degree of their prior knowledge and therefore the level of training required (e.g. 'further'). These data are then amalgamated across the school and the federation, as a whole.

Moreover the analysis of student performance and lesson observations present another way of identifying staff development needs. Observation data is used in the needs analysis process at the whole school level to define improvement priorities, at the departmental level (departmental reviews and needs analysis) and individual level (performance management).

The analysis of the student performance data is one of the key sources of identifying the school improvement priorities, which shape the CPD programme for staff. Colleagues have opportunities to explore and discuss student performance data and its implications for development e.g. during departmental meetings, subject leader and year manager meetings, etc.

The school works hard to strike a balance between whole school and individual staff needs. On the one hand, a number of formal CPD opportunities and numerous forms of on-going support from the Lead Learners are tightly focused on the school improvement priorities. In order to ensure relevance of the whole school CPD sessions, many of which explore areas of general pedagogy such as differentiation or assessment, the Lead Learners guided by the SLT, structures the training to allow for contextualisation in the department.

Use of specialist expertise

Staff voice interviews help to develop colleagues' awareness of their own strengths and areas of expertise as well as provide the school with an overview of existing and emerging specialist expertise. Moreover, linking the role of Lead Learners to the key areas of school development made the school leaders' commitment to recognising and developing specialist expertise explicit and visible to staff. Lead Learners are responsible for continually developing their knowledge and skills in their core area and supporting colleagues' development in it. Lead Learners' specialisms are made known to all staff via the CPD programme documents, and more recently via the school VLE.

Members of SLT identified knowledge of a particular specialist or provider, their reputation and their own and other local schools' prior engagement with them as some of the factors that would help them decide which external specialists to use. Other colleagues mentioned undertaking some online research to ensure that an 'expert' was a good choice amongst their approaches to sourcing and selecting external specialist expertise

HoDs and ASTs or other experienced colleagues from their curriculum area, Lead Learners, members of the SLT and (less frequently) external consultants and facilitators were mentioned amongst the people who provided staff with specialist expertise most frequently.

Colleagues highlighted a range of ways in which specialists helped them develop as professionals, including modelling, observation and feedback, joint planning, and teaching and discussion of relevant issues. These were particularly highlighted in relation to departmental practices, helping colleagues contextualise their knowledge.

Colleagues' experiences of engaging with expertise via external courses were less rich, the bulk of them being limited to listening to a PowerPoint presentation and accessing their materials and resources. Yet it was external facilitators (alongside 'more experienced colleagues') that were identified as the group of specialists who helped practitioners understand *why* things did or did not work. Several colleagues suggested that internal specialists need to be encouraged and supported to *challenge* staff more, and help them identify what they *don't* know (and what they don't know they don't know), which is crucial in the environment that places a lot of emphasis on professional learners' self-direction and voluntary involvement in CPD.

Leadership

Senior leaders are involved in staff professional development both directly, e.g. through strategic goal setting and programme design at a whole school level, participation in school-based training, and indirectly, e.g. through guidance and supervision they provide to the strong network of middle leaders existing within the school (lead learners, heads of department).

Many staff agreed that members of the SLT cascaded their learning after instances of external CPD or highlighted their experiences during staff CPD sessions.

There was evidence suggesting that CPD opportunities for staff in leadership positions tended to be less structured than those for e.g. teachers or support staff and therefore less visible to others and sometimes leaders themselves.

Additionally the school effectively and systematically investigates and gives priority to CPD in relation to planning, resourcing and contributing to the CPD on offer to its staff, and to colleagues in other schools that it supports. The school CPD programme is aligned with the key school development priorities.

The members of the SLT have in-depth understanding of many of the factors that make staff development effective which means they are able to prioritise the areas that are significant, such as e.g. detailed understanding of the staff development needs, supporting staff to be skilled professional learners and take control of their development through taking up voluntary CPD, development of internal specialist capacity, including the capacity to plan and deliver CPD. The school is planning to invest further in high-leverage CPD approaches such as the use of video and extending the use of enquiry and knowledge creation.

School 3

Needs analysis

The school's approach to professional development is driven by overarching school objectives including, for instance, action points emerging from OfSTED. These are linked to individual practitioner needs via the twice-yearly performance management (PM) cycle through which both PM targets and individual action plans (IAPs) are agreed.

The overarching priority for CPD emerges from this analysis, from OfSTED feedback and from analysis of research, and is currently the promotion of student independent learning. The IAPs point individual members of staff to the internal Professional Learning offer most appropriate to their individual needs.

Objectives set within the PM process also link staff and pupil learning by specifying the forms of evidence relevant to demonstrating progress which include, for example, observation, students' written work, performance data, and student feedback. Observation is extensively used but, for most of the school, this is confined to PM observations so that its formative use for connecting staff and pupil learning needs and progress during the learning process is less evident; although some peer observation was reported in two departments.

Other evidence suggests that staff understand, and are sympathetic to, the priorities embedded in the school's professional learning strategies; and survey responses suggest that many staff feel that they have a lot of choice about which PL activities they participate in. However, some staff feel that their individual professional learning needs were not being met because they could not relate them to the independent learning priority.

Use of specialist expertise

The school is unusual in the extent to which it engages with research so that senior leaders model an interest in evidence-informed expertise systemically. The Executive Head teacher very explicitly evaluates the level of expertise of external partners and contributors. The extended senior leadership team also models the school's commitment to ensuring that outstanding teachers with deep knowledge of curriculum areas sit at the heart of development.

Colleagues cite the speakers at conferences, heads of department, Advanced Skills teachers, LA advisers (in certain contexts), and the senior leadership team (which overlaps with heads of

department) as the specialist colleagues they use most frequently and find most useful. Some colleagues report extensive use of discussion on the web as another important source of expertise. The processes valued most highly for drawing down such expertise are coaching, observation and feedback, modelling, mentoring, reading, using resources made by others (including research resources), and team teaching.

Opportunities to work with others to draw down expertise include drawing on practice from other schools in the partnership, although this applies mostly to senior colleagues. The most frequent source of such expertise comes from more experienced colleagues within departments, followed by members of the SLT.

For more senior colleagues, specialist expertise can also be drawn down from the school's local partnership. Knowledge about expertise within the school arises from the school's extensive tracking system and about expertise across the partnership from the impressively shared planning and analysis mechanisms.

Many colleagues report a desire for access to more external perspectives whilst recognising that this needs to happen within the school e.g. during PLDs. Also, the focus on independent learning has reduced the opportunities for staff to contribute to each others' learning, and a number report a desire to contribute their own expertise to CPD and to learn from each other. On the other hand, the school rightly expresses concern that such contributions should themselves be genuinely specialist.

Leadership

PL needs are systematically identified through the PM processes and individual improvement targets are set to include PL elements.

The PL programme is informed by and structured around larger school priorities and targets (arising from the school development plan, OfSTED report etc.), for instance, students' independent learning. The school is an active participant in collaborations beyond the school, particularly with the Kingswood Partnership.

The school has identified and started to use some 'high leverage' approaches to PL (e.g. coaching, micro enquiry, peer observation and review) and has built these into the school's regular practices, although several staff commented that they felt this activity is, as yet, rather too infrequent for learning to be sustained in depth. Commitment in principle is weakening in practice under the burden of external challenges, notably financial ones.

Highlights from SISS CPD Vignettes

Formal networks

Schools' use of subject leader networks is prevalent across local authority areas. While local authority capacity has decreased, there is evidence of network meetings being held in maths, English and science, typically on a termly basis, although this varies according to LA and school phase. In some cases, these events enable LA personnel to disseminate any new initiatives or ideas as well as helps schools to share their best practice. In others, they are wholly school-led.

In one formal collaboration of secondary schools, member secondary schools have established subject networks in maths, English and science to replace those previously provided by the LA. Led by Heads of Department in one or more Network schools, the aim is for subject leaders and teachers from each school to meet half-termly to discuss developments in curriculum and pedagogy and deepen common priorities:

Other subject networks similarly reflect schools' contexts, so these existed within TSAs, within a federation, within clusters and within formal collaborations. For example:

- One case, a primary school, is involved in subject networks within its cluster of local schools, while a secondary school federation holds subject network meetings for its academies, hosted by SLEs, six times per term. In the primary phase, writing moderation is a key focus for cluster-based networks.
- In a large academy graded good in its latest OfSTED inspection, a religious studies leader proactively developed a network of ten leaders from schools across two LAs. The network focuses on sharing experiences and best practice; discussing matters relating to curriculum reforms and the different exam boards the member schools use. The agenda is set by the members and has an intentional informality. This leader considers that being within a small group environment of like-minded leaders aids sharing and openness: *For me, teaching is about collaboration.*

Whilst the development of networks to enable subject-specific development is seen as an asset, competing provision in some instances meant that judgments had to be made on which network(s) should be attended based on perceptions of relative quality. For example:

- One secondary academy serving a disadvantaged area in a large unitary authority and graded good by OfSTED, had the option to send its head of maths to three maths subject leader networks: the LA network; the MAT chain's network and a national network (PiXL). Its principal stated: *"[The MAT] has subject networks and it's very excited and keen on its subject networks. [The LA] has subject networks and it's very keen and excited in its subject networks. Something's got to give here. I can't have my head of maths out at a PiXL conference one week, a head of subjects' meeting for [the MAT] the next week, and a [City] head of subjects' meeting the following week. It's just ludicrously expensive. They get conflicting priorities and development things. They end up developing things for the group, rather than just for the school."*
- In a secondary school, graded good in its latest OfSTED inspection, a senior leader responsible for teaching and learning has instigated a network for others in the local area with the same area of responsibility. The rationale for this was that she recognised, through her own connections, that there was good practice in schools but no established forum for sharing this and learning from each other's expertise in the locality. The half-termly network meetings are hosted in turn by members' schools. In terms of impact, this leader considers that all schools have benefited, reporting back in meetings how practice shared has been implemented in their own schools and made a difference
- In one formal collaboration of 13 secondary schools, sharing of one another's effective practice to develop their own has become more established. For example, staff from one school have visited another's maths department to learn about the school's practices.
- A senior leader from one school said they felt that there was 'no comparison' between going on an LA-run course and working with other schools in the collaboration: *"It's not so much the mechanics of it, it's the mindset. It's 'how can we make this work for our children', rather than 'I've got to go on a course so someone can tell me how to do it.'"*

In some LAs, subject leaders sustained some of the networks previously run by the LAs so as not to lose this provision.

Informal collaboration

The increased emphasis on 'sharing best practice' can also facilitate the informal development of networking to support subject specific development and spark subsequent networking opportunities for schools that are particularly interested in what has been presented. Some schools believe that it has also accelerated improvements, either through the sharing of resources, or through having a

greater awareness of implementation pitfalls as well as recommendations so that leadership implications are appreciated more. Having such a network previously would, one leader considers, have saved her considerable time and effort as there would not have been such a need to *“reinvent the wheel.”*

Visits to observe practice in other schools are highly prized. The benefits of seeing effective practice in action and being able to discuss this with those implementing it were influential considerations in building networks. In addition, a key contributor to this collaboration is seen by the principal to be that it is not forced or defined by a system that demands collaboration, but a freer approach defined by interest and need: *“It's not like 'you will work this way. You will support each other this way.' It's literally a case by case basis.”*

The use of visits to develop practice is, in one primary Teaching School Alliance, in which all member schools were graded good or better by OfSTED, used more broadly. An INSET day was specifically used to enable all the subject leaders (as well as inclusion and early years' leaders) from its schools to visit others in the LA or neighbouring LA to explore outstanding practice. These leaders subsequently report back on their findings in a Teach Meet style.

Close links between two schools

In some cases, concentrated collaborative activity has been developed between two schools. For example, an inner-city secondary school graded outstanding by OfSTED has established close working relationships with another outstanding secondary school in a neighbouring LA. As part of their joint-working, heads of department are able to collaborate and learn from one another's practice. For example, the Modern Foreign Languages leaders spent a day in each other's schools observing every member of staff in the department; meeting to write up the notes to feedback to staff, and co-developing an action plan focused on improvement areas which the schools could subsequently collaborate. One head teacher commented: *“I think it's enabled both schools to explore contemporary issues in education and how we are managing that in a non-threatening, supportive forum.”*

Use of external organisations

Some schools use external organisations to support CPD. In secondary schools PiXL features in a number of cases while in primary schools these are largely those with specific programmes and associated training such as Read Write Inc, Big Maths and the Centre for Literacy in Primary Education's (CLPE) The Power of Reading programme. In one primary case, ARK is providing training for a maths leader and year team on maths mastery, both through centralised training and school-based CPD.

Use of LA for subject-specific training

While in most instances LA provision of CPD is limited, in some cases this is still offered to, and used by, schools. For example, an outstanding Teaching School in a unitary authority has drawn on CPD focused on reading recovery interventions and level 6 reading.

In maths, this Teaching School's SLE meets regularly with the LA's maths strategic leader so that a pattern of maths LA-wide training provision has been agreed between them. The SLE's provision focuses on delivering courses with groups of schools over a sustained period of time focused on subject knowledge, whereas the LA typically provides information dissemination half-day sessions.

SLEs providing CPD in maths

There are a number of examples of specialist leaders in education (SLEs) enabling subject specific CPD and school improvement support. For example:

- an SLE from a TSA was contracted by a school to provide extensive support due to maths being its priority improvement focus. The nature of this work has been to initially support the maths leader to determine the focus for training which was subsequently led by the SLE. This comprised two INSET days and 12 staff meetings, all focused on deepening subject knowledge, around 40 per cent of the school's CPD for the year. Subsequently, the SLE worked with the subject leader to consider how they would take the work forward so that it is embedded the following academic year.
- another SLE was carrying out drop-in observations and work scrutiny with the subject leader in another school to establish accuracy in their perception of the school's strengths and weaknesses in maths which lead to a CPD sessions focused on key areas identified, co-planning with every year team for an afternoon focusing on teachers making changes to their practice, related to subject knowledge, in light of the CPD session that will contribute to long-term school developments in practice, sending notes from each planning meeting to the subject leader identifying teachers' subject knowledge foci and planning a day to meet with the subject leader to consider how to share key learning about changes and build from these in the year ahead to strengthen whole school practices.

Wider points

1. The lack of LA provision has caused schools to look outward more. However, some school leaders identify that whilst there are a range of external providers and curriculum packages with associated training to select from, this proliferation brings with it challenges, for example, in assessing quality.
2. Overall, there is an emphasis on movement from external training to collaborative approaches – to working with and learning from other schools, rather than sending people on LA courses. This is also true of courses provided by other organisations, although this still does happen. It is important to think about the implications of this for subject-specific CPD, and whether it might lead to the prioritisation of particular subjects.
3. Networks are viewed as important, but these too have their associated challenges. For example, the proliferation of networks with professional bodies such as MATs, clusters/collaborations, TSAs, or external organisations, bring with them questions about which are best to attend, and who sets the agenda or has ownership over the network.
4. The extent to which subject-specific training is provided varies throughout the case study, although as this was not a specific focus for the research, it is not necessarily representative. In addition, in some cases, the references to CPD are not sufficient to develop into more in-depth case studies. However, the researchers have made a number of observations in relation to this, including in relation to accountability – as this drives the areas where schools focus, maths and English dominate the case studies. Examples of collaboration also have an emphasis on accountability in a number of cases. This therefore raises the question as to whether this reflects the full picture.

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